Project Manual

Underwood Creek Daylighting

Village of Elm Grove
Waukesha County, Wisconsin

January 2026

Stantec Project Number: 193806812

Stantec

SECTION 00 01 05

CERTIFICATIONS PAGE

I hereby certify that this specification was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the laws of the State of Wisconsin.

WISCONSIN
RICHARD J. KLEIN
E-33601
PORT WASHINGTON
WI
PROFESSIONAL ENGINEER

Klein, Richard
2025.12.30 15:22:34 -06'00'

Richard J. Klein, PE

Date: January 2026 Reg. No. E-33601

WISCONSIN
RICHARD S MCDANIEL
E-47641
GRANITE CITY
IL
PROFESSIONAL ENGINEER

Digitally signed by Richard McDaniel
Date: 2025.12.30 14:11:58-05'00'

Richard S. McDaniel, PE

Date: January 2026 Reg. No. E-47641

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SECTION 00 01 10

TABLE OF CONTENTS

UNDERWOOD CREEK DAYLIGHTING

VILLAGE OF ELM GROVE

WAUKESHA COUNTY, WISCONSIN

STANTEC PROJECT NO. 193806812

Division 00 – Procurement and Contracting Requirements

Introductory Information
00 01 05 Certifications Page
00 01 10 Table of Contents

Procurement Requirements
00 11 13 Advertisement for Bids
00 21 13 Instructions to Bidders
00 31 00 Available Project Information
00 41 10 Bid Form

Contracting Requirements
00 52 10 Agreement Form
00 61 13.13 Performance Bond
00 61 13.16 Payment Bond
00 72 05 General Conditions
00 73 01 Supplementary Conditions

Division 01 – General Requirements
01 10 00 Summary
01 20 00 Measurement and Payment
01 31 00 Project Management and Coordination
01 33 00 Submittal Procedures
01 50 00 Temporary Facilities and Controls
01 57 13 Temporary Erosion, Sediment, and Water Control
01 60 00 Product Requirements
01 70 00 Execution Requirements

Division 02 – Existing Conditions
02 41 13 Selective Site Demolition

Division 03 – Concrete
03 01 00 Maintenance of Concrete
03 11 00 Concrete Forming
03 15 00 Concrete Accessories
03 21 00 Reinforcement Bars
03 30 00 Cast-in-Place Concrete

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03 34 00 Low Density Concrete
03 60 00 Grouting

Division 05 – Metals
05 05 19 Post-Installed Concrete Anchors
05 50 00 Metal Fabrications

Division 07 – Thermal and Moisture Protection
07 92 13 Elastomeric Joint Sealants

Division 31 – Earthwork
31 23 00 Earthwork

Division 32 – Exterior Improvements
32 11 20 Subgrade Preparation
32 11 23 Aggregate Base
32 12 16 Hot Mix Asphalt Pavement
32 16 13 Concrete Sidewalk and Curbs and Gutters
32 17 23 Pavement Markings
32 34 00 Prefabricated Pedestrian Bridge
32 92 10 Seeding and Planting

Division 33 – Utilities
33 05 05 Trench Excavation and Backfill
33 12 12 Water Services
33 31 00 Sanitary Utility Sewer Piping
33 40 00 Storm Drainage Utilities

Division 35 – Waterway and Marine
35 42 10 Watercourse Channel Banks
35 43 60 Constructed Channel Materials
35 43 70 Toe Wood

Appendix A - GEOTECHNICAL BORING LOGS

Appendix B - PERMITS

DRAWINGS
Plan Set (Bound separately)

END OF SECTION

SECTION 00 11 13

ADVERTISEMENT FOR BIDS

Sealed Bids for the Construction of the Underwood Creek Daylighting will be received electronically, via Quest Construction Data Network, by the Village of Elm Grove, Wisconsin, the Owner, until 1:30 PM CT, January 27th, 2026, at which time they will be publicly opened.

Underwood Creek Daylighting

Work consists of:

- Demolition and abandonment of the existing Underwood Creek channel culvert and stream channel between Watertown Plank Road and Wall Street.
- New channel excavation and construction.
- Soil disposal.
- Concrete retaining wall construction.
- Quarry stone bank armoring.
- New road crossing culvert construction at Wall Street.
- Pedestrian bridge across the newly constructed channel.
- Storm sewer construction.
- Asphalt road and parking lot paving.
- Concrete curb and gutter and sidewalk construction.
- Landscaping and restoration of areas disturbed during construction.
- Maintenance of vegetation and plant items.

The bidding documents are available at www.QuestCDN.com. Reference Quest Number 9980160. To be considered a plan holder for bids, register with QuestCDN.com for a free Regular membership and download the bidding documents in digital form at a cost of $42.00. Downloading the documents and becoming a plan holder is recommended as plan holders receive automatic notice of addenda, other bid updates and access to vBid, online bidding via QuestCDN. Contact QuestCDN Client Success at 952-233-1632 Success@QuestCDN.com for assistance in membership registration, downloading digital bidding documents and vBid questions. Interested parties may view the contract documents at no cost prior to deciding to become a plan holder. To access the electronic bid form, download the digital bidding documents and click the 'Online Bid' button or Online Bidding 'Available' button on the bid posting page. Bids will ONLY be received and accepted through vBid via QuestCDN.com. Prospective bidders must be on the plan holder list through QuestCDN for bids to be accepted.

Requests for information should be uploaded via QuestCDN. Responses will be provided via QuestCDN.

The Owner may, in its sole discretion, deduct the vegetation maintenance work from the Contract, provided a separate Vegetation Maintenance Contract is executed between the Village and the Landscape and Vegetation Maintenance Contractor. Should this occur, related lump sum amounts in the Bid for Vegetation Maintenance shall be deducted from the Contract.

Contract Bid Security in the amount of five percent of the amount of the Bid must accompany each Bid in accordance with the Instructions to Bidders.

The Owner reserves the right to retain the deposits of the three lowest Bidders for a period not to exceed 60 days after the date and time set for the Opening of Bids. No Bids may be withdrawn for a

period of 60 days after the date and time set for the Opening of Bids.

The Owner reserves the right to reject any and all Bids, to waive irregularities and informalities therein, and further reserves the right to award the Contract to the best interests of the Owner.

Published by authority of the Village of Elm Grove, Wisconsin.

By:

Thomas Harrigan
Elm Grove Village Manager

Published: Tuesday, January 6, 2026

END OF SECTION

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SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - PROJECT

1.01 Sealed Bids are invited for UNDERWOOD CREEK DAYLIGHTING

1.02 Location: Elm Grove, Wisconsin.

1.03 Based upon Contract Documents prepared by:

Stantec
Richard J. Klein, PE

ARTICLE 2 – BID DELIVERY AND TIME DEADLINE

2.01 Electronic Bids are required. Bids shall be submitted electronically no later than the date and time indicated in the Advertisement for Bids.

2.02 The bidding documents are available at www.QuestCDN.com. Reference **Quest Number 9980160**. To be considered a plan holder for bids, register with QuestCDN.com for a free Regular membership and download the bidding documents in digital form at a cost of $42.00. Downloading the documents and becoming a plan holder is recommended as plan holder's receive automatic notice of addenda, other bid updates and access to vBid, online bidding via QuestCDN. Contact QuestCDN Client Success at 952-233-1632 Success@QuestCDN.com for assistance in membership registration, downloading digital bidding documents and vBid questions. Interested parties may view the contract documents at no cost prior to deciding to become a plan holder. To access the electronic bid form, download the digital bidding documents and click the 'Online Bid' button or Online Bidding 'Available' button on the bid posting page. Bids will ONLY be received and accepted through vBid via QuestCDN.com. Prospective bidders must be on the plan holder list through QuestCDN for bids to be accepted.

2.03 Bidder's Qualification

A. In order to determine the Bidder's responsibility, before a Contract will be awarded for the work contemplated herein, the Owner will conduct such investigation as is necessary to determine the performance record and ability of the apparent low Bidder to perform the size and type of work specified under this Contract.

B. The Bidder shall submit to the QuestCDN bidding site with their Bid the information listed below necessary for the Owner to evaluate the Bidder's qualifications.

1. List one to three projects undertaken within the last five years demonstrating the Bidder's experience with projects involving similar natural stream channel or similar stream bank or retaining wall construction. For each submitted project, include:

a. Project name, location, and description.

b. Project Owner name and contact information.

c. Project Designer/Engineer name and contact information.

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d. Contractor's role, names of Contractor's key personnel that worked on the Project.

e. Project construction value.

f. Project start and completion date.

2.04 All Bids must be submitted electronically using the Quest Construction Data Network (Quest CDN) by the time and in the manner prescribed. The online Bid must be completed and uploaded, and all addenda acknowledged.

2.05 All blank spaces on the Bid Form Signature and Sworn Statement provided by Quest CDN must be filled in, signed by the Bidder in the presence of a notary, **and uploaded to Quest CDN**.

2.06 A copy of the bid bond must be uploaded to the site.

A. The original of the bid bond must be provided to the Village after the bid opening but before the end of business on the second business day after the bid opening.

2.07 It is the responsibility of the Bidder to go to www.questcdn.com, check for the presence of Bidding Documents (including Addendum), and download documents as they become available. Bidder shall regularly check the QuestCDN for Addendum or other additions or revisions to the Bidding Documents through the Bid Opening date, whether or not Bidder has received email notice of Addendum from QuestCDN.

2.08 The bidder shall assume full responsibility for timely submittal of Bid.

2.09 Written, oral, or telephonic Bids are invalid and will not receive consideration.

ARTICLE 3 – APPLICABLE LAWS

3.01 The bidder shall become familiar with all laws, ordinances, regulations and Codes of Federal, State, Village and other local governmental agencies, which may in any manner affect the preparation of proposals or the performance of the Contract.

ARTICLE 4 - EXAMINATION OF DOCUMENTS AND PROJECT SITE

4.01 Complete sets of Bid Documents shall be used in preparing Bids. Neither the Owner nor the Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

4.02 Before submitting a Bid, bidders shall carefully examine the Contract Documents and existing conditions and limitations of the jobsite, to assure that all costs to complete the Project under the requirements of these Documents are included in the Bid. The submission of a proposal shall be accepted as prima fascia evidence that the Bidder has followed the instructions herein and the Bidder shall, therefore, be singularly responsible for any and all errors that may be included in the Proposal resulting from failure or neglect to comply with these instructions.

4.03 After the Bid Opening, no allowance will be made to any Bidder for any change in the scope or price of the Project due to items which would have been apparent by the Bidder's proper examination of the Documents and jobsite, during the bidding period.

4.04 Should Bidders, upon examination of Bid Documents and project site, discover discrepancies, omissions, or duplications in the Bid Documents, or questions of scope or intended quality, they shall immediately report in writing via e-mail to Stantec no later than five (5) business days prior

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to the date of Bid receipt to the following email address. Engineer will respond in one of two ways:

A. By issuing a written statement of explanation
B. By issuing an Addendum

Reports / requests should be addressed to:

Richard Klein, Stantec Project Manager
richard.klein@stantec.com

4.06 Neither Stantec nor the Village of Elm Grove shall be responsible for any oral interpretations.

ARTICLE 5 – PRE-BID MEETING

5.01 The Village will host a Pre-Bid Meeting on Thursday, January 15, 2026 at 1:30 p.m. at Elm Grove Village Hall (13600 Juneau Boulevard, Elm Grove, WI 53122) followed directly by a site tour to familiarize attendees with the project site. All bidders and vendors interested in this contract are encouraged to attend. Hard hats, safety glasses, safety shoes and safety vests are required for the site tour.

5.02 Attendance at the Pre-Bid Meeting is not mandatory.

ARTICLE 6 - ADDENDA

6.01 During the bidding, certain revisions to the Contract Documents may be initiated. These revisions shall be issued in writing, as Addenda, and will be numbered. Any and all Addenda shall be incorporated as part of the Documents and shall supersede all previous information in these Documents they affect.

6.02 Addenda will be made available only through the QuestCDN site.

6.04 No Addenda will be issued later than four (4) days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

6.05 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 7 – PREPARATION OF BID FORM

7.01 Bids shall be prepared and submitted online at www.questcdn.com. Refer to the instructions on the website for preparation of the bid form.

7.02 Bids submitted should contain taxes required by state law for construction services.

7.03 Subcontractor Listing: Each Bidder must list identify the Subcontractors they will use in the performance of the Work upon request of the Village of Elm Grove. Village of Elm Grove reserves the right to reject any subcontractor prior to award of contract. Failure to provide a listing of Subcontractors may result in failure to award the contract.

ARTICLE 8 - BID SECURITY

8.01 A Bid must be accompanied by Bid Security made payable to Village of Elm Grove in an amount of 5 percent of Bidder's maximum Bid price and in the form of a certified check, cashier's check, or a Bid Bond issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

8.02 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 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid Security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults. The Bid Security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Agreement or 61 days after the Bid Opening, whereupon Bid Security furnished by such Bidders will be returned.

8.03 In submitting a Bid, the Bidder understands and agrees that if his Bid is accepted, and if bidder fails to enter into an Agreement with the Owner, bidder shall forfeit his Bid Security paid to the Owner, not as a penalty, but as liquidated damages due to such failure.

8.04 Bid Security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within 7 days after the Bid Opening.

ARTICLE 9 – PERFORMANCE AND PAYMENT BONDS

9.01 Bidder shall furnish Performance and Payment Bonds for the full amount of the Contract within seven (7) days of Notification of Award for the Contract, if requested by the Owner.

9.02 Performance bond shall be written on EJCDC Form C-610, "Performance Bond." This form is included in the Project Manual.

9.03 Payment bond shall be written on EJCDC Form C-615, "Payment Bond." This form is included in the Project Manual.

9.04 The bond shall be with a surety or sureties with a rating of "A" or better by A.M. Best and Company and such sureties shall be approved by the Village of Elm Grove. Bonds in the form of certified or cashier's checks shall be made payable to the Village of Elm Grove. The Performance and Payment Bond shall be furnished in the same number of copies as the number of copies of the contract to be executed.

ARTICLE 10 – POST BID CONFERENCE

10.01 Bidder may be invited to an individual Post Bid Conference attended by the Village of Elm Grove, and the Engineer. The Post Bid Conference will allow the parties an opportunity to discuss concerns and negotiate elements of the Contract Documents, including the Contract Sum and Contract Time.

ARTICLE 11 – BASIS OF AWARD

11.01 Village of Elm Grove reserves the right to reject any or all Bids for any reason and to accept any one Bid deemed most favorable to the best interests of the Village of Elm Grove.

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11.02 The successful Bidder shall be required to enter into a Contract with the Village of Elm Grove, covering the entire work of the Bid, and must furnish to the Owner all bonds, certifications, insurance documents, and other requirements, within seven (7) days after issuance of a written Notice of Award of Contract or Letter of Intent by the Village of Elm Grove.

11.03 In determining the best Bidder, the Village of Elm Grove shall consider the following:

A. The Base Bid, Unit Prices, Contract Time and the costs for any required bonds or certificates. The Village of Elm Grove will not consider alternates at this time.

B. Competence of the firm and its staff to perform the required construction as indicated by the technical training, education and experience of the Contractors personnel and subcontractors who are assigned to perform the service.

C. Ability of the Contractor and his subcontractor's ability to deliver the product competently and on an appropriate schedule to meet the needs of the Village.

D. Prior experience of the Contractor and his selected subcontractors with comparable projects.

E. Past performance as demonstrated by evaluations from previous clients with respect to cost control, quality of work and meeting project schedules.

F. Ability to understand and protect the environmentally sensitive nature of the unique construction site.

G. Information which the Village of Elm Grove may obtain through independent investigation.

11.04 Competence of Subcontractors

A. Each Bidder is required to complete the form attached to the Bid Form listing intended subcontractors to be employed on the Project.

B. The competence and responsibility of all subcontractors shall be considered in awarding the Contract. If subcontractors are unknown or their competence is questioned, it is understood that such subcontractor shall file, upon request, evidence of facilities, equipment, experience, financial and other data and references for investigation and qualification.

C. The Village of Elm Grove reserves the right to reject any subcontractor, reserves the right to require the Contractor to provide an alternate subcontractor prior to consideration of bid and/or award of bid, and reserves the right to reject the bid of any Contractor for failure to provide competent subcontractors.

11.05 The successful Bidder must at the very least employ a working superintendent, who shall be responsible for all the Work performed on the Project and who shall be on the jobsite whenever work is being performed. Provide list of key individuals to be assigned to the Project. Include individual's role and time commitment to the Project.

ARTICLE 12 – CHANGES AND WITHDRAWAL OF BID

12.01 A Bidder may withdraw his bid and bid security at any time before the deadline set for Bid Opening, either personally or by written request. Withdrawn Bids may be resubmitted up to

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the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions.

12.02 No Bid may be withdrawn after the Bid Opening, unless the award of the Contract is delayed for a period exceeding ninety (90) days after the Bid Opening.

ARTICLE 13 – SUBSTANTIAL COMPLETION

13.01 The Agreement establishes project criteria and information concerning completion dates and milestones.

13.02 The Bidder will be required to include all required costs to meet the specified dates, including overtime, if necessary, in the Base Bid.

ARTICLE 14 – CONSTRUCTION PROGRESS AND SCHEDULE

14.01 Subject to the Village, State and Federal issuance of required permits, the Contractor shall be notified to start work by issuance of a written Notice to Proceed by the Village of Elm Grove. Work shall start within ten (10) calendar days after the issuance of a Notice to Proceed.

14.02 Prior to work start, a Pre-Construction Conference will be held.

14.03 All Work shall be completed within the time periods established in Article 4 of the Agreement.

14.04 A Construction Schedule shall be submitted in accordance with the requirements of these Contract Documents.

ARTICLE 15 - LIQUIDATED DAMAGES

15.01 Provisions for liquidated damages are set forth in the Agreement.

END OF SECTION

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SECTION 00 31 00

AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Documents that are available upon request to the Owner containing technical information that may be of interest to the Contractor.

1.02 SITE RELATED DOCUMENTS

A. These documents are for information only and are not considered Contract Documents.

B. Documents are available in PDF format only.

C. Bidders are responsible for their own interpretation, verification, and use of the information contained in these documents.

D. Available documents include:
   1. Geotechnical boring logs completed in the general vicinity of the project area between 2003 and 2005.
   2. Design plans for existing Watertown Plank Road Bridge.
   3. As-built drawings for existing water main in Wall Street.
   4. Draft environmental boring logs along the proposed channel alignment completed in 2024. Associated tabulated analytical data summary.

E. Contact Richard Klein, Stantec Project Manager, at richard.klein@stantec.com to request these documents.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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BIDDER: _____

DOCUMENT 00 41 10
BID FORM
Underwood Creek Daylighting
FILE NO. 193806812 Village
of Elm Grove, WI
2026

THIS BID IS SUBMITTED TO:

The Village of Elm Grove ellectronically through Quest vBid.

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

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

3.01 In submitting this Bid, Bidder represents that:

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

Addendum No.	Addendum Date

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at, or contiguous to, the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at, or contiguous to, the Site (except Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of Hazardous Environmental Conditions that have been identified in SC-4.06.

E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary 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 the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this 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.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

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H. Bidder has correlated 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.

I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

K. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

4.01 Bidder further represents that:

A. The prices in this Bid have been arrived at independently, without consultation, communication, or agreement as to any matters relating to such prices with any other Bidder or with any competitor for the purpose of restricting competition.

B. The prices in this Bid have not or will not be knowingly disclosed to any other Bidder or competitor prior to opening of the Bids.

C. No attempt has been made or will be made by the Bidder to induce any other person or firm to submit or not to submit a Bid for the purpose of restricting competition.

4.02 Bidder understands that the law may require the Owner, or Engineer at the Owner's direction, to undertake an investigation and submit an evaluation concerning Bidder's responsiveness, responsibility, and qualifications before awarding a contract. Bidder hereby waives any and all claims, of whatever nature, against Owner, Engineer and their employees and agents, which arise out of or relate to such investigation and evaluation, and statements made as a result thereof, except for statements that can be shown by clear and convincing evidence to be intentionally false and made with actual malice. Nothing in this paragraph is intended to restrict Bidder's rights to challenge a contract pursuant to law.

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

All specific cash allowances are included in the price(s) set forth below and have been computed in accordance with Paragraph 11.02 of the General Conditions.

Unit Prices have been computed in accordance with Paragraph 11.03.B of 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 provided, determined as provided in the Contract Documents.

6.01 Bidder agrees that the Work will be Substantially Completed and completed and ready for Final Payment in accordance with Paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

which shall be stated in the Agreement.

7.01 The following documents are attached to and made a condition of this Bid:

A. Required Bid Security in the form of 5 percent.

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

SUBMITTED on _____, 20__.

If Bidder Is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)

Doing business as: _____

Business Street Address (No P.O. Box #'s):
_____

_____

Phone No.: _____ Fax No.: _____

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A Partnership

Partnership Name: _____(SEAL)

By: _____
(Signature of general partner)

Name (typed or printed): _____

Business Street Address (No P.O. Box #'s):

_____

Phone No.: _____ Fax No.: _____

A Corporation

Corporation Name: _____(SEAL)
State of Incorporation: _____

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

By: _____
(Signature)

Name (typed or printed): _____

Title: _____

Attest _____ (CORPORATE SEAL)
(Signature of Corporate Secretary)

Business Street Address (No P.O. Box #'s):
_____

_____

Phone No.: _____ Fax No.: _____

A Joint Venture

Joint Venture Name: _____(SEAL)

By: _____
(Signature of joint venture partner)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone No.: _____ Fax No.: _____

Joint Venturer Name: _____(SEAL)

By: _____

(Signature)

Name (typed or printed): _____

Title: _____

Business Street Address (No P.O. Box #'s):
_____

_____

Phone No.: _____ Fax No.: _____

Phone and Fax Number, and Address for receipt of official communications:

_____

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

END OF DOCUMENT

BID WORKSHEET

The following worksheet is provided as a courtesy for drafting a bid. Bids must be entered and submitted electronically using the Quest Construction Data Network (Quest CDN). In the event of a discrepancy between this worksheet and the Quest CDN bid form, the Quest CDN bid form shall govern.

No.	Item	Units	Qty	Unit Price	Total
1	Mobilization, Demobilization, And Site Preparation	LS	1		
2	Lighting Removal and Reinstallation	LS	1		
3	Clearing and Grubbing	LS	1		
4	Asphalt Removal	SY	12000		
5	Concrete Sidewalk Removal	SY	50		
6	Curb and Gutter Removal	LF	700		
7	Railroad Bridge Removal	LS	1		
8	Culvert/Channel Complete Removal	LS	1		
9	Culvert/Channel Partial Removal	LS	1		
10	Culvert Bulkhead	LS	1		
11	Well Abandonment	EA	6		
12	Miscellaneous Demolition and Disposal	LS	1		
13	Cast-In-Place Retaining Wall (East)	LS	1		
14	Cast-In-Place Retaining Wall (West)	LS	1		
15	Excavation, Grading, and Disposal of Exempt Materials	LS	1		
16	Excavation, Grading, and Landfill Disposal of Non-Exempt Materials	LS	1		
17	Impervious Fill Layer of Soil Cap	CY	50		
18	Wall Street Roadway	SY	470		
19	Parking Lot Asphalt Paving	SY	9065		
20	East Path	SY	1070		
21	Concrete Curb and Gutter	LF	1115		
22	Concrete Sidewalk	SF	440		
23	Pedestrian Bridge - Structure	LS	1		
24	Pedestrian Bridge - Abutment	EA	2		
25	Topsoil	CY	2640		
26	Native Seeding – Zones A & B	SY	1850		
27	Native Seeding – Zone C	SY	5050		
28	Turf Seeding – Zone D	SY	3170		
29	Live Stakes (Dormant Woody Cuttings)	EA	2220		
30	Shrubs	EA	406		
31	Trees	EA	45		
32	Vegetation Maintenance	LS	1		
33	Storm Sewer Pipe RCP 12-Inch	LF	304		
34	Storm Sewer Pipe RCP 18-Inch	LF	198		
35	Storm Sewer Pipe RCP 24-Inch	LF	118		
36	Storm Sewer Pipe RCP 36-Inch	LF	302		

37	Storm Sewer Pipe HE RCP 34x53-Inch	LF	234		
38	34x53-Inch Concrete Apron Endwall	EA	1		
39	Storm Sewer Manhole 48-Inch	EA	7		
40	Storm Sewer Manhole 60-Inch	EA	3		
41	Storm Sewer Manhole 96-Inch	EA	1		
42	Storm Sewer Catch Basin 2'x3'	EA	1		
43	Remove and Replace Storm Casting	EA	1		
44	Wall Street Box Culvert	LS	1		
45	Quarry Stone Bank	TON	2280		
46	Riprap Quarry Stone Bank Transitions	TON	610		
47	Vegetated Riprap Bank	CY	40		
48	Heavy Riprap Energy Dissipator	TON	300		
49	Bank Protection	SY	1320		
50	Erosion Control Fabric	SY	5050		
51	Mulch	SY	3170		
52	Riffle Construction	CY	570		
53	Boulder Brush Run Construction	CY	370		
54	Glide Construction	CY	130		
55	Foundation Stabilization	CY	140		
56	Toe Wood	LF	415		
57	Sanitary Manhole 48 Inch	EA	1		
58	Sanitary Sewer Pipe PVC 21-Inch	LF	23		
				TOTAL BID	

SECTION 00 52 10

AGREEMENT FORM

THIS AGREEMENT is by and between Village of Elm Grove (hereinafter called Owner) and _____ (hereinafter called Contractor). Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: demolition and abandonment of the existing Underwood Creek channel culvert and stream channel between Watertown Plank Road and Wall Street; new channel excavation and construction; soil disposal; concrete retaining wall construction; quarry stone bank armoring; new road crossing culvert construction at Wall Street; pedestrian bridge; storm sewer construction; asphalt road and parking lot paving; concrete curb and gutter and sidewalk construction; landscaping and restoration of areas disturbed during construction; maintenance of vegetation and plant items.

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally referred to as follows: Underwood Creek Daylighting

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Stantec.

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

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

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

4.02 *Contract Times: Dates*

A. Contractor agrees to Commencement of Work within six months after the date the Owner issues the Notice to Proceed.

1. Commencement of Work is defined as the date on which the Contractor begins mobilizing construction equipment to the project site.

2. Contractor shall provide Owner written notification of the date corresponding to Commencement of Work a minimum of 10 days prior to mobilizing.

B. Contractor agrees to complete the construction, in all respects, such that it is ready for final payment in accordance with Paragraph 15.06 of the General Conditions, within 1,590 days (4.5 years) from the Commencement of Work.

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C. The time for completion of the Contract shall be 1,590 days (4.5 years) from the Commencement of Work. Two schedule milestones prior to completion of the Contract are identified below.

1. Milestone 1: Time for completion of the Contract, not including final seeding, planting or the 3-year post-construction vegetation maintenance, is 365 days (one year) from the Commencement of Work.

2. Milestone 2: Time for completion of the Contract, not including the 3-year post-construction vegetation maintenance, shall be 495 days (1.5 years) from the Commencement of Work.

D. The Owner may, in its sole discretion, deduct the post-construction vegetation maintenance work from the Contract, provided a separate Vegetation Maintenance Contract is executed between the Owner and the Landscape and Vegetation Maintenance Contractor. Should this occur, related lump sum amounts in the Bid for Vegetation Maintenance shall be deducted from the Contract.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. In the event the Bidder is awarded the Contract and fails to complete the work within the time limits or extended time limits agreed upon, as more particularly set forth in the Contract Documents, liquidated damages shall be paid to the Owner at the daily rate of $800 until the work is finished as provided by the Contract Documents. Owner may apply liquidated damages to Milestone 1, Milestone 2, and Contract completion.

ARTICLE 5 – CONTRACT PRICE

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

A. For all Work at the prices stated in Contractor's Bid, attached hereto as an exhibit. The Bid prices for Unit Price Work set forth as of the Effective Date of the Agreement are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 10.06 of the General Conditions.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

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

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment, monthly during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract

a. 95 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

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

ARTICLE 7 – INTEREST

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

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement.
2. Performance bond.
3. Payment bond.
4. General Conditions.
5. Supplementary Conditions.
6. Specifications as listed in the table of contents of the Project Manual.
7. Drawings bearing the following general title: Underwood Creek Daylighting.
8. Addenda (numbers ___ to ___, inclusive).

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9. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid.
10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
    a. Notice to Proceed.
    b. Work Change Directives.
    c. Change Orders.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

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

10.02 *Assignment of Contract*

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

10.03 *Successors and Assigns*

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

10.04 *Severability*

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

10.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

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

This Agreement will be effective on _____, 2026 (which is the Effective Date of the Contract).

OWNER:	CONTRACTOR:
Village of Elm Grove	
By:	By:
Title:	Title: *(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*
Attest:	Attest:
Title:	Title:
Address for giving notices:	Address for giving notices:
	License No.: *(where applicable)*

END OF SECTION

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PERFORMANCE BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

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

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

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

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

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

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

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

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

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

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

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

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

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

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

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

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

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

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

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

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

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

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

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

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

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the Owner or its heirs, executors, administrators, successors, and assigns.

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

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

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

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

14. Definitions

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

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

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

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

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

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

16. Modifications to this Bond are as follows:

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ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PAYMENT BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND

Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

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

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

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

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

   5.1 Claimants who do not have a direct contract with the Contractor,

      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2 Pay or arrange for payment of any undisputed amounts.

   7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

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

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12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

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

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

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

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

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

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

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

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

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

18. Modifications to this Bond are as follows:

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

Page

Article 1 – Definitions and Terminology 1

1.01 Defined Terms 1

1.02 Terminology 5

Article 2 – Preliminary Matters 6

2.01 Delivery of Bonds and Evidence of Insurance 6

2.02 Copies of Documents 6

2.03 Before Starting Construction 6

2.04 Preconstruction Conference; Designation of Authorized Representatives 7

2.05 Initial Acceptance of Schedules 7

2.06 Electronic Transmittals 7

Article 3 – Documents: Intent, Requirements, Reuse 8

3.01 Intent 8

3.02 Reference Standards 8

3.03 Reporting and Resolving Discrepancies 8

3.04 Requirements of the Contract Documents 9

3.05 Reuse of Documents 10

Article 4 – Commencement and Progress of the Work 10

4.01 Commencement of Contract Times; Notice to Proceed 10

4.02 Starting the Work 10

4.03 Reference Points 10

4.04 Progress Schedule 10

4.05 Delays in Contractor's Progress 11

Article 5 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions 12

5.01 Availability of Lands 12

5.02 Use of Site and Other Areas 12

5.03 Subsurface and Physical Conditions 13

5.04 Differing Subsurface or Physical Conditions 14

5.05 Underground Facilities 15

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

5.06 Hazardous Environmental Conditions at Site 17
Article 6 – Bonds and Insurance 19
6.01 Performance, Payment, and Other Bonds 19
6.02 Insurance—General Provisions 19
6.03 Contractor's Insurance 20
6.04 Owner's Liability Insurance 23
6.05 Property Insurance 23
6.06 Waiver of Rights 25
6.07 Receipt and Application of Property Insurance Proceeds 25
Article 7 – Contractor's Responsibilities 26
7.01 Supervision and Superintendence 26
7.02 Labor; Working Hours 26
7.03 Services, Materials, and Equipment 26
7.04 "Or Equals" 27
7.05 Substitutes 28
7.06 Concerning Subcontractors, Suppliers, and Others 29
7.07 Patent Fees and Royalties 31
7.08 Permits 31
7.09 Taxes 32
7.10 Laws and Regulations 32
7.11 Record Documents 32
7.12 Safety and Protection 32
7.13 Safety Representative 33
7.14 Hazard Communication Programs 33
7.15 Emergencies 34
7.16 Shop Drawings, Samples, and Other Submittals 34
7.17 Contractor's General Warranty and Guarantee 36
7.18 Indemnification 37
7.19 Delegation of Professional Design Services 37
Article 8 – Other Work at the Site 38
8.01 Other Work 38
8.02 Coordination 39
8.03 Legal Relationships 39

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Article 9 – Owner's Responsibilities 40
9.01 Communications to Contractor 40
9.02 Replacement of Engineer 40
9.03 Furnish Data 40
9.04 Pay When Due 40
9.05 Lands and Easements; Reports, Tests, and Drawings 40
9.06 Insurance 40
9.07 Change Orders 40
9.08 Inspections, Tests, and Approvals 41
9.09 Limitations on Owner's Responsibilities 41
9.10 Undisclosed Hazardous Environmental Condition 41
9.11 Evidence of Financial Arrangements 41
9.12 Safety Programs 41
Article 10 – Engineer's Status During Construction 41
10.01 Owner's Representative 41
10.02 Visits to Site 41
10.03 Project Representative 42
10.04 Rejecting Defective Work 42
10.05 Shop Drawings, Change Orders and Payments 42
10.06 Determinations for Unit Price Work 42
10.07 Decisions on Requirements of Contract Documents and Acceptability of Work 42
10.08 Limitations on Engineer's Authority and Responsibilities 42
10.09 Compliance with Safety Program 43
Article 11 – Amending the Contract Documents; Changes in the Work 43
11.01 Amending and Supplementing Contract Documents 43
11.02 Owner-Authorized Changes in the Work 44
11.03 Unauthorized Changes in the Work 44
11.04 Change of Contract Price 44
11.05 Change of Contract Times 45
11.06 Change Proposals 45
11.07 Execution of Change Orders 46
11.08 Notification to Surety 47
Article 12 – Claims 47

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12.01 Claims 47
Article 13 – Cost of the Work; Allowances; Unit Price Work 48
13.01 Cost of the Work 48
13.02 Allowances 50
13.03 Unit Price Work 51
Article 14 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work 52
14.01 Access to Work 52
14.02 Tests, Inspections, and Approvals 52
14.03 Defective Work 53
14.04 Acceptance of Defective Work 53
14.05 Uncovering Work 53
14.06 Owner May Stop the Work 54
14.07 Owner May Correct Defective Work 54
Article 15 – Payments to Contractor; Set-Offs; Completion; Correction Period 55
15.01 Progress Payments 55
15.02 Contractor's Warranty of Title 58
15.03 Substantial Completion 58
15.04 Partial Use or Occupancy 59
15.05 Final Inspection 59
15.06 Final Payment 59
15.07 Waiver of Claims 61
15.08 Correction Period 61
Article 16 – Suspension of Work and Termination 62
16.01 Owner May Suspend Work 62
16.02 Owner May Terminate for Cause 62
16.03 Owner May Terminate For Convenience 63
16.04 Contractor May Stop Work or Terminate 63
Article 17 – Final Resolution of Disputes 64
17.01 Methods and Procedures 64
Article 18 – Miscellaneous 64
18.01 Giving Notice 64
18.02 Computation of Times 64
18.03 Cumulative Remedies 64

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18.04 Limitation of Damages 65
18.05 No Waiver 65
18.06 Survival of Obligations 65
18.07 Controlling Law 65
18.08 Headings 65

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

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has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Engineer*—The individual or entity named as such in the Agreement.

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

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24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

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37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

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

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide*:

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

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3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

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

2.02 *Copies of Documents*

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

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

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computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

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error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

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

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

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3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

4.04 *Progress Schedule*

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

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

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2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

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G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

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

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part

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by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

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5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

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c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

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

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

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5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

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F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

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ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

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

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

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

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4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

a. Such insurance shall be maintained for three years after final payment.

b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

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of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

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

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6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

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5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

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6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

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policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

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guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

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D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

a. shall certify that the proposed substitute item will:

1) perform adequately the functions and achieve the results called for by the general design,

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

c. will identify:

1) all variations of the proposed substitute item from that specified, and

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2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

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E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

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O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

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

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7.09 *Taxes*

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

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

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

7.12 *Safety and Protection*

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

1. all persons on the Site or who may be affected by the Work;

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2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

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

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

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exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

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

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

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

1. *Shop Drawings*:

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

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

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provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

   a. Contractor shall submit the number of Samples required in the Specifications.

   b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

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8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

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D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

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Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

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8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

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

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

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

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

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

9.07 *Change Orders*

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

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9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

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

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

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

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

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or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

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

10.04 *Rejecting Defective Work*

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

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

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

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

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

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

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B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

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

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

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

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adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

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

11.02 *Owner-Authorized Changes in the Work*

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

11.03 *Unauthorized Changes in the Work*

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

11.04 *Change of Contract Price*

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

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

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the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

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

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

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the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

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B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

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

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

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submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

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thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

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other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

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B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

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

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

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cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

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B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

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

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

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include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

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

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

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a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

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e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

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remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

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

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

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E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

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

15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

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inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

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

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

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including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

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E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

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

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

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and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

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

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

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expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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

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18.04 *Limitation of Damages*

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

18.05 *No Waiver*

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

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Headings*

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

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SUPPLEMENTARY CONDITIONS

SECTION 00 73 01

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

SC-5.03 Subsurface and Physical Conditions

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

C. The following reports of explorations and tests of subsurface conditions at or adjacent to the Site are known to Owner:

1. Reports related to subsurface conditions in the vicinity of 13405 Watertown Plank Road can be found by accessing the WDNRs Bureau of Remediation and Redevelopment Tracking System (BRRTS) database.

2. Reports related to subsurface conditions elsewhere at or adjacent to the Site are identified in Section 00 31 00 – Available Project Information.

D. Contractor may examine copies of reports and drawings identified in SC 5.03.C.2 that were not included with the Bidding Documents as described in Section 00 31 00 – Available Project Information.

ARTICLE 6 – BONDS AND INSURANCE

SC-6.03 Contractor's Liability Insurance

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

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

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

State:	Statutory
Federal, if applicable (e.g., Longshoreman's):	Statutory

Employer's Liability:

Bodily injury, each accident	$ 500,000
Bodily injury by disease, each employee	$ 500,000
Bodily injury/disease aggregate	$ 500,000

Foreign voluntary worker compensation	Statutory

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

General Aggregate	$ 2,000,000
Products - Completed Operations Aggregate	$ 2,000,000
Personal and Advertising Injury	$ 1,000,000
Each Occurrence (Bodily Injury and Property Damage)	$ 1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:	
Each person	$
Each accident	$
Property Damage:	
Each accident	$
[or]	
Combined Single Limit of	$ 1,000,000

4. Excess or Umbrella Liability:

Per Occurrence	$ 5,000,000
General Aggregate	$ 5,000,000

5. Contractor's Pollution Liability:

Each Occurrence	$ 1,000,000
General Aggregate	$ 2,000,000

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following: *The Village of Elm Grove, its officers and agents.*

7. Contractor's Professional Liability:

Each Claim	$ 1,000,000
Annual Aggregate	$ 2,000,000

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SC-6.05 Property Insurance

SC-6.05. Add the following to the list of requirements in Paragraph 6.05.A, as a numbered item:

13. be subject to a deductible amount of no more than $10,000 for direct physical loss in any one occurrence.

END OF SECTION

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SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
1. Basic description of the Project and Work restrictions.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
1. All Work and costs of this Section shall be incidental to the Project and included in the appropriate unit prices or lump sum bid items.

1.03 SUMMARY OF WORK

A. Project Name: Underwood Creek Daylighting, located in the Village of Elm Grove, Wisconsin.

B. Description of Work:
1. Demolition and abandonment of the existing Underwood Creek channel culvert and stream channel between Watertown Plank Road and Wall Street.
2. New channel excavation and construction.
3. Soil disposal.
4. Concrete retaining wall construction.
5. Quarry stone bank armoring.
6. New road crossing culvert construction at Wall Street.
7. Pedestrian bridge across the newly constructed channel.
8. Storm sewer construction.
9. Asphalt road and parking lot paving.
10. Concrete curb and gutter and sidewalk construction.
11. Landscaping and restoration of areas disturbed during construction.
12. Maintenance of vegetation and plant items.

1.04 COMPLETION DATES

A. Set forth in the Agreement.

1.05 LIQUIDATED DAMAGES

A. Provisions for liquidated damages are set forth in the Agreement.

1.06 WORK RESTRICTIONS

A. Use of Site
1. Allowable location of construction facilities, staging areas, product stockpiles, material storage, and temporary construction shall be within the construction limits, as defined on the Drawings, and shall be removed upon completion of work.

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2. Construction and Contractor use of site shall occur between the hours of 7:00 AM and 7:00 PM, Monday through Friday, unless otherwise approved in advance by Owner.
3. Contractor requests to work on Saturdays will be considered by the Owner. Approval may be given to work on Saturdays.
4. Contractor responsible for snow removal if necessary to maintain access and working space during construction.
5. Keep existing driveways, sidewalks and entrances clear and available to the public and to the Owner. Any closure or modification of access must be approved by the Owner in advance.

B. Access to Site
1. Construction access and egress route is shown on the Drawings.
2. Contractor parking shall occur within the areas of the project site.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 01 20 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes administrative and procedural requirements for pricing of Work and request for payment procedures.

1.02 MEASUREMENT AND PAYMENT

A. General

1. Payment items for the work of this contract are listed in the Bid Form and described below. The contract price for each item shall constitute full compensation for furnishing all plant, labor, materials, appurtenances, incidentals, surveying, quality control, environmental protection, meeting safety requirements, tests and reports, permit submittals, and performing all operations necessary to construct and complete the work in accordance with these Specifications and the applicable Drawings. All costs for items of work, which are not specifically mentioned to be included in a particular pay item, shall be included in the listed item most closely associated with the work involved. No separate payment will be made for the work, services, or operations required by the Contractor, as specified to complete the project in accordance with these Specifications; all costs thereof shall be considered as incidental to the work unless specifically listed on the Bid Form.

B. Bid Item 1 : MOBILIZATION, DEMOBILIZATION, AND SITE PREPARATION

1. Mobilization, Demobilization, and Site Preparation will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. Payment shall constitute full compensation for furnishing all labor, material, maintenance, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Mobilizing to the site
   b. Site preparation
   c. Traffic control
   d. Permit submittals
   e. Performance and payment bonds
   f. Temporary erosion and sediment control installation, maintenance and removal
   g. Relocation of mailboxes
   h. Relocation and rewiring of DPW gate entrance control
   i. Securing the site
   j. Utility locates
   k. Site cleanup
   l. Punch list item completion
   m. Demobilization from the site
   n. All related work.

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3. All costs connected with this Item will be paid for at the Contract Lump Sum (LS) price for this Item. Sixty percent (60%) of the LS will be paid to the Contractor on completion of their mobilization and site preparation. The remaining forty percent (40%) will be included in the final payment for work under this Contract.
4. In the event the Owner considers that the amount in this Item does not bear a reasonable relation to the cost of the work, the Owner may require the Contractor to produce cost data to justify this portion of the bid. Failure to justify such price to the satisfaction of the Owner will result in payment of actual mobilization and site preparation costs, as determined by the Owner at the completion of mobilization and site preparation, and payment of the remainder of this Item in the final payment under this Contract. The determination of the Owner is not subject to appeal.
5. This item does not include:
    a. Erosion control fabric along proposed channel bank slopes, which is included in Bid Item 50: Erosion Control Fabric.

C. Bid Item 2: LIGHTING REMOVAL AND REINSTALLATION

1. Lighting Removal and Reinstallation will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Removal of three light poles/fixtures in the Park & Shop parking lot along the west side of the existing culvert.
    b. Storage and protection of these items until reinstallation after completion of channel construction.
    c. Reinstallation of lighting.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Removal, storage and protection of the light poles/fixtures.
    b. Abandonment of existing wiring.
    c. Reinstallation of the light poles/fixtures.
    d. New wiring.
    e. All related work.

D. Bid Item 3: CLEARING AND GRUBBING

1. Clearing and Grubbing will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Cutting, removal and disposal of all trees, brush, and stumps within the project limits designated for removal.
    b. Selection and storage of appropriate woody material for use in boulder brush run and toe wood construction.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Clearing and grubbing.
    b. Storage of appropriate woody material for use in boulder brush run and toe wood construction.
    c. Disposal of excess material.

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d. All related work.

Bid Item 4: ASPHALT REMOVAL

4. Asphalt Removal will be paid for at the Contract per SQUARE YARD price identified on the Bid Form.
5. The work covered by this item generally includes the removal and disposal of existing asphalt pavement within the parking lot and on Wall Street designated for removal.
6. Quantity will consist of actual square yards of asphalt pavement removed and approved by the Engineer.
7. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Saw cutting existing asphalt pavement at limits of removal.
    b. Removal of asphalt pavement including base course.
    c. Protection of adjacent pavement and structures.
    d. Disposal.
    e. All related work.

E. Bid Item 5: CONCRETE SIDEWALK REMOVAL

1. Concrete Sidewalk Removal will be paid for at the Contract per SQUARE YARD price identified on the Bid Form.
2. The work covered by this item generally includes the removal and disposal of existing concrete sidewalk along Watertown Plank Road.
3. Quantity will consist of actual square yards of sidewalk removed and approved by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Saw cutting existing concrete sidewalk at limits of removal.
    b. Removal of concrete sidewalk including base course.
    c. Protection of adjacent sidewalk and structures.
    d. Disposal.
    e. All related work.

F. Bid Item 6: CURB AND GUTTER REMOVAL

1. Curb And Gutter Removal will be paid for at the Contract per LINEAR FOOT price identified on the Bid Form.
2. The work covered by this item generally includes the removal and disposal of existing concrete curb and gutter along Watertown Plank Road and within the parking lot.
3. Quantity will consist of actual linear feet of curb and gutter removed and approved by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Saw cutting existing concrete curb and gutter at limits of removal.
    b. Removal of concrete curb and gutter including base course.
    c. Protection of adjacent curb and gutter, pavement, and structures.
    d. Disposal.

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e. All related work.

G. Bid Item 7: RAILROAD BRIDGE REMOVAL

1. Railroad Bridge Removal will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes the removal and disposal of existing abandoned reinforced concrete railroad bridge at the south end of the project.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Removal of the superstructure and former track bed materials, piers, abutments and foundations.
   b. Disposal of all removed items.
   c. Backfill and compaction.
   d. Control of water.
   e. All related work.
4. This item does not include:
   a. Restoration of stream banks. Restoration of stream banks is included in Bid Item 47: Vegetated Riprap Bank and Bid Item 56: Toe Wood.

H. Bid Item 8: CULVERT/CHANNEL COMPLETE REMOVAL

1. Culvert/Channel Complete Removal will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Complete removal of retaining walls, removal of wing walls on downstream side of existing Watertown Plank Road Bridge, and concrete invert associated with the first approximately 125 feet of open channel reach of Underwood Creek immediately downstream of Watertown Plank Road, as shown on the Drawings.
   b. Complete removal of any additional portion of the existing culvert downstream of the open channel reach, including top, walls, and concrete invert, necessary to accommodate the construction of proposed retaining walls.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Sawcutting, demolition and disposal.
   b. Control of water.
   c. Protection of adjacent facilities.
   d. Abandonment of drainage and storm sewer pipes that will not be connected to new sewer.
   e. All related work.
4. This item does not include:
   a. Restoration of stream banks. Restoration of stream banks is included in Bid Item 13: Cast-In-Place Retaining Wall (East), Bid Item 14: Cast-In-Place Retaining Wall (West), and Bid Item 45: Quarry Stone Bank.

I. Bid Item 9: CULVERT/CHANNEL PARTIAL REMOVAL

1. Culvert/Channel Partial Removal will be paid for at the Contract LUMP SUM price identified on the Bid Form.

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2. The work covered by this item generally includes:
    a. Removal of culvert top slab and side walls, including beams supporting top slab, to at least three feet below grade for approximately 320 feet immediately downstream of the Complete Removal reach of Underwood Creek, up to the Sendik's building.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Demolition and disposal.
    b. Control of water.
    c. Protection of adjacent facilities.
    d. Abandonment of drainage and storm sewer pipes that will not be connected to new sewer.
    e. All related work.
4. This item does not include:
    a. Fill material for remaining culvert section. Fill material is included in Bid Item 15: Excavation, Grading, and Disposal of Exempt Materials.
    b. Pavement restoration. Pavement restoration is included in Bid Item 19: Parking Lot Asphalt Paving.

J. Bid Item 10: CULVERT BULKHEAD

1. Culvert Bulkhead will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Abandonment of the existing approximately 185-foot-long reach of Underwood Creek culvert beneath the Sendik's building to the culvert outfall by bulkheading the downstream end and the upstream end, as shown on the Drawings.
3. Contractor shall coordinate with Owner to verify that Sendik's has completed all necessary plumbing modifications to their equipment and premises prior to abandoning the culvert.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Two bulkheads.
    b. Protection of adjacent facilities.
    c. All related work.

K. Bid Item 11: WELL ABANDONMENT

1. Well Abandonment will be paid for at the Contract per EACH price identified on the Bid Form.
2. The work covered by this item generally includes the abandonment of six existing 2-inch diameter monitoring wells shown on the Drawings located east of the channel near the upstream project extent.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Well abandonment by filling in accordance with WDNR requirements.
    b. Removal of top portion of well, including excavation and backfill.

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c. Disposal of excess well casing materials.
d. Completion of WDNR well abandonment documentation.
e. All related work.

L. Bid Item 12: MISCELLANEOUS DEMOLITION AND DISPOSAL

1. Miscellaneous Demolition and Disposal will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes removal and disposal of various items required to complete proposed work.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Removal and disposal of:
      1) Existing metal fencing.
      2) Masonry base for Park & Shop near Watertown Plank Road.
      3) Bollards and guardrails.
      4) Miscellaneous concrete, including base slab and foundation of former One Hour Martinizing building.
      5) Abandoned railroad track and tie materials.
      6) Removal or abandonment of culverts or drainage pipes necessary for channel construction or site grading.
      7) Removal and bulkhead of sanitary sewers and manholes necessary for channel construction, wall construction and noted on the Drawings.
      8) Other items encountered requiring demolition.
   b. All related work.

M. Bid Item 13: CAST-IN-PLACE RETAINING WALL (EAST)

1. Cast-in-Place Retaining Wall (East) will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Construction of the East Channel Bank Wall cast-in-place retaining wall located on the east side of the proposed channel, immediately downstream of Watertown Plank Road.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Temporary shoring
   b. Preparation of subgrade
   c. Base material
   d. Reinforcement
   e. Forms
   f. Form liners
   g. Concrete placement
   h. Finishing
   i. Curing
   j. Stain
   k. Guard rails
   l. Protection of work

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m. Control of water
n. All related work.

4. This item does not include:
    a. Demolition as included in Bid Item 8: Culvert/Channel Complete Removal.
    b. Excavation and disposal as included in Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.

N. Bid Item 14: CAST-IN-PLACE RETAINING WALL (WEST)

1. Cast-in-Place Retaining Wall (West) will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Construction of the West Channel Bank Wall cast-in-place retaining wall located on the west side of the proposed channel, immediately downstream of Watertown Plank Road.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Temporary shoring
    b. Preparation of subgrade
    c. Placement of base material
    d. Installing reinforcement
    e. Forms
    f. Form liners
    g. Concrete placement
    h. Finishing
    i. Curing
    j. Stain
    k. Guard rails
    l. Protection of work
    m. Control of water
    n. All related work.
4. This item does not include:
    a. Demolition as included in Bid Item 8: Culvert/Channel Complete Removal.
    b. Excavation and disposal as included in Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.

O. Bid Item 15: EXCAVATION, GRADING, AND DISPOSAL OF EXEMPT MATERIALS

1. Excavation, Grading, and Disposal of Exempt Materials will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Excavation, grading, and filling or off-site disposal of soils within the channel and pavement areas that are deemed as Exempt and therefore do not require landfill disposal.
    b. Grading to subgrade elevation necessary for subsequent installation of channel features, landscaping and surface restoration.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Excavation and grading for channel construction and other general grading.

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b. On-site hauling and placing fill materials.
c. Off-site hauling and non-landfill disposal.
d. Soil management.
e. Compaction.
f. Testing.
g. Control of water.
h. All related work.

4. This item does not include:
   a. Demolition of existing channel, retaining walls and culvert, which is included in Bid Item 8: Culvert/Channel Complete Removal, and Bid Item 9: Culvert/Channel Partial Removal.
   b. Excavation and disposal for installation of storm sewers or storm sewer structures, which is included in Bid Items 33 through 42.
   c. Placement and grading of topsoil, which is included in Bid Item 25: Topsoil.

P. Bid Item 16: EXCAVATION, GRADING, AND LANDFILL DISPOSAL OF NON-EXEMPT MATERIALS

1. Excavation, Grading, and Landfill Disposal of Non-Exempt Materials will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Excavation, grading, and fill of soils within the channel and pavement areas.
   b. Soils graded to the subgrade elevation necessary for subsequent installation of channel features, landscaping and surface restoration.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Excavation and grading for channel construction and other general grading.
   b. Off-site hauling and landfill disposal.
   c. Soil management.
   d. Testing.
   e. Control of water.
   f. All related work.
4. If soil is excavated which requires a new landfill waste profile for disposal other than those provided in the Drawings, the Owner will pay the difference in landfill tipping fees between tipping fees associated with the profiles provided and tipping fees associated with the new profile.
5. This item does not include:
   a. Demolition of existing channel, retaining walls and culvert, which is included in Bid Item 8: Culvert/Channel Complete Removal, and Bid Item 9: Culvert/Channel Partial Removal.
   b. Excavation and disposal for installation of storm sewers or storm sewer structures, which is included in Bid Items 33 through 42.
   c. Placement and grading of topsoil, which is included in Bid Item 25: Topsoil.

Q. Bid Item 17: IMPERVIOUS FILL LAYER OF SOIL CAP

1. Impervious Fill Layer Of The Soil Cap will be paid for at the Contract per CUBIC YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Impervious fill required for the lower 6-inch layer of the soil cap within Soil Management Unit (SMU) 1.

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3. Quantity will consist of actual cubic yards of Impervious Fill installed and measured by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings, including:
    a. Subgrade preparation.
    b. Hauling and placing on-site Impervious Fill material.
    c. Testing.
    d. Compaction.
    e. All related work.
5. This item does not include:
    a. Topsoil for the upper 6-inch layer of the soil cap, which is included in Bid Item 25: Topsoil.

R. Bid Item 18: WALL STREET ROADWAY

1. Wall Street Roadway will be paid for at the Contract per SQUARE YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Reconstruction of the Wall Street roadway following completion of culvert construction.
3. Quantity will consist of actual square yards of asphalt pavement and base aggregate installed and approved by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Subgrade preparation.
    b. Furnishing and installing aggregate base.
    c. Furnishing and installing asphalt pavement.
    d. Compaction of aggregate base and asphalt pavement.
    e. Placement of tack coat.
    f. Testing.
    g. Centerline pavement marking.
    h. All related work.
5. This item does not include:
    a. Wall Street Culvert as included in Bid Item 44: Wall Street Box Culverts
    b. Asphalt path adjacent to north side of roadway as included in Bid Item 20: East Path.
    c. Topsoil and seed as included in Bid Item 25: Topsoil and Bid Item 28: Turf Seeding – Zone D.

S. Bid Item 19: PARKING LOT ASPHALT PAVING

1. Parking Lot Asphalt Paving will be paid for at the Contract per SQUARE YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Repaving areas of the parking lot removed or damaged during construction.
3. Quantity will consist of actual square yards of asphalt pavement and base aggregate installed and approved by the Engineer.

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4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Subgrade preparation.
    b. Furnishing and installing aggregate base.
    c. Furnishing and installing asphalt pavement.
    d. Compaction of aggregate base and asphalt pavement.
    e. Placement of tack coat.
    f. Testing.
    g. Pavement markings.
    h. Structure rim adjustments.
    i. All related work.

T. Bid Item 20: EAST PATH

1. East Path will be paid for at the Contract per SQUARE YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Asphalt paving of the East Path.
3. Quantity will consist of actual square yards of asphalt pavement and base aggregate installed and approved by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Subgrade preparation.
    b. Furnishing and installing aggregate base.
    c. Furnishing and installing asphalt pavement.
    d. Compaction of aggregate base and asphalt pavement.
    e. Placement of tack coat.
    f. Testing.
    g. All related work.

U. Bid Item 21: CONCRETE CURB AND GUTTER

1. Concrete Curb and Gutter will be paid for at the Contract per LINEAR FOOT price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Concrete curb and gutter along the west side of the proposed channel, a portion of Watertown Plank Road, and near storm sewer outfall structure OF-1.
3. Quantity will consist of actual linear feet installed and approved by the Engineer.
4. Measurement shall be along the gutter flow line.
5. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Surface preparation.
    b. Furnishing and installing aggregate base.
    c. Furnishing and installing concrete curb and gutter.
    d. Furnishing and installing curing compound.
    e. Furnishing and installing joint material.
    f. Backfilling to subgrade elevation.

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g. All related work.

V. Bid Item 22: CONCRETE SIDEWALK

1. Concrete Sidewalk will be paid for at the Contract per SQUARE FOOT price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Concrete sidewalk adjacent Watertown Plank Road.
3. Quantity will consist of actual square feet of concrete sidewalk and aggregate base installed and measured by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Surface preparation and compaction.
   b. Furnishing and installing aggregate base.
   c. Furnishing and installing concrete sidewalk.
   d. Furnishing and installing curing compound.
   e. Furnishing and installing joint material.
   f. Backfilling to subgrade elevation.
   g. All related work.

W. Bid Item 23: PEDESTRIAN BRIDGE - STRUCTURE

1. Pedestrian Bridge - Structure will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Furnishing the pedestrian bridge structure crossing the proposed channel.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Furnishing and installing the bridge structure
   b. Concrete bridge deck.
   c. Timber rails.
   d. All related work.
4. This item does not include:
   a. Bridge abutments as included in Bid Item 24: Pedestrian Bridge – Abutment.

X. Bid Item 24: PEDESTRIAN BRIDGE - ABUTMENT

1. Pedestrian Bridge - Abutment will be paid for at the Contract per EACH price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Installation of the abutments for the pedestrian bridge.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Temporary shoring
   b. Preparation of subgrade
   c. Placement of base material
   d. Reinforcement

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e. Forms
f. Concrete placement
g. Finishing
h. Curing
i. Protection of work
j. Control of water
k. All related work.

4. This item does not include:
   a. Bridge structure as included in Bid Item 23: Pedestrian Bridge - Structure.
   b. Excavation and disposal as included Bid Item 15: Excavation, Grading, And Disposal of Exempt Materials and Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.

Y. Bid Item 25: TOPSOIL

1. Topsoil will be paid for at the Contract per CUBIC YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Providing, placing and grading imported topsoil along the channel banks and in landscape areas where identified on the Drawings throughout the project site.
3. Quantity will consist of actual cubic yards of topsoil installed and measured by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Subgrade preparation.
   b. Furnishing and installing topsoil, including grading to final elevations and contours shown on the Drawings.
   c. Testing.
   d. Amendments as necessary.
   e. All related work.
5. This item does not include:
   a. Topsoil for riprap quarry stone bank transitions as included in Bid Item 46: Riprap Quarry Stone Bank Transitions.
   b. Topsoil for vegetated riprap bank at confluence as included in Bid Item 47: Vegetated Riprap Bank.

Z. Bid Item 26: NATIVE SEEDING – ZONES A & B

Bid Item 27: NATIVE SEEDING – ZONE C

Bid Item 28: TURF SEEDING – ZONE D

1. Native Seeding – Zones A & B, Native Seeding – Zone C and Turf Seeding – Zone D will be paid for at the Contract per SQUARE YARD price identified on the Bid Form.
2. The work covered by these items generally includes:
   a. Seeding native seed and turf seed throughout the project site where indicated on the Drawings.
3. Quantity will consist of actual square yard seeded and approved by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:

a. Surface preparation.
b. Furnishing and installing seed material in place as specified.
c. Cover crop.
d. Fertilizer.
e. Warranty as specified.
f. All related work.

5. These items do not include:
   a. Topsoil as included in Bid Item 25: Topsoil.
   b. Live Stakes, Shrubs, or Trees, which are included in Bid Item 29: Live Stakes (Dormant Woody Cuttings), Bid Item 30: Shrubs, and Bid Item 31: Trees.
   c. Matting for bank protection as included in Bid Item 49: Bank Protection.
   d. Erosion control fabric and mulch as included in Bid Item 50: Erosion Control Fabric and Bid Item 51: Mulch.

AA. Bid Item 29: LIVE STAKES (DORMANT WOODY CUTTINGS)

Bid Item 30: SHRUBS

Bid Item 31: TREES

1. Live Stakes (Dormant Woody Cuttings), Shrubs and Trees will be paid for at the Contract per EACH price identified on the Bid Form.
2. The work covered by these items generally includes:
   a. Providing live stakes, shrubs and trees along the channel corridor where indicated on the Drawings.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Surface preparation.
   b. Excavation.
   c. Furnishing and installing planting material in place as specified.
   d. Backfill.
   e. Required watering.
   f. Warranty as specified.
   g. All related work.
4. These items do not include:
   a. Topsoil as included in Bid Item 25: Topsoil.

BB. Bid Item 32: Vegetation Maintenance

1. Vegetation Maintenance will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Maintenance of all vegetation beginning immediately following installation and continuing until the end of the Three-Year Vegetation Maintenance Period.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Maintenance of vigorous growth.
   b. Development of Maintenance Plan.

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c. Implementation of Maintenance Plan during Three-Year Vegetation Maintenance Period, including maintenance logs, after-storm inspection and reporting, mowing, annual reports, vegetative control, erosion and surface repairs.
d. All related work.

4. Progress payments will be made quarterly during Three-Year Vegetation Maintenance Period based on Cost of the Work completed by Contractor during the pay period.

CC. Bid Item 33: STORM SEWER PIPE RCP 12-INCH

Bid Item 34: STORM SEWER PIPE RCP 18-INCH

Bid Item 35: STORM SEWER PIPE RCP 24-INCH

Bid Item 36: STORM SEWER PIPE RCP 36-INCH

Bid Item 37: STORM SEWER PIPE HE RCP 34x53-INCH

1. Storm Sewer Pipe RCP 12-Inch, Storm Sewer Pipe RCP 18-Inch, Storm Sewer Pipe RCP 24-Inch, Storm Sewer Pipe RCP 36-Inch, and Storm Sewer Pipe HE RCP 34x53-Inch will be paid for at the Contract per LINEAR FOOT price identified on the Bid Form.
2. The work covered by these items generally includes:
   a. Storm sewer construction as shown on the Drawings.
3. Quantity will consist of actual linear feet of pipe installed and approved by the Engineer.
4. Measurement for payment will be made from center to center of manholes, connection to existing storm sewer, or to the upstream end of the concrete apron endwall at the outfall.
5. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Furnishing and installing pipe complete in place as specified.
   b. Excavation.
   c. Shoring.
   d. Subgrade preparation.
   e. Bedding, cover, backfilling to subgrade, and compaction per the trench sections shown in the Drawings.
      1) Note: new storm sewer north of Sendik's will be constructed within the existing box culvert that is being abandoned. As a result, the trench section for this reach of pipe is wider than typical.
   f. All connections of existing drainage and storm sewer piping that had discharged to the Underwood Creek culvert being abandoned and that require reconnection to the new storm sewer.
      1) Including removing, providing all materials, coring, couplings, concrete collars, and pipe.
   g. All connections to existing structures and pipes.
   h. Improved pipe foundation where necessary.
   i. Control of water.
   j. Testing.
   k. Joint ties.
   l. All related work.

6. These items do not include:
    a. Surface restoration as shown on the Drawings.

DD. Bid Item 38: 34x53-INCH CONCRETE APRON ENDWALL

1. 34x53 Inch Concrete Apron Endwall will be paid for at the Contract per EACH price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Furnishing and installing a concrete apron endwall at the downstream end of the storm sewer.
3. Quantity will consist of each apron endwall installed and approved by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Furnishing and installing apron endwall.
    b. Excavation.
    c. Bedding.
    d. Backfilling.
    e. Joint ties.
    f. Furnishing and installing riprap and filter fabric downstream of and surrounding the endwall.
    g. Control of water.
    h. Testing.
    i. All related work.

EE. Bid Item 39: STORM SEWER MANHOLE 48-INCH

Bid Item 40: STORM SEWER MANHOLE 60-INCH

Bid Item 41: STORM SEWER MANHOLE 96-INCH

Bid Item 42: STORM SEWER CATCH BASIN 2'X3'

1. Storm Sewer Manhole 48-Inch, Storm Sewer Manhole 60-Inch, Storm Sewer Manhole 96-Inch, and Storm Sewer Catch Basin 2'x3' will be paid for at the Contract per EACH price identified on the Bid Form.
2. The work covered by these items generally includes:
    a. Furnishing and installing storm sewer manholes as shown on the Drawings.
3. Quantity will consist of each storm sewer structure installed and approved by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Furnishing and installing manhole and catch basin sections and components.
    b. Excavation and disposal.
    c. Trench protection.
    d. Bedding and backfilling.
    e. Compaction.
    f. Joint sealant.
    g. Frame and cover.

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h. Connections.
i. Concrete adjustment rings.
j. Testing.
k. All related work.

FF. Bid Item 43: REMOVE AND REPLACE STORM CASTING

1. Remove and Replace Storm Casting will be paid for at the Contract per EACH price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Removal of existing casting in Watertown Plank Road approximately 10 feet east of the existing channel.
   b. Installing storm sewer casting as identified on the Drawings.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Removal and disposal of existing storm sewer casting.
   b. Removal and disposal of concrete existing adjustment rings as necessary to install proposed casting.
   c. Installation of new adjustment rings as necessary to achieve final grades.
   d. Installation of new storm sewer casting as shown on the Drawings.
   e. All related work.

GG. Bid Item 44: WALL STREET BOX CULVERT

1. Wall Street Box Culvert will be paid for at the Contract LUMP SUM price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Installation of a new 3-cell pre-cast concrete box culvert for the new Underwood Creek crossing at Wall Street.
3. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Submittals.
   b. Excavation for foundation, culvert, and headwalls.
   c. Shoring.
   d. Subgrade preparation.
   e. Foundation.
   f. On-site soil management and necessary disposal.
   g. Furnishing and installing culvert components complete in place as specified, including foundation, culvert barrels, wingwalls, and headwalls.
   h. Low density concrete backfill.
   i. Guard rails.
   j. Coordination with owners of existing gas and communications utilities, temporary support during construction and/or alteration of existing utilities.
   k. Alteration of existing 2-inch water service.
   l. Backfilling and compaction to road subgrade elevation.
   m. All related work.
4. This item does <u>not</u> include:

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a. Excavation and disposal as included Bid Item 15: Excavation, Grading, And Disposal of Exempt Materials and Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.
b. Wall Street Road surface restoration as included in Bid Item 18: Wall Street Roadway.
c. Channel bed material included in Bid Item 52: Riffle Construction.
d. Restoration included in Bid Item: 28: Turf Seeding – Zone D.

HH. Bid Item 45: QUARRY STONE BANK

1. Quarry Stone Bank will be paid for at the Contract per TON price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Installation of the quarry stone bank revetments along the east and west banks of the proposed channel.
3. The quantity will consist of actual tons of quarry stone placed, and will be based on the weight tickets submitted to the Engineer and approved.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Subgrade preparation
   b. Provision and placement of geotextile fabric, bedding stone and filter gravel materials.
   c. Provision and placement of quarry stone.
   d. Control of water.
   e. Protection of work.
   f. Survey of final elevations.
   g. All related work.
5. This item does <u>not</u> include:
   a. Excavation and disposal as included Bid Item 15: Excavation, Grading, And Disposal of Exempt Materials and Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.

II. Bid Item 46: RIPRAP QUARRY STONE BANK TRANSITIONS

1. Riprap Quarry Stone Bank Transitions will be paid for at the Contract per TON price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Riprap, filled with topsoil and seeded, located at each end of the quarry stone banks and along the toe of the banks.
3. Quantity will consist of actual tons of riprap installed based on weight tickets submitted to the Engineer and approved.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and sown on the Drawings including:
   a. Subgrade preparation.
   b. Placement of geotextile fabric.
   c. Placement of riprap and topsoil.
   d. Placement of choke stone.
   e. Hydromulch.
   f. Protection of adjacent quarry stone and bedding materials.

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g. Control of water.
h. All related work.

5. This item does not include:
   a. Excavation and disposal as included Bid Item 15: Excavation, Grading, And Disposal of Exempt Materials and Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.
   b. Native seeding as included in Bid Item 26: Native Seeding – Zones A & B and Bid Item 27: Native Seeding – Zone C.

JJ. Bid Item 47: VEGETATED RIPRAP BANK

1. Vegetated Riprap will be paid for at the Contract per CUBIC YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Installation of vegetated riprap bank at the confluence located at the south end of the project.
3. Quantity will consist of actual cubic yards of riprap and footer boulders installed based on the measurements by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Subgrade preparation.
   b. Placement of geotextile fabric.
   c. Placement of footer boulders.
   d. Placement of riprap and topsoil.
   e. Hydromulch.
   f. Control of water.
   g. All related work.
5. This item does not include:
   a. Excavation and disposal as included Bid Item 15: Excavation, Grading, And Disposal of Exempt Materials and Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.
   b. Native seeding as included in Bid Item 26: Native Seeding – Zones A & B and Bid Item 27: Native Seeding – Zone C.

KK. Bid Item 48: HEAVY RIPRAP ENERGY DISSIPATOR

1. Heavy Riprap will be paid for at the Contract per TON price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Installation of the Energy Dissipator at the upstream end of the project.
3. Quantity will consist of actual tons of heavy riprap material installed based on the weight tickets submitted to the Engineer and approved.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Subgrade preparation.
   b. 3-inch base aggregate.
   c. Heavy riprap.
   d. Grading and compaction.
   e. Control of water.
   f. All related work.

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5. This item does not include:
    a. Excavation and disposal, which is included in Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.

LL. Bid Item 49: BANK PROTECTION

1. Bank Protection will be paid for at the Contract per SQUARE YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Installation of coir matting and straw along the proposed channel banks.
3. Quantity will consist of actual square yards of bank protection installed based on the measurements by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Subgrade preparation.
    b. Straw.
    c. Coir matting.
    d. Anchors.
    e. Hardwood stakes.
    f. Anchoring matting into riprap and bed materials.
    g. Repairing any damaged areas.
    h. Protection of adjacent work.
    i. All related work.
5. This item does not include:
    a. Topsoil as included in Bid Item 25: Topsoil.
    b. Native seeding as included in Bid Item 26: Native Seeding – Zones A & B.

MM. Bid Item 50: EROSION CONTROL FABRIC

1. Erosion Control Fabric will be paid for at the Contract per SQUARE YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Installation of erosion control fabric along the proposed channel banks slopes.
3. Quantity will consist of actual square yards of bank protection installed based on the measurements by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Surface preparation.
    b. Installation of erosion control fabric.
    c. Biodegradable stakes
    d. Protection of adjacent work.
    e. Repairing any damaged areas.
    f. All related work.
5. This item does not include:
    a. Topsoil as included in Bid Item 25: Topsoil.
    b. Native seeding as included in Bid Item 27: Native Seeding – Zone C.

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NN. Bid Item 51: MULCH

1. Mulch will be paid for at the Contract per SQUARE YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Installation of mulch in turf seeded areas.
3. Quantity will consist of actual square yards of mulch installed based on the measurements by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Surface preparation.
   b. Spreading and placing mulch.
   c. Anchoring mulch materials.
   d. Protection of adjacent work.
   e. Repairing any damaged areas.
   f. All related work.
5. This item does not include:
   a. Topsoil as included in Bid Item 25: Topsoil.
   b. Seeding as included in Bid Item 28: Turf Seeding – Zone D.

OO. Bid Item 52: RIFFLE CONSTRUCTION

1. Riffle Construction will be paid for at the Contract per CUBIC YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Construction of Riffles within the proposed channel.
3. Quantity will consist of actual cubic yards of riffle material installed based on the measurements by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Subgrade preparation.
   b. Furnishing and installing riffle materials in place as specified.
   c. On-site mixing of materials.
   d. Grading and compaction of riffle materials.
   e. Furnishing and placement of boulders.
   f. Control of water.
   g. Protection of adjacent work.
   h. All related work.
5. This item does not include:
   a. Excavation and disposal as included Bid Item 15: Excavation, Grading, And Disposal of Exempt Materials and Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.

PP. Bid Item 53: BOULDER BRUSH RUN CONSTRUCTION

1. Boulder Brush Run Construction will be paid for at the Contract per CUBIC YARD price identified on the Bid Form.
2. The work covered by this item generally includes:

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a. Construction of Boulder Brush Runs within the proposed channel.

3. Quantity will consist of actual cubic yards of boulder brush run material installed based on the measurements by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Subgrade preparation.
   b. Furnishing and installing boulder brush run materials in place as specified.
   c. On-site mixing of materials.
   d. Grading and compaction of boulder brush run materials.
   e. Control of water.
   f. Protection of adjacent work.
   g. All related work.
5. This item does not include:
   a. Excavation and disposal as included Bid Item 15: Excavation, Grading, And Disposal of Exempt Materials and Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.

QQ. Bid Item 54: GLIDE CONSTRUCTION

1. Glide Construction will be paid for at the Contract per CUBIC YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Construction of Glides within the proposed channel.
3. Quantity will consist of actual cubic yards of glide material installed based on the measurements by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Subgrade preparation.
   b. Furnishing and installing glide materials in place as specified.
   c. Grading and compaction of glide materials.
   d. Control of water.
   e. Protection of adjacent work.
   f. All related work.
5. This item does not include:
   a. Excavation and disposal as included Bid Item 15: Excavation, Grading, And Disposal of Exempt Materials and Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.

RR. Bid Item 55: FOUNDATION STABILIZATION

1. Foundation Stabilization will be paid for at the Contract per CUBIC YARD price identified on the Bid Form.
2. The work covered by this item generally includes:
   a. Improvement to the channel foundation or pavement subgrade as determined by the Engineer.
3. Quantity will consist of actual cubic yards of soil excavated and foundation stabilization material installed based on the measurements by the Engineer.

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4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Excavation.
    b. Soil management.
    c. On-site or off-site disposal.
    d. Subgrade preparation.
    e. Furnishing and installing material in place as specified.
    f. Grading and compaction of foundation stabilization materials.
    g. Control of water.
    h. Protection of adjacent work.
    i. All related work.

SS. Bid Item 56: TOE WOOD

1. Toe Wood will be paid for at the Contract per LINEAR FOOT price identified on the Bid Form.
2. The work covered by this item generally includes:
    a. Construction of toe wood bank treatments along stream channel.
3. Quantity will consist of actual linear feet installed and measured by the Engineer.
4. Measurement shall be along the inner berm of the bank where toe wood is installed.
5. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
    a. Subgrade preparation and excavation.
    b. Installation of footer logs.
    c. Installation of woody debris mixed with on-site soils.
    d. Compaction of woody debris and soils.
    e. Installation of coir lifts.
    f. Grading as necessary to tie into adjacent structures
    g. Control of water.
    h. All related work.
6. The Owner has procured and stockpiled adequate quantities of wood materials on site for the proposed Toe Wood structures. The Contractor will not be required to provide off-site woody material.
7. This item does <u>not</u> include:
    a. Excavation and disposal as included Bid Item 15: Excavation, Grading, And Disposal of Exempt Materials and Bid Item 16: Excavation, Grading, And Landfill Disposal of Non-Exempt Materials.

TT. Bid Item 57: SANITARY MANHOLE 48 INCH

1. Sanitary Manhole 48-Inch will be paid for at the Contract per EACH price identified on the Bid Form.
2. The work covered by these items generally includes:
    a. Furnishing and installing sanitary manholes as shown on the Drawings.
3. Quantity will consist of each structure installed and approved by the Engineer.
4. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:

a. Furnishing and installing manhole sections and components.
b. Excavation and disposal.
c. Connection to existing pipes.
d. Trench protection.
e. Bedding and backfilling.
f. Compaction.
g. Joint sealant.
h. Frame and cover.
i. Chimney seal.
j. Connections.
k. Concrete adjustment rings.
l. Testing.
m. All related work.

UU. Bid Item 58: SANITARY SEWER PIPE PVC 21-INCH

1. Sanitary Sewer Pipe PVC 21-Inch will be paid for at the Contract per LINEAR FOOT price identified on the Bid Form.
2. The work covered by these items generally includes:
   a. Sanitary sewer construction as shown on the Drawings.
3. Quantity will consist of actual linear feet of pipe installed and approved by the Engineer.
4. Measurement for payment will be made from center to center of manholes or connection to existing sanitary sewer.
5. Payment shall constitute full compensation for furnishing all labor, material, and equipment necessary to complete the work as specified and shown on the Drawings including:
   a. Furnishing and installing pipe complete in place as specified.
   b. Excavation.
   c. Shoring.
   d. Subgrade preparation.
   e. Bedding, cover, backfilling to subgrade, and compaction per the trench sections shown in the Drawings.
   f. All connections to existing structures and pipes.
   g. Improved pipe foundation where necessary.
   h. Control of water.
   i. Testing.
   j. All related work.
6. These items do <u>not</u> include:
   a. Surface restoration as shown on the Drawings.

1.03 BID PRICES

A. Partial payment for lump sum items will be made according to a schedule of values submitted by the Contractor for approval by the Owner. The approved and finalized schedule of values shall subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction.

B. The Engineer will make measurements and determinations as necessary to classify the work within Bid Items and verify the quantities for pay purposes.

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C. Work for which there is not a Bid Item will be considered incidental to the Contract and no separate payment will be made unless approved by the Engineer.

D. Contractor's general and administrative costs, including but not limited to project management, coordination, submittals, bonds and insurance, warranties and guaranties, shall be incidental to the Work and shall be distributed through all Bid Items. No separate payment will be made for these costs unless specifically listed on the Bid Form.

E. If the Contractor delivers and places more of any material that is paid for on a Bid Unit Price basis than is required to perform the Work and thereby causes the materials to be wasted, the quantity wasted will be deducted from the final measurement for that Bid Item.

1.04 PAYMENT PROCEDURES

A. Use one of the following formulas:

1. EJCDC C-620 (2013);
2. Owner approved alternative.

B. Preparation of Applications:

1. Comply with Article 14 of the General Conditions.
2. Use approved Schedule of Values.
3. List each authorized Change Order with Engineer-assigned change item number.

C. Submittal procedure:

1. Submit monthly, electronically in PDF format, by date set at Pre-construction conference.

D. Submit a written report detailing current progress of Work and indicating Work schedule deficiencies. Engineer will use information contained in report when reviewing Contractor's Payment Application.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. General requirements for overall Project coordination, and includes information on utilities, permits, survey control, and meetings.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment

1. All Work and costs of this Section shall be incidental to the Project and included in the appropriate unit prices or lump sum bid items.

1.03 UTILITIES

A. Notify Diggers Hotline before starting construction.

B. Contractor shall be responsible for all costs associated with utility location.

C. Project Utility Sources: Coordinate Work with all utility owners. The following utilities are known to be on the Site and are shown on the Drawings in a general way:

1. Water: City of Brookfield.
2. Sanitary Sewer: Owner.
3. Storm Sewer: Owner.
4. Electric: WE Energies.
5. Gas: WE Energies.
6. Telephone: AT&T.
7. Communications: Spectrum.

D. Owner requires a 48-hour notice for all utility interruptions.

1.04 PERMITS

A. Contractor must conform with the requirements of the permits listed below. These permits have been obtained by the Owner and are available in Appendix B.

1. USACE NWP 27: Aquatic Habitat Restoration, Enhancement, and Establishment Activities
2. WDNR WDNR-G11: Wetland Statewide General Permit for Wetland Disturbance - Municipal Development

B. The following permits have been applied for by the Owner. Upon approval, final permit conditions will be amended to the Contract.

1. WDNR Chapter 30

C. Contractor shall prepare and submit to the WDNR all documentation necessary to obtain coverage for the Owner under General Permit to Discharge Under the Wisconsin Pollution

Discharge Elimination System Permit No. WI-S067831-6 for Construction Site Storm Water Runoff.

1. Contractor shall provide copies of Erosion Control Inspection Reports to Village and Engineer following each inspection.

D. Prepare, apply for, obtain, and comply with other permits, licenses, and approvals which may be required for the Project.

1.05 SURVEYING AND CONSTRUCTION OBSERVATION

A. The Engineer will provide the Contractor with the location and horizontal / vertical coordinates of site survey control points. The Contractor will be responsible for all surveying needed to establish lines, grades, measurements, grade checks, and other necessary locations of the Work.

B. Engineer may furnish a Resident Project Representative consistent with Paragraph 9.03 of the General Conditions.

1.06 PROJECT MEETINGS

A. Administrative Requirements

1. Project Superintendent or persons designated by the Contractor to attend and participate in the Project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the Project meetings.
2. Engineer will set the time, sites, and prepare the agenda for the meetings.
3. Engineer will prepare meeting minutes and distribute to Contractor. Notify Engineer of inaccuracies or discrepancies in the meeting minutes within 5 calendar days of receipt of the minutes.
4. The attendance and cooperation of subcontractors and suppliers may be required.

B. Preconstruction Conference

1. Provisions and requirements for the Preconstruction Conference are set forth in the General Conditions.
2. Submittal procedures shall be consistent with Section 01 33 00.
3. Contractor and all main subcontractors shall attend.

C. Progress Meeting Procedures

1. Engineer may schedule construction progress meetings throughout the duration of the Project to assess the progress of the Work, identify and discuss Project related issues, and discuss near-term construction activities.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. General procedures and requirements for submittals during the course of construction.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. All Work and costs of this Section shall be incidental to the Project and included in the appropriate unit prices or lump sum bid items.

1.03 SEQUENCING AND SCHEDULING

A. Schedule submittals consistent with the Contractor's schedule of shop drawings.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 CONSTRUCTION SCHEDULE

A. Submit preliminary schedule and progress schedule consistent with the General Conditions.

B. Prepare schedules on 11 inch by 17 inch sheets showing overall sequence of construction. Organize the schedule by work activity. Identify separate stages of each work activity:
   1. List work items in chronological sequence. Show beginning and completion dates of each activity. Include all activities with an estimated duration of 2 days or longer.
   2. Format schedule as a horizontal bar chart. Provide separate bars for each activity or trade.
   3. Provide space for revisions and notations.
   4. Identify interrelations between activities.
   5. Include estimated times for preparation of submittals by Contractor, processing and review of submittals by Engineer, fabrication, delivery, installation, testing, start-up, instruction of Owner, and clean-up.

C. As Work progresses, revise, update, and resubmit schedule as requested by Engineer. At a minimum, update schedule with each Application for Payment. Show all activities started or finished since previous schedule was submitted and show percentage of completion for each activity.

3.02 EMERGENCY CONTACT LIST

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A. Before any Work at the Site is started, submit a typed list on 8.5 inch by 11 inch paper outlining 24-hour on-call contacts for the Project. This list shall include the Contractor's safety representative, key representatives from the Contractor, subcontractors, and suppliers. Include the following information for each contact:
   1. Company name.
   2. Contact person(s).
   3. Local and mobile phone numbers.
   4. Email address

3.03 SHOP DRAWINGS AND MANUFACTURERS' INFORMATION

A. Conform to the requirements of the General Conditions, except as modified herein.

B. The minimum sheet size shall be 8.5 inches by 11 inches. Non-legible submittals will not be reviewed.

C. Submittals shall be submitted to the Engineer electronically via email attachment in PDF format.

D. Each submittal shall contain a transmittal sheet with the following information:
   1. Date of submission and date of any previous submittals.
   2. Project Title.
   3. Names of: Contractor, subcontractor, supplier, and manufacturer.
   4. Identification of product and Specification Section number.
   5. Identification of revisions from previous submittals.

E. Engineer's review will be in conformance with the requirements of the General Conditions, except as modified herein.

F. Shop Drawing Submittal Procedure

   1. The Contractor shall submit to the Engineer for his review, shop drawings and catalog cuts for fabricated items and manufactured items furnished under this Contract. The initial submittal of shop drawings shall be accurate, distinct, and complete, and shall contain all required information, including satisfactory identification of items, units, and assemblies in relation to the applicable parts of these Contract Documents.

   2. Unless otherwise approved by the Engineer, shop drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp on the shop drawings, or other acceptable means, that they (the Contractor) have checked and approved the shop drawings, and that the work shown is in accordance with the Contract Documents and has been checked for dimensions and relationship with other work. The practice of submitting incomplete or unchecked shop drawings for the Engineer to correct or finish will not be acceptable, and shop drawings which, in the opinion of the Engineer, indicate that they have not been checked by the Contractor will be stamped, notated as "Rejected" and returned to the Contractor for resubmission in the proper form.

   3. When shop drawings have been reviewed by the Engineer, the submittal(s) will be returned to the Contractor appropriately stamped and notated.

   4. If major changes or corrections are necessary, the shop drawings may be notated as "Rejected" and the set will be returned to the Contractor with such deficiencies indicated. The Contractor shall correct and resubmit the shop drawings in the same

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manner and quantity as specified for the initial submittal, unless otherwise indicated by the Engineer.

5. If changes or corrections to be made by the Contractor necessitate a resubmittal for the Engineer's further review, the shop drawings will be notated "Revise and Resubmit."
6. Shop drawings returned to the Contractor notated with either "Make Corrections Noted", "No Exceptions Taken" or "For Record Only" are to be considered appropriately stamped final shop drawings.
7. If changes are made by the Contractor (in addition to those requested by the Engineer) on the resubmitted shop drawings, such changes shall be clearly explained by the Contractor in a transmittal letter accompanying the resubmitted shop drawings.
8. The review of shop drawings and catalog cuts by the Engineer shall not relieve the Contractor from responsibility for interfacing with other trades' work that will impact the shop drawing correctness of dimensions, fabrication details, and space requirements, or for deviations from the Plans and Specifications, unless the Contractor has called attention to such deviations in writing by a letter accompanying the initial shop drawings submittal and the Engineer approves the change or deviation in writing at the time of that submittal, nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, the Contractor shall state in his letter whether or not such deviations cause any deduction or extra cost adjustment.
9. The Contractor agrees that shop drawing submittals processed by the Engineer do not become Contract Documents and are not Change Orders; that the purpose of the shop drawing review is to establish a reporting procedure and means to assess the Contractor's understanding of the project requirements and is intended for the Contractor's convenience in organizing his work and to permit the Engineer to monitor the Contractor's progress.

G. Submittals for review and approval by the Engineer will be acted upon by the Engineer as promptly as possible, and in all cases within 30 days of receipt, and returned to the Contractor. Resubmittals will be acted upon by the Engineer as promptly as possible, and in all cases within 15 days of receipt. Delays caused by the need for resubmittals shall not constitute reason for an extension of Contract time.

3.04 TEST REPORTS

A. Submit all inspections, tests, and approvals required in the Specification in electronic PDF format.

3.05 WELDING CERTIFICATES

A. Submit welding certificates for each person by name assigned to do field welding of materials installed under this Contract. Certificates shall indicate that each person has passed tests specified by AWS and shall be submitted prior to execution of any welding.

3.06 MATERIAL AND SAFETY DATA SHEETS

A. Furnish Owner with current versions of Material Safety Data Sheets for all chemicals and products on Site.

END OF SECTION

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Temporary utilities and miscellaneous temporary facilities required during construction.
   2. Staging, access, and traffic control plan requirements.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00 Measurement and Payment.

1.03 REFERENCES

A. Wisconsin Department of Transportation Standard Specifications (WisDOT Spec.) – Latest edition.

B. Wisconsin Manual on Uniform Traffic Control Devices (WisMUTCD) – Latest edition.

C. WisDOT Traffic Guidelines Manual.

1.04 SUBMITTALS

A. Construction Staging, Access, and Traffic Control Plan for Owner review and approval, including the following information:
   1. Sequence of construction and traffic control.
   2. Streets, driveways and sidewalks closed or restricted during any stage of construction.
   3. Provisions for routing any detoured traffic as permitted.
   4. Specific signs, striping, and other traffic control devices to be utilized.
   5. Material and equipment staging layout plan.
   6. Haul and access routes.
   7. Permits or applications required by local authorities.
   8. Temporary facilities required.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 MOBILIZATION

A. Move personnel, equipment, materials, and all other items required to complete the Work at the Site.
   1. Contractor staging shall occur only in easement area directly east of 890 Elm Grove Road building.

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B. Establish Contractor facilities necessary for Work on the Project.

C. Temporarily hold or relocate utilities and any miscellaneous structures, such as signs, power poles, guy wires, and mailboxes disturbed.

3.02 TEMPORARY UTILITIES

A. Provide and maintain all temporary facilities, utilities, and controls as long as needed for the safe and proper completion of the Work. Remove all temporary facilities, utilities, and controls as rapidly as progress will permit or as directed by Engineer.

B. Temporary Water for Construction
   1. If Contractor requires temporary water connection for construction, Contractor is responsible for identifying acceptable source, obtaining all necessary permits, and paying all necessary fees. This includes obtaining a meter and backflow preventer or assembly if necessary.

C. Temporary Electricity
   1. Provide all necessary temporary electric service and temporary wiring needed for construction activities. Contractor shall pay for all temporary electricity.

3.03 CONSTRUCTION FACILITIES

A. Sanitary Facilities
   1. Comply with all governing regulations, including safety and health codes, for sanitary fixtures and facilities.
   2. Provide self-contained toilet units, or water and sewer connected temporary toilet facilities, consistent with governing regulations. Contractor may not use Owner's toilet facilities.
   3. Provide and maintain adequate supply of toilet tissue, paper towels, paper cups, and similar disposable materials appropriate for each facility. Provide appropriate covered waste containers for used material.

3.04 TRAFFIC CONTROL

A. General
   1. Pursuant to Section 200.35(7) WIS. STATS. and the Contract Documents, the Contractor shall prepare and submit a traffic control plan for approval. Changes to this plan can only be made by Owner's written approval. It is the Contractor's responsibility to secure such approvals for any necessary changes so as not to delay the progress of the work.
   2. Traffic control devices shall be employed, and they shall comply with the requirements of the Wisconsin Manual on Uniform Traffic Control Devices (WMUTCD).
   3. The Contractor shall conduct Work in a manner which will allow access to all properties within and adjacent to the Project by fire, police, and emergency vehicles.
   4. Along Wall Street:
      a. At least one lane of traffic in each direction shall be maintained at all times, except where specifically approved in writing.
   5. Along Watertown Plank Road:
      a. During construction of the West Channel Bank Wall, at least one lane of access into the parking lot from Watertown Plank Road west of the channel shall be maintained at all times.
         1) The duration of this one-lane access condition shall be no more than 10 weeks.

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b. During all other work prior to construction of the West Channel Bank Wall and after its completion, two lanes of access between the parking lot and Watertown Plank Road west of the channel shall be maintained.
c. The Contractor shall coordinate with the Owner for any parking lot lane or access modifications a minimum of one week prior to the expected modification if required by the approved traffic control plan.

3.05 TEMPORARY BARRIERS AND ENCLOSURES

A. Temporary Barriers
1. Provide temporary covers, enclosures, markers, and barriers as necessary to protect Work.
2. Damage to the Site caused by removal of temporary fencing, including postholes, shall be promptly repaired by Contractor. During removal at no time shall the Work remain unattended if a dangerous condition exists because of incomplete removal or Site repair operations.

B. Temporary Fence
1. Install temporary fence at Construction Limits, at locations shown on the Drawings, and as necessary to protect the public and the Work.
2. Maintain fence in good repair throughout the duration of the Project.
3. Provide Owner and Engineer with keys or combinations to any locks that may be used to secure fencing gates.

3.06 CONTRACTOR'S OFFICE

A. Contractor's temporary office location must be approved by Owner.

END OF SECTION

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SECTION 01 57 13

TEMPORARY EROSION, SEDIMENT, AND WATER CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Managing stormwater runoff and other Project related water discharges to minimize sediment pollution during construction.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00 Measurement and Payment.

1.03 REFERENCES

A. State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction – most current edition and current supplements (WisDOT Spec):
   1. Section 628 - Erosion Control.
   2. Section 645 – Geotextile Fabric.

B. State of Wisconsin, Department of Natural Resources (DNR), Storm Water Construction Technical Standards.

1.04 PERMITS

A. Contractor shall prepare and submit to the WDNR all documentation necessary to obtain coverage for the Owner under General Permit to Discharge Under the Wisconsin Pollution Discharge Elimination System Permit No. WI-S067831-6 for Construction Site Storm Water Runoff.

1.05 SUBMITTALS

A. Certification and Sampling:
   1. Furnish a manufacturer's certification stating that the material supplied conforms to the requirements of this Section. The certification shall include or have attached typical results of tests for the specified properties, representative of the materials supplied.

B. EROSION CONTROL PLAN DRAWINGS (NOTICE OF INTENT)

   1. The Contractor shall review the erosion control requirements of the project and prepare a plan drawing, and a detail or typical section drawing of the erosion control methods utilized, for submittal of the WDNR Notice of Intent. The types of erosion control methods and materials considered shall conform to the Plans, specifications included in this section, Wis. Admin Code NR 216, and WDNR Storm Water Construction Technical Standards as appropriate, but not be limited to:

      - Soil and slope stabilization

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- Access point-tracking pads
- Storm drain inlet protection
- Perimeter erosion control
- Drainage swales
- Sedimentation basins
- Stockpile protection
- Dewatering – related protection
- Outfall protection

2. The plan drawing shall illustrate plan view information on the following items:

- Construction site boundary
- Location of all erosion control measures
- Stockpile areas
- Vehicle and equipment access sites
- Areas of disturbance
- Sensitive areas prone to soil erosion
- Drainage diversion measures
- Topography
- Soil types
- Floodplains and wetlands

C. If the contractor determines that dewatering will be necessary, a dewatering plan following WDNR Storm water Construction Technical Standard 1061 shall be submitted by the contractor to the Engineer and WDNR for approval. Notify the WDNR if dewatering is scheduled to occur in areas of soil and/or groundwater contamination, or if dewatering will occur from a high capacity well (70 gpm or greater). Provide anti-scour protection and maintain non-erosive flow during dewatering.

1.06 QUALITY ASSURANCE

A. Erosion Control Supervisor: Provide an Erosion Control Supervisor to direct the erosion control operations and ensure compliance with Federal, State, and Local ordinances and regulations.

1.07 SEQUENCING AND SCHEDULING

A. Install erosion control measures prior to starting any construction operation, which might cause any sedimentation or siltation.

B. Remove erosion control after the site has become stabilized and turf and grass cover is developed to the extent that future erosion is unlikely.

C. Bare soil areas, including soil stockpiles, left undisturbed for 7 days, shall be stabilized with: temporary or permanent seed and mulch (properly anchored by crimping, netting, or tackifier); hydromulch; tarp; or other approved method.

PART 2 PRODUCTS

2.01 STORM SEWER INLETS

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1060.

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2.02 SILT FENCE AND SILT SOCK

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1056.

2.03 STONE TRACKING PAD

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1057.

2.04 EROSION MAT (TEMPORARY)

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1052.

2.05 DITCH CHECK

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1062.

2.06 SEDIMENT TRAP

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1063.

2.07 TURBIDITY BARRIER

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1069.

2.08 OTHER EROSION CONTROL PRODUCTS

A. For erosion control products and devices not listed in this Part, comply with relevant Wisconsin DNR Conservation Practice Standards.

2.09 DEWATERING

A. Install and construct dewatering methods conforming to WDNR Technical Standard 1061.

2.10 FLOW DIVERSION

A. Materials used for construction and operation of any flow diversion and dewatering system including blocking flow, diverting flow, creating sumps, piping, support for infrastructure, pumps, power source, by-pass measures, and fuel storage shall be maintained to provide adequate control of water to perform work as specified. The Contractor shall maintain a supply of backup units and replacement parts for equipment.

PART 3 EXECUTION

3.01 GENERAL

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A. Comply with all applicable laws, ordinances, regulations, permit requirements, orders and decrees pertaining to erosion/sediment control and stormwater discharge during the conduct of the Work.

B. A Suggested Erosion Control Plan, Notes and Details are included in Drawings.

C. Take necessary precautions against damage to the Project by action of the elements.

D. Minimize the amount of disturbed land that is susceptible to erosion at any time. Delineate areas not to be disturbed:
   1. Exclude vehicles and construction equipment from area not to be disturbed to preserve natural vegetation
   2. Maintain and preserve riparian and naturally vegetated buffer strips (10 feet minimum distance) along water courses, outside of revetment construction area.

3.02 STORM SEWER INLETS

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1060.

3.03 SILT FENCE AND SILT SOCK

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1056.

3.04 STONE TRACKING PAD

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1057.

3.05 EROSION MAT (TEMPORARY)

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1052.

3.06 DITCH CHECK

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1062.

3.07 SEDIMENT TRAP

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1063.

3.08 TURBIDITY BARRIER

A. Install and construct erosion control methods conforming to WDNR Technical Standard 1069.

3.09 MAINTENANCE

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A. Comply with recommended practices as described in Wisconsin DNR Storm Water Construction Technical Standards, and as follows:
   1. Contractor is responsible for inspection, maintenance and repair of any washouts or accumulations of sediment that occur as a result of the grading or construction. Restoration consists of grade repair, turf reestablishment and street sweeping of mud and debris tracked from the site.
   2. Contractor is responsible for the maintenance and repair of all temporary erosion control devices.
   3. Inspection of all erosion control items will take place immediately after each runoff event and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

B. All erosion and sediment control measures shall be inspected weekly and after every 24-hour precipitation event of 1/2 inch or greater or in accordance with the permit requirements. Needed repair or replacement shall be made immediately.

3.10 EROSION CONTROL METHODS

A. All erosion and sediment control measures should be constructed and maintained in accordance with the Wisconsin DNR Storm Water Construction Technical Standards.

B. All sediment control measures should be adjusted to meet field conditions at the time of construction and installed prior to any grading or disturbance of existing surface material.

C. Maintenance of all sediment control structures shall be provided to ensure intended purpose is accomplished. Sediment control measures are to be in working condition at the end of each working day.

D. Sediment control measures shall not be removed until the disturbed area is permanently stabilized and no longer susceptible to erosion.

E. Sediment tracked onto roads shall be removed by street cleaning, not flushing, before the end of each work day.

3.11 DEWATERING

A. Install and construct dewatering methods conforming to WDNR Technical Standard 1061.

3.12 FLOW DIVERSION

A. Flow diversion systems for diverting flow away from the work zone for streambank, floodwall, and endwall construction shall be installed, as necessary, by the Contractor prior to construction and suitable to prevent water from entering and to remove water from the work zone. The diversion system shall be in operational order at all times while work is commencing along the active stream.

B. The diversion system shall be inspected on a daily basis and immediately repaired as necessary. Failure of the diversion system shall not affect the progress of the work on this Contract, nor cause damage to the work completed. All damages due to diversion system failure shall be repaired at no cost to the Owner.

END OF SECTION

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SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Basic requirements for products used in the Work.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. All Work and costs of this Section shall be incidental to the Project and included in the appropriate unit prices or lump sum bid items.

1.03 SUBMITTALS

A. Submit the following items consistent with Instructions to Bidders:
   1. Written request for approval with supporting documentation.

B. Submit the following items consistent with Section 01 33 00 and General Conditions Article 6.05:
   1. Shop drawings for named products and "or-equal" products.
   2. Written application for substitute items, including supporting documentation.

1.04 PRODUCT SUBSTITUTIONS AND "OR-EQUAL" PROCEDURES

A. Procedures During Bidding
   1. Conform to the requirements of the Instructions to Bidders.

B. Procedures During Construction
   1. Scheduling of Submittals: Conform to the Contractor's Schedule of Submittals.
   2. Submittal Procedures: Conform to the requirements of Section 01 33 00.
   3. Items not approved as "or-equal" may be resubmitted as a Substitute Item.
   4. Engineer will review Substitute Item requests that conform to General Conditions Article 6.05.A2d and the following additional supporting documentation:
      a. Drawings and Specifications.
      b. Installation lists.
      c. Performance data, including equipment capacity, strengths, weights, and dimensions.
      d. Catalog cut-sheets.
      e. Lists of deviations from and exceptions to the Specifications.
      f. Detailed information for all buy-out items, including motors and drives.
      g. Lists of materials of construction.
      h. Maintenance schedules of equipment, including buy-out items.
      i. Other information deemed necessary at the discretion of Engineer.
   5. Incomplete submittals will be returned to Contractor without review.
   6. Contract times will not be modified due to substitute and "or-equal" review process.
   7. Engineer shall not have to prove that an item is not an "or-equal."

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8. Owner does not have to accept proposed Substitute Items.

1.05 SUBSTITUTE ITEMS

A. Procedures During Bidding
   1. Conform to the requirements of the Instructions to Bidders.

B. Procedures During Construction
   1. Alternate material or equipment items accepted by the Owner and included in the award of Contract become named materials or equipment.
   2. Submit shop drawings and material certifications consistent with Section 01 33 00.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 DELIVERY

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

B. Handle and lift products only at designated lift points and by methods to avoid soiling, disfigurement, bending, over stressing, and damage.

C. Store products on shelves, in bins, or in neat groups of like items with seals and labels intact and legible, and in a manner to provide access for maintenance and inspection.

D. Store loose granular materials on clean, solid, flat surfaces, and prevent mixing with foreign matter. Store fabricated products supported above the ground on skids or blocking. Provide surface drainage to prevent erosion and ponding of water.

E. Cover products subject to discoloration or deterioration with impervious sheet covering and protect products from soiling and staining.

F. Store and protect products which are subject to damage by the elements in weathertight, climate controlled enclosures, and according to the manufacturer's instructions. Maintain temperature, ventilation, and humidity within ranges stated in the manufacturer's instructions.

G. Attach applicable manufacturer's service instructions labeled "STORAGE SERVICE INSTRUCTIONS ENCLOSED" to exterior of each stored product.

H. Inspect, maintain, and service stored products on a regularly scheduled basis, consistent with the manufacturer's instructions.

I. Record inspection, maintenance, services performed, and keep log available for review.

J. Traffic control required for all deliveries to and from the Site shall be the responsibility of the Contractor. All flagmen, barricades, flares, and safety measures are the sole responsibility of the Contractor.

3.02 STORAGE AND HANDLING

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A. Protect from damage all materials and equipment to be used in the completed facility.

B. Provide temporary Site security fencing around storage areas and as indicated on the Drawings.

C. The Contractor shall provide the Owner and Engineer with keys or combinations to any locks that may be used to secure fencing gates.

D. Storage areas and hazardous areas shall be protected by use of chain link fence around the perimeter of the area. This fencing is in addition to any other fencing required for Site containment.

END OF SECTION

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SECTION 01 70 00

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Requirements for overall execution of the Work and closeout of the Contract for Final Payment.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. All Work and costs of this Section shall be incidental to the Project and included in the appropriate unit prices or lump sum bid items.

1.03 SUBMITTALS

A. Submit the following items consistent with the Conditions of the Contract and Division 01 Sections:
   1. Record Documents.
   2. Written Notification of Substantial Completion.
   3. Executed Certificate of Substantial Completion
   4. Written Notification of Final Completion.
   5. Spare Parts, Operation and Maintenance Manuals, instructions, schedules, warranties, guarantees, Bonds, certificates, certificates of inspection, and other documents.
   6. Final Application for Payment, including accompanying documentation.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 EXAMINATION

A. Acceptance of Conditions: By commencing Work, Contractor construes acceptance of the adjacent work as satisfactory to receive subsequent work.

B. Existing Conditions: Before commencing Work, inspect work completed by others that is adjacent to Work. If adjacent conditions prevent completion of Work, Contractor will not commence Work until the conditions are corrected.

C. Inspect each product immediately prior to installation. Remove damaged products from Site.

3.02 GENERAL INSTALLATION REQUIREMENTS

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A. Comply with the manufacturer's instructions for installation of manufactured products to the extent that these instructions are applicable and more explicit or more stringent than requirements indicated in the Contract Documents.

B. Secure Work true to line and level, within recognized industry tolerances, with anchorage devices designed and sized to withstand stresses, vibration, and rocking. Allow for expansion and movement of building.

C. Install each element of work during weather conditions and Project status to ensure coordination of the Work. Isolate each element of work from incompatible work as necessary to prevent deterioration.

D. Conceal pipes, ducts, and wiring within the construction in finished areas, except as otherwise indicated. Coordinate locations of fixtures and outlets with finish elements.

E. Record installation details and prepare Record Documents consistent with the General Conditions.

3.03 SITE MAINTENANCE

A. Maintain stockpiles, excavations, access roads, and all other work areas free from dust. Employ dust abatement techniques whenever a dust nuisance or hazard occurs, or as directed by Engineer. Comply with local ordinances.

B. Protect hazardous work areas and hazardous material storage areas.

C. Protect trees, unless specifically indicated on Drawings.

D. Clean access roads and haul routes with mechanical street sweeper.

E. If Contractor fails to maintain Site, Engineer will provide Written Notice of Contractor's defective Work. Contractor will be given 12 hours from the Notice to clean Site. After the 12-hour period, Owner may correct the defective Work consistent with Article 13.09 of the Conditions of the Contract.

3.04 CLEANING AND PROTECTION

A. Clean and protect Work in progress and adjoining Work during handling and installation. Apply protective covering on installed Work where it is required to ensure freedom from damage or deterioration.

B. Clean and perform maintenance as frequently as necessary throughout construction period. Adjust and lubricate operable components to ensure operability without damage effects.

3.05 FINAL CLEANING

A. Wash and polish all glass surfaces.

B. Dust, vacuum, wash, and clean all spaces, duct work, light fixtures, equipment, electrical work, and all other components of the Work. Remove all stains, dust, and dirt.

3.06 CUTTING AND PATCHING

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A. Complete all cutting, fitting, and patching as necessary to join the new Work to existing conditions.

B. Remove or cut existing work only as necessary to join the new work to the existing construction or as required by the Contract Documents.

C. Patch defective and incomplete surfaces caused or exposed by Work of the Project.

D. Repair any damage to existing conditions and patch to match.

E. Existing construction designated by the Contract Documents to remain that is loosened, cracked, or otherwise damaged or defaced beyond repair as a result of Work by the Contractor will be considered unsuitable for the use intended and shall be removed and replaced by the Contractor.

3.07 SPECIAL TOOLS

A. Provide any special tools, jigs, fixtures, and lifting tackle which are necessary for assembly, erection, operation, maintenance, and repair of equipment.

B. Special tools and devices are those the design, purpose, and use of which are peculiar to the equipment furnished and which are not available from normal wholesale or retail outlets. Standard general purpose tools are not included in this requirement.

3.08 SUBSTANTIAL COMPLETION

A. The work shall be considered substantially complete when the Engineer issues a Substantial Completion Certificate.

B. Prior to issues of the certificate, all work shall be completed, with the exception of final inspection and acceptance of grass and prairie cover.

3.09 FINAL PAYMENT

A. Upon completion of the punch list items and as a condition of final payment, the Contractor shall prepare and submit to the Engineer for transmission to the Owner.
   1. All exhibits required by the Project Manual
   2. Work site shall be clean.
   3. Punch list shall be completed.

END OF SECTION

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SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Complete or partial removal and disposal or salvage of at grade, above grade, and below grade structures, pavement, and miscellaneous items.

2. Clearing and grubbing, including the clearing brush and trees, removal of rocks, roots, stumps, logs, fences, pipes, debris and any other obstructions interfering with construction.

3. Abandonment in place of drainage structures and piping.

4. Removal of the existing railroad bridge located at the downstream section of the project.

5. Abandonment of existing monitoring wells.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment

1. Refer to Section 01 20 00.

1.03 REFERENCES

A. State of Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" - most current edition including all current supplements (WisDOT Spec):

1. 201 – Clearing and Grubbing

2. 204 – Removing or Abandoning Miscellaneous Structures

3. 519 – Brick Masonry and Concrete Brick or Block Masonry

4. 690 – Sawing Pavement

B. All work performed and material supplied shall conform to these State of Wisconsin Standard Specifications, except as may hereinafter be modified.

1.04 DEFINITIONS

A. Remove: To take away or eliminate from the Project Site by any method selected by the Contractor, including disposal of material.

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B. Salvage: To dismantle, disassemble, or remove carefully without damage so the item can be re-assembled, replaced, or reused in a workable condition equal to that existing before removal.

C. Abandon: To fill, bulkhead, or close off pipes and structures so that no settlement or flow can occur.

D. Clearing: Cutting, removing, and disposing of trees, shrubs, bushes, windfalls, and other vegetation in the designated areas.

E. Grubbing: Removing and disposing of stumps, rocks, logs, roots, and other remains in the designated areas.

F. Tree Trimming/Pruning: Cutting broken, damaged, or obstructing branches and installing wound dressing.

1.05 REGULATORY REQUIREMENTS

A. All materials designated for removal shall be disposed of outside the Project Site at locations to be selected by the Contractor.

B. All materials designated for salvage shall be stockpiled or temporary stored on sites to be provided by the Contractor.

C. Conform to all applicable codes for the disposal of material.

1.06 SUBMITTALS

A. Detailed drawings and calculations sealed by a Wisconsin professional engineer showing the reinforced concrete or masonry bulkheads for each end of the culvert beneath the Sendik's building, including:

1. Sections and elevations including proposed dimensions.
2. Proposed materials.

1.07 SCHEDULING

A. Fill holes or depressions resulting from removal or salvage immediately.

B. Protect all items intended to be salvaged.

C. Provide temporary surface restoration for traffic continuity where removal or salvage operations are completed within streets, driveways, or parking lots.

PART 2 PRODUCTS

2.01 GENERAL

A. The contractor shall employ all products necessary for the complete execution of the work.

2.02 LOW DENSITY CONCRETE

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A. Refer to Section 03 34 00 Low Density Concrete.

2.03 BULKHEADS AND PLUGS

A. Concrete for bulkheads and plugs shall be in accordance with Section 03 30 00 – Cast In-Place Concrete.

B. Masonry for bulkheads shall be concrete brick or concrete block masonry conforming to WisDOT Standard Specification Section 519.

2.04 TREE PROTECTION

A. Tree Protection fence shall be orange plastic mesh, 4 feet in height.

B. Wound Dressing

1. Asphalt base tree paint.

2. Other acceptable materials per Engineer's approval.

PART 3 EXECUTION

3.01 GENERAL

A. Dispose of all items removed, except for those items identified to be salvaged or recycled. Said disposal shall be in accordance with all laws, regulations, statutes, etc.

B. Perform removal work without damage to adjacent retained work. Where such work is damaged, the Contractor shall patch, repair, or otherwise restore same to its original condition at no expense to the Owner.

C. Remove debris from the work area as often as necessary, but not less than at least once at the end of each workday. Debris shall be placed in approved containers to prevent the spread of dust and dirt.

D. Owner will identify trees to be removed.

E. Execute the work in a careful and orderly manner with the least possible disturbance to the public and occupants of buildings.

F. Fill holes resulting from removals consistent with Section 31 23 13 – Subgrade Preparation and Section 32 11 23 – Aggregate Base.

3.02 EXAMINATION

A. Meet with owners of signs to determine requirements for salvage, storage, and replacement.

3.03 PROTECTION

A. Take all necessary precautions to adequately protect personnel and public and private property in the areas of Work. All Site fencing shall be in place prior to the start of any removal work.

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B. All street signs, traffic control signs, guy wires, mailboxes, posts, wood fence, etc. which may interfere with construction shall be removed, stored safely, and replaced.

C. Approved barriers or warning signs shall be provided as necessary.

D. Provide and maintain temporary protection of existing structures designated to remain where removal work is being done, connections made, materials handled, or equipment moved.

E. Do not close or obstruct walkways or roadways. Do not store or place materials in passageways or other means of egress. Conduct operations with minimum traffic interference.

F. Take reasonable precautions to limit damage to existing turf.

G. Install tree protection (temporary fencing) at the drip lines of trees to be protected prior to any construction activities in order to protect vegetation.

H. Holes or depressions created by removals shall not be left open for more than 1 day. Any hole within 10 feet of sidewalks shall be filled, suitably marked, or covered immediately.

I. Avoid disturbance to any material beyond the limits required for new construction.

3.04 CLEARING, GRUBBING, DEMOLITION

A. Clearing Trees: Cut off, remove, and dispose of trees and brush in the areas designated as a clearing operation. When grubbing is not required, the point of cut off shall be 6 inches above the ground.

B. Clearing Brush: Cut even with the ground surface.

C. Grubbing: Remove brush, stumps, roots, and other remains to a minimum depth of 6 inches below subgrade for all proposed sections.

D. Fencing, guardrail, and bollards to be demolished shall be removed in their entirety and disposed of offsite. Backfill all open holes or excavations immediately following removal.

E. Backfill all depressions resulting from the grubbing operations in accordance with Section 31 23 00 Earthwork.

F. Conduct operations so as not to damage surrounding private property or tree designated not to be removed.

3.05 SALVAGE OF WOODY MATERIAL

A. Select and stockpile appropriate woody material for use in toe wood and boulder brush run construction.

B. Dispose of excess woody material not suitable for toe wood or boulder brush run construction.

3.06 SALVAGE OF PARKING LOT LIGHT FIXTURES

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A. Parking lot lighting fixtures in conflict with the proposed work shall be removed and temporarily stored at a secure location during construction.

B. Following completion of all work, lighting poles and fixtures shall be replaced. Contractor shall install new cabling between poles and new concrete pole bases.

C. Damage to existing lighting facilities will be the responsibility of the Contractor.

3.07 SAWING PAVEMENT

A. Saw cut pavements in neat straight lines, at right angles to the street or drive to produce a clean joint.

B. If saw cuts are damaged during construction; saw cut edges again immediately prior to paving at the Contractor's cost.

C. Sawing pavement shall conform to the requirements of WisDOT Spec. 690.3.3.

D. Sawcutting locations shall be as marked in the field by the Engineer.

3.08 BULKHEADS AND PLUGS

A. For round sewers, concrete and masonry plugs and bulkheads shall be at least 1-foot long, or 6 inches longer than the diameter of the pipe, whichever is greater, and shall fill the entire area of the pipe. The plug shall extend 3 inches beyond the end of the pipe.

B. For the section of existing Underwood Creek culvert beneath the Sendik's building:

1. Abandon by bulkheading both ends of the culvert section.

2. Contractor shall provide bulkheads to resist all loads from completed adjacent work, including surcharge from vehicular loads.

C. Bulkheads and plugs shall be watertight.

3.09 ABANDONMENT OF EXISTING CONCRETE CHANNEL COMPONENTS

A. COMPLETE REMOVAL – Section immediately downstream of Watertown Plank Road

1. Completely remove the first approximately 125 feet of concrete channel bed, walls, railings, and culvert lid downstream of Watertown Plank Road, as necessary to allow proposed stream channel and retaining wall construction.

2. Work shall be done in accordance with WisDOT Standard Specification 204.

3. Removal limits as shown in Drawings and as directed by the Engineer in the field.

4. Fill and compaction requirements shall comply with requirements of Section 31 23 00 - Earthwork.

B. PARTIAL REMOVAL – Section north of Sendik's building

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1. Remove culvert top slab and side walls, including beams supporting top slab, to at least three feet below grade of the remaining approximately 320-foot reach of box culvert downstream to Sendik's building.

2. Removal limits as shown in Drawings and as directed by the Engineer in the field.

3. Fill with General Fill and compact in compliance with the requirements of Section 31 23 00 - Earthwork.

C. Culvert Abandonment – Beneath Sendik's building to culvert outfall

1. Bulkhead ends of culvert reach beneath the Sendik's building to be abandoned according to this Section.

2. Abandonment limits as shown in Drawings and as directed by the Engineer in the field.

D. Abandon earthen channel reach of Underwood Creek between culvert outfall and Wall Street as shown on the Drawings by filling with General Fill to subgrade and compacting in accordance with the requirements of Section 31 23 00 – Earthwork.

3.10 ABANDONING PIPE

A. Pipes to be abandoned shall be bulkheaded or plugged at the upstream and downstream ends that connect to catch basins or manholes, or at locations as determined by the Engineer, and filled with CLSM or Cellular Concrete in accordance with requirements of Section 03 34 00 - Low Density Concrete.

B. Pipes to be abandoned shall be removed if the top of pipe is within 3 feet of final surface elevation.

3.11 REMOVING BITUMINOUS PAVEMENT, PATH, DRIVEWAY

A. Remove bituminous pavement in accordance with WisDOT Standard Specification 204.

B. Removal limits as shown in Drawings and directed by the Engineer in the field.

C. Contractor shall be responsible for documenting existing pavement markings prior to any pavement demolition to ensure replacement markings match the existing markings.

3.12 REMOVING BUILDING SLAB AT 13405 WATERTOWN PLANK ROAD

A. Remove building slab and foundation to a depth of 12-inches below finished grade.

B. Backfill to subgrade as necessary with General Fill and compact in accordance with the requirements of Section 31 23 00 – Earthwork.

3.13 REMOVING CURB

A. Remove concrete curb in accordance with WisDOT Standard Specification 204.

B. Removal limits as shown in Drawings and directed by the Engineer in the field.

3.14 REMOVING RIPRAP

A. Remove riprap as shown in the Drawings.

3.15 REMOVING RAILROAD BRIDGE

A. Remove entire existing bridge structure, including superstructure and former track bed materials, piers, abutments, and foundations.

1. Remove abutments to a minimum of three feet below finished grade or as necessary to construct proposed stream banks.

2. Remove piers within stream bed to a minimum of two feet below bed elevation. Backfill excavation with riffle material.

B. Dispose of concrete and wood materials at an appropriate off-site location in compliance with state and local regulations.

C. Restore disturbed areas according to the Drawings and Specifications.

3.16 MONITORING WELL ABANDONMENT

A. Monitoring wells shown on the Plans for abandonment shall be abandoned in accordance with Wisconsin Administrative Code Chapter NR141.25.

B. Well casings shall be removed to a minimum depth of 30 inches below existing or proposed subgrade, whichever is lower.

C. Contractor shall complete and provide to Owner the required WDNR well abandonment documentation for each well abandoned (Form 3300-005: Well/Drillhole/Borehole Filling and Sealing Form).

3.17 FIELD QUALITY CONTROL

A. Salvaged items to be reinstalled shall be of the same shape, dimension, location, and quality of the original item prior to construction.

B. Items damaged during removal or salvaging operations shall be replaced with new material of equal type and quality of the damaged item when it was new.

3.18 DISPOSING OF MATERIAL

A. Disposal of materials shall conform to the requirements of Section 31 23 00 - Earthwork.

END OF SECTION

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SECTION 03 01 00

MAINTENANCE OF CONCRETE

PART 1 -- GENERAL

1.01 SUMMARY

A. Repair damage to concrete and concrete surfaces as directed by the client, as shown within the contract documents, or when concrete damage occurs during the removal of embedded items or from other construction activities within the scope and duration of the contract.

B. Remove, repair, or rehabilitate new concrete members and surfaces as indicated.

C. Provide all materials and equipment necessary to accomplish the Work.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. The edition of the standards applicable to the Work shall be those editions referenced by the 2015 International Building Code (IBC). If the standard is not referenced by the IBC-referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of signing and sealing of the contract specifications.

B. Reference Specifications

01 33 00	Submittal Procedures
03 11 00	Concrete Forming
03 21 00	Reinforcement Bars
03 30 00	Cast-in-Place Concrete
03 15 00	Concrete Accessories
03 60 00	Grouting

C. Reference Standards

American Concrete Institute (ACI)	
ACI 201.1R-08	Guide for Making a Condition Survey of Concrete in Service
ACI 546R-14	Concrete Repair Guide
ASTM International (ASTM)	
ASTM C109	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)

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ASTM C666	Standard Test Method for Testing Resistance of Concrete to Freezing and Thawing in Sodium Chloride Solution
ASTM C882 (modified)	Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear
NSF International (NSF)	
NSF/ANSI 61	Drinking Water System Components – Health Effects

1.04 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with the requirements of Section 01 33 00 – Submittal Procedures.

B. Shop Drawings

1. Submit Shop Drawings for strengthening required around new openings.

2. Submit detailed drawings showing proposed methods for supporting existing structures, equipment, and piping during demolition and repair activities.

C. Concrete Repair Products and Procedures

1. Submit a comprehensive plan for each repair method indicated within this Section, the plan shall include the following:

a. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, curing, and appropriate uses for each product.

b. Curing products and procedures for each repair method for which curing is recommended by the manufacturer.

1.05 QUALITY ASSURANCE

A. Field Tests of Cement Based Mortars and Grouts

1. The Engineer may take compression test specimens during construction from the first placement of each type of mortar or grout, and at intervals thereafter as selected by the Engineer in order to ensure continued compliance with the indicated requirements.

2. The Contractor shall assist the Engineer in obtaining specimens for testing.

3. The compression tests and fabrication of specimens for repair mortar and non-shrink grout will be performed as specified in ASTM C 109.

4. A set of 5 specimens will be made for testing at 7 days, 28 days, and additional time periods as appropriate.

5. Any material, already placed, which fails to meet the indicated performance requirements is subject to removal and replacement as part of the Work.

6. The cost of laboratory tests on mortar and grout will be paid by the Owner, but the Contractor shall be responsible for the cost of any additional tests and investigation on the Work that does not meet the indicated requirements.

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7. The Contractor shall supply all necessary materials for fabricating the test specimens.

B. Repair Concrete: Repair concrete shall be tested as required in Section 03 30 00 – Cast-in-Place Concrete.

C. Epoxy Grout: Epoxy grout shall be tested as required in Section 03 60 00 – Grouting.

D. Construction Tolerances: Construction tolerances shall comply with the requirements of Section 03 30 00 – Cast-in-Place Concrete, except as otherwise indicated.

PART 2 -- PRODUCTS

2.01 GENERAL

A. All products and materials in contact with potable water shall be certified as being in conformance with NSF/ANSI 61.

2.02 REPAIR MORTAR

A. Provide repair mortar as a pre-packaged, 2-component, polymer-modified, cementitious, non-sag mortar, specifically formulated for the repair of surface defects.

B. Provide the mortar with a penetrating corrosion inhibitor.

C. Repair mortar shall have the following properties:

Physical Property	**Value**	**ASTM Standard**
Compressive Strength (min.)		C-109
at 7 days	6000 psi	
at 28 days	7000 psi	
Bond Strength (min.		C-882 (modified)
at 28 days	2200 psi	
Freeze/Thaw resistance (min.)		C-666
300 cycles	98 percent	

D. Provide a minimum repair thickness of 1/4 inch, unless otherwise indicated.

E. Repair Mortar shall be SikaTop 123 Plus for vertical and overhead surfaces and SikaTop 122 Plus for horizontal surfaces, by Sika Corporation, or equal.

2.03 NON-SHRINK GROUT

A. Provide non-shrink grout conforming to the requirements of Section 03 60 00 – Grouting.

2.04 CONCRETE MATERIALS

A. Cement

1. Use Type II Portland cement unless otherwise indicated.

2. Where repairs are to be made on wall surfaces open to view and above normal water surface elevations, blend white Portland cement as needed in order to match the color of the adjacent existing concrete surface.

B. Structural Repair Grout

1. Where required, provide structural repair grout meeting the requirements of a Congested Section Concrete Mix design per Section 03 30 00 – Cast-in-Place Concrete.

2. As an alternate to ready mix concrete, the contractor may use Five Star Structural Concrete ES-60 by Five Star Products Inc, or equal, and extended 60% by weight with 3/8", non-reactive, washed aggregate per the manufacturer's requirements.

3. Provide a minimum repair thickness of 3 inches.

C. Miscellaneous Materials**:** For concrete construction materials not covered specifically in this Section, conform to the requirements of Section 03 30 00 – Cast-in-Place Concrete.

2.05 AGGREGATE

A. Obtain the written permission of the manufacturer and Engineer before using aggregate to extend repair mortar and grout products.

B. If allowed and unless otherwise indicated, provide aggregate consisting of 3/8-inch, non-reactive, washed gravel or crushed stone as required in Section 03 30 00 – Cast-in-Place Concrete.

2.06 BONDING AGENT AND ANTI-CORROSION COATING

A. Provide a bonding agent that is a solvent-free, moisture-tolerant, epoxy-modified, cementitious product, specifically formulated as a bonding agent and anti-corrosion coating.

B. Bonding Agent shall be Armatec 110 EpoCem, by Sika Corporation, or equal.

2.07 EPOXY GROUT

A. Provide an epoxy grout conforming to the requirements of Section 03 60 00 – Grouting.

2.08 EPOXY RESIN

A. Use epoxy resin for structural crack repair.

B. For crack injection, provide a 2-component, moisture-tolerant, low-viscosity, high-strength epoxy resin adhesive that is specially formulated for that usage.

C. Provide a minimum bond strength (tensile adhesion strength) of 2900 psi when tested per ASTM C 882 at 14 days, moist cured.

D. Epoxy Resin shall be Sikadur 35, Hi-Mod LV, by Sika Corporation, KEMKO 068 LoVis IR, by ChemCo Systems, Inc., or equal.

2.09 PROTECTIVE COATING

A. Waterproofing

1. Provide a 2-component, polymer-modified, cementitious waterproofing and protective slurry mortar for concrete.

2. Apply the material in 2 coats, with a coverage of 40 sq ft/gal/coat.

3. Waterproofing shall be Sika Top Seal 107, by Sika Corporation, or equal.

2.10 FORMWORK

A. Where needed, provide formwork that meets the requirements of Section 03 11 00 – Concrete Forming.

2.11 REINFORCEMENT STEEL

A. Where required, provide reinforcing steel that meets the requirements of Section 03 21 00 – Reinforcement Bars.

2.12 POLYURETHANE SEALANT

A. Use polyurethane sealant for expansion joint repair.

B. Provide a 2-part polyurethane, gun-grade sealant.

C. Polyurethane Sealant shall be Sikaflex – 2C, by Sika Corporation, or equal.

2.13 POLYURETHANE CHEMICAL GROUT

A. Use polyurethane chemical grout for non-structural crack repair.

B. Polyurethane Chemical Grout shall be SikaFix HH, by Sika Corporation, De Neef Flex LV PURe, by GCP Applied Technologies, De Neef Flex SLV PURe, by GCP Applied Technologies, or equal.

2.14 EXPANSION JOINTS

A. Provide an expansion joint system for repair of the existing expansion joints, consisting of a Hypalon sealing strip and an epoxy adhesive in order to provide a watertight seal.

B. Expansion Joint System shall be Sikadur Combiflex, by Sika Corporation, or equal.

2.15 HYDROPHILIC WATERSTOP

A. Provide hydrophilic waterstop of the type which expands in the presence of water to form a watertight joint seal without damaging the concrete in which it is cast.

B. Provide hydrophilic waterstop that is bentonite-free and manufactured from chloroprene rubber and modified chloroprene rubber with hydrophilic properties.

C. Hydrophilic Waterstop shall be Hydrotite RSS-040 P, by Sika Corporation, KM 4mm String, by Adeka Ultra Seal, or equal.

2.16 HIGH STRENGTH EPOXY GEL

A. High-Strength Epoxy Gel for crack surface sealing shall be Denepox Rapidgel, by GCP Applied Technologies, or equal.

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2.17 EPOXY BONDING ADHESIVE

A. Epoxy Bonding Adhesive shall be Sikadur 31, by Sika Corp, Tyfo S by Tyfo/Aegion, or equal.

PART 3 -- EXECUTION

3.01 GENERAL

A. Repairs

1. Repair techniques will be reviewed during the pre-construction meeting between the Contractor, Engineer, and Owner.

2. The Contractor shall be familiar with the cause of deteriorated concrete and shall choose the right equipment, repair materials and techniques to be used for each particular repair.

3. Choose repair materials to match the adjacent concrete surface in color and texture.

4. Apply repair materials in strict accordance with the manufacturer's printed instructions, including temperature and moisture requirements throughout application and curing.

5. Protect adjacent portions of the structure, including all valves, pipes, mechanical equipment, and filter media from debris generated by repair activities.

6. For portions of the structure that are not identified to be repaired, maintain in their original condition.

B. Structural Stability

1. Use caution not to weaken the structural capacity of a beam, column, wall, slab, walkway, or other concrete member during concrete removal.

2. For severely deteriorated concrete members, consult with the Engineer before removing a major portion of any structural member.

3. Shoring may be required in order to support the structure and to protect workers.

C. Provide off-site disposal of debris generated as a result of repair procedures.

D. Provide concrete construction procedures not specifically addressed in this Section in accordance with the requirements of Section 03 30 00 – Cast-in-Place Concrete.

3.02 REPAIR SEQUENCING

A. Unless otherwise indicated, perform concrete repairs in the following sequence, with no activity in an area being started until previous activities in that area have been completed, including curing, cleanup, and the like:

1. removal of equipment, miscellaneous metals, and other surface features that would interfere with the repair;

2. removal of concrete sections which require complete replacement;

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3. surface preparation hydroblasting over the entire area to be repaired;

4. embedded metal repair;

5. crack repair;

6. filter trough to wall connection repair;

7. spalled and delaminated concrete repair;

8. scaled concrete;

9. pop-out repair, and repair of other surface damage, deterioration, or defects;

10. patching of holes in concrete;

11. replacement of concrete sections which require complete replacement;

12. new construction;

13. application of protective coatings;

14. expansion joint repair; and,

15. installation of traffic topping.

B. For areas which require combinations of spalled and delaminated concrete repair, scaled concrete, and pop-out repair, perform these repairs at the same time.

C. Limit the size of the repair area in order to permit the repairs to be performed together, without sacrificing the quality of the individual repairs.

3.03 EMBEDDED METAL REPAIR

A. Unless otherwise indicated, repair anchor bolts and other embedded metal, except rebar, that are exposed at the concrete surface and are showing signs of corrosion, as follows:

1. Cut off or otherwise remove corroded metal fastened at the surface;

2. Trim back embedded metals to a depth of at least 2 inches beyond the surface of sound concrete;

3. Chip away unsound concrete around the embedded metal.

4. Apply epoxy grout to the repair area until level with the surface of the surrounding sound concrete.

B. Unless otherwise indicated, repair embedded rebar that is exposed at the concrete surface following the procedures outlined in the appropriate concrete repair subsection, below.

3.04 CRACK REPAIR

A. Structural Cracks - Structural Cracks are defined as follows:

1. All cracks where reinforcing steel is passing across the crack, including erratic cracks, and cracks at construction joints.

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2. Repair structural cracks with epoxy resin.

B. Non Structural Cracks - Non Structural Cracks are defined as follows:

1. Cracks occurring at flexible joints, contraction joints or expansion joints.

2. Repair non-structural cracks with polyurethane chemical grout.

C. Efflorescence

1. Prior to the crack repair, clean efflorescence from the cracks and the surrounding area.

2. Clean the efflorescence by light hydro-blasting or scrubbing.

D. Pressure Injection: Pressure Injection to be performed prior to leak testing and roof membrane installation.

1. General

a. The indicated repair materials have been selected to minimize the loss of material during the injection process. The areas selected for crack repair are to be identified by the Contractor, Engineer or Construction Manager and be determined prior to leak tests and roof membrane installation. The injection of cracks may also be required as a result of the leak test.

b. In order to avoid excessive loss of injected material at the lower exposed portions of the cracks, space the injection ports a distance no greater than the thickness of the wall being repaired.

2. Structural cracks – Open through thickness cracks are to be repaired to deliver a water tight hydraulic structure passing the specified leakage test. All 3-foot long or greater through thickness cracks, wider than 15 mils, in the walls are to be injected unless they do not accept grout. All 2-foot long or greater through thickness cracks, wider than 10 mils, in the foundation/floor slabs and roof are to be injected unless they do not accept grout. Perform structural crack repairs by pressure injection in accordance with the manufacturer's directions, and in accordance with the following basic procedure:

a. Remove unsound and foreign materials from the crack in a manner that does not trap debris in the crack and prevent the flow of repair materials.

b. Remove any contamination by flushing with water or solvent, allowing adequate time for air-drying or blow out the solvent with compressed air. For potable water applications, any solvents must be fully flushed from the joint unless NSF/ANSI Standard 61 approved.

c. Install the injection ports in accordance with the manufacturer's directions.

d. Sealing

1) Seal the surface in order to keep the pressure injecting materials from leaking out before it has set or gelled.

2) Seal a surface by brushing an epoxy over the surface of the crack and allowing it to harden, or use high injection pressures to cut-out the cracks in a 'V' shape, fill with an epoxy, and strike off flush with the surface.

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3) Surface patching or sealant shall be performed where needed to provide for complete penetration of the injected polyurethane grout and to prevent wastage. Seal surface of crack with fast setting hydraulic cement or high strength epoxy gel. The floor surface along the cracks shall be cleaned and all wasted grout and surface seal material shall be completely removed from the concrete surface following completion of the repair work

e. Inject the repair materials, with consideration of the following items:

1) Carefully select the pressure of the hydraulic pump or other device, because too much pressure can extend the existing cracks and cause more damage.

2) For vertical cracks, start by pumping material into the entry port at the lowest elevation until the material level reaches the entry port above, then cap the lower injection port and repeat the process at successively higher ports until the crack has been completely filled.

3) For horizontal cracks, start at one end of the crack and work to the other end, filling the crack until the pressure can be maintained.

4) For very fine cracks, start the injection of repair material at the widest end and proceed toward the thinner end, using low-viscosity repair material.

f. Cleanup

1) Remove the surface seal by grinding or other appropriate means.

2) Coat fittings and holes at injection ports with an epoxy patching compound.

3) If crack repairs are part of repair for surface defects, painting with epoxy is not necessary and surface preparation may be started after crack repairs have been completed.

3. Non-structural cracks – Open through thickness cracks are to be repaired to deliver a watertight hydraulic structure passing the specified leakage test. All 3-foot long or greater through thickness cracks, wider than 15 mils, in the walls are to be injected unless they do not accept grout. All 2-foot long through thickness cracks, wider than 10 mils, in the foundation/floor slabs and roof are to be injected unless they do not accept grout. Perform non-structural crack repairs in accordance with the manufacturer's directions, and in accordance with the following basic procedure:

a. Remove unsound and foreign materials from the crack in a manner that does not trap debris in the crack and prevent the flow of repair materials.

b. Remove contamination by flushing with water or solvent, allowing adequate time for air-drying or blow out the solvent with compressed air. Any solvents must be fully flushed from the joint unless NSF/ANSI Standard 61 approved.

c. Install the injection ports in accordance with the manufacturer's directions.

d. Moisture

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1) For non-structural cracks, moisture must be present for the chemical grout to react.

2) Prior to injecting the repair materials, inject the crack with a small amount of water in order to completely moisten the crack.

e. Inject the repair materials, with consideration of the following items:

1) Carefully select the pressure of the hydraulic pump or other device, because too much pressure can extend the existing cracks and cause more damage.

2) For vertical cracks, start by pumping material into the entry port at the lowest elevation until the material level reaches the entry port above, cap the lower injection port and repeat the process at successively higher ports until the crack has been completely filled, and then, starting again at the lowest port, re-inject into all ports in order to ensure that all voids are properly sealed off.

3) For horizontal cracks, start at one end of the crack and work to the other end, filling the crack until the pressure can be maintained.

4) For very fine cracks, start the injection of repair material at the widest end and proceed toward the thinner end.

f. Cleanup

1) Remove excess surface material by grinding or other appropriate means.

2) Coat fittings and holes at injection ports with an epoxy patching compound.

3) If crack repairs are part of repair for surface defects, painting with epoxy is not necessary and surface preparation may be started after crack repairs have been completed.

3.05 SPALLED AND DELAMINATED CONCRETE REPAIR

A. Repair spalls and delaminated concrete using repair mortar.

B. Surface Preparation

1. Remove all delaminated concrete and all unsound concrete beyond the spalled or delaminated area.

2. Boundaries

a. Determine the boundaries of the patch by sawcuts to a depth of at least 1/4 inch up to one inch deep.

b. Refer to the Structural Drawings for sawcut locations.

c. Where the sawcut locations are not shown on the Drawings, the boundary layouts shall be designed to reduce boundary edge length.

d. Avoid excessive or complex edge conditions.

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3. Sawcuts

    a. Perform sawcuts perpendicular to the surface or slightly undercut.

    b. Construct sawcuts in maximum 1/4-inch increments.

    c. After each incremental cut, inspect the cut surface in order to ensure that the existing reinforcement has not been cut.

    d. If at any depth the reinforcement becomes exposed, terminate the sawcut and notify the Engineer.

4. Chip away concrete within the repair area to a depth sufficient to expose sound concrete over the entire repair area, or to a minimum depth required by repair mortar, whichever is greater.

5. Base the selection of partial depth concrete removal equipment on the size of repair area, depth of concrete to be removed, and the location of the deteriorated concrete such as wall, slab-on-grade, underside or top of elevated slab.

6. Removal

    a. The maximum allowable pneumatic chipping hammer shall be a 30-lb class hammer.

    b. Hydroblast removal shall use a maximum pressure of 40,000 psi.

    c. Sand blasting is not permitted.

    d. Hydroblast concrete removal is recommended for large area of surface defects.

    e. Remove water blasting debris daily in order to prevent it from setting up.

    f. If a chipping hammer is used, ensure that the existing structure and reinforcement are not damaged during the concrete removal operations.

    g. Remove protrusions, such as mortar spatter or fins, by grinding or by striking with a hammer or other tool.

7. Reinforcement

    a. Remove concrete from around reinforcement when the rebar is rusted, more than half the rebar perimeter is already exposed, the concrete bond around the rebar is broken, or if the concrete is unsound or honey-combed.

    b. Remove concrete in order to provide a clear space of minimum one inch on all sides of the reinforcement, such that the rebar can be cleaned and the repair material will completely surround the rebar.

    c. Clean exposed reinforcement by water blasting or wire brushing.

    d. After fully exposing and cleaning the reinforcement, check for steel deterioration, and if the cross-sectional area of the steel has been reduced by more than 10 percent, whether by deterioration, surface preparation, or a combination of both, provide additional reinforcement.

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e. Consult with the Engineer before adding or replacing rebar.

C. Repairing Surface Defects

1. Clean the concrete surface after removing unsound concrete, repairing cracks, and cleaning the reinforcement.

2. Ensure that the concrete surface and reinforcement are free of form-release agents, curing compounds, surface hardeners, oils, grease, chemicals, and other contaminants.

3. Remove dust, including new dust generated by surface preparation or scarifying.

4. Prior to application of the bonding agent, apply anti-corrosion coating to exposed rebar in accordance with the manufacturer's recommendations, allow the coating to dry, reapply the coating, and allow to dry again.

5. Prior to applying the repair mortar, apply bonding agent in accordance with the manufacturer's recommendations.

6. Repair Mortar

   a. Apply repair mortar in accordance with the manufacturer's recommendations.

   b. The thickness of each lift of repair mortar shall be in accordance with the manufacturer's recommendations, with the minimum thickness being not less than 1/4 inch.

7. Fully consolidate the repair mortar, working the material into the substrate to completely fill all pores and voids in the area to be filled.

8. Bring the repair surface into alignment with the adjacent existing surfaces in order to provide a uniform, even surface.

9. Float-finish the repaired surface using wood or sponge floats.

10. Match the repair surface to adjacent existing surfaces in texture by applying necessary coatings and surface treatments.

11. For repaired surfaces to receive a protective coating, brush-finish the surface in order to produce a roughened substrate for the coating.

12. Minimum and maximum ambient and surface temperatures shall be as recommended by repair material manufacturer.

D. Curing

1. Curing of repair mortar to receive waterproofing shall be as follows:

   a. Keep the mortar continuously wet by the application of water for a minimum period of at least 7 consecutive days, beginning immediately after the mortar has reached final set;

   b. Weight the curing blankets or otherwise held them in place in order to prevent being dislodged by wind or other causes, and to be substantially in contact with the concrete surface;

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c. Ensure that edges are continuously held in place; and,

d. Keep the curing blankets and concrete continuously wet by the use of sprinklers or other means, both during and after normal working hours.

2. If the repair mortar is not to receive waterproofing, provide curing in accordance with the manufacturer's recommendations except that the minimum cure period shall be 7 days.

3. During cold weather, maintain the repair material temperature above 50 degrees F for at least 3 days after placement.

3.06 SCALED CONCRETE REPAIR

A. Repair scaling and pop-outs using repair mortar.

B. Surface Preparation

1. Prior to repair, prepare the surface in accordance with the repair mortar manufacturer's recommendations with the following minimum requirement.

2. Remove unsound concrete from surfaces by high-pressure water blasting, using a minimum pressure of 10,000 psi and maximum pressure of 40,000 psi.

3. Clean exposed reinforcement by water blasting or wire brushing.

C. Repairing Surface Defects

1. Clean the concrete surface after removing unsound concrete, repairing cracks, and cleaning reinforcement.

2. Ensure that the concrete surface and reinforcement are free of form-release agents, curing compounds, surface hardeners, oils, grease, food, chemicals, and other contaminants.

3. Remove dust, including new dust generated by surface preparation or scarifying.

4. Prior to application of the bonding agent, apply anti-corrosion coating to exposed rebar in accordance with the manufacturer's recommendations, allow the coating to dry, reapply the coating, and allow to dry again.

5. Prior to applying the repair mortar, apply bonding agent in accordance with the manufacturer's recommendations.

6. Apply repair mortar in accordance with the manufacturer's recommendations, using a minimum repair material thickness of 1/4 inch.

7. Fully consolidate the repair material, working the material into the substrate to completely fill all pores and voids in the area to be filled.

8. Bring the repair surface into alignment with the adjacent existing surfaces in order to provide a uniform, even surface.

9. Float-finish the repaired surface using wood or sponge floats.

10. Match the repair surface to adjacent existing surfaces in texture by applying necessary coatings and surface treatments.

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D. Provide strip joint in newly placed mortar at the location of repaired cracks.

E. Curing

1. Curing of repair mortar to receive waterproofing shall be as follows:

a. Keep the mortar continuously wet by the application of water for a minimum period of at least 7 consecutive days, beginning immediately after the mortar has reached final set;

b. Weight the curing blankets or otherwise held them in place in order to prevent being dislodged by wind or other causes, and to be substantially in contact with the concrete surface;

c. Ensure that edges are continuously held in place; and,

d. Keep the curing blankets and concrete continuously wet by the use of sprinklers or other means, both during and after normal working hours.

2. If the repair mortar is not to receive waterproofing, provide curing in accordance with the manufacturer's recommendations except that the minimum cure period shall be 7 days.

3. During cold weather, maintain the repair material temperature above 50 degrees F for at least 3 days after placement.

3.07 POP-OUT REPAIR, AND REPAIR OF OTHER SURFACE DAMAGE, DETERIORATION, OR DEFECTS

A. Repair pop-outs and other surface damage, deterioration, and defects which are 1/4 inch deep or shallower, using the procedures described under "SCALED CONCRETE REPAIR," above.

B. Repair other pop-outs and surface damage, deterioration, and defects using the procedures described under "SPALLED AND DELAMINATED CONCRETE REPAIR," above.

3.08 REPLACEMENT OF CONCRETE SECTIONS WHICH REQUIRE COMPLETE REPLACEMENT

A. Refer to the Structural Drawings for locations where the level of concrete deterioration is such that complete removal and replacement of the deteriorated section is required.

B. At these locations, remove the deteriorated concrete in accordance with the details on the Structural Drawings and the requirements of this Section.

C. Limits

1. The limits of concrete removal shall be as indicated on the Structural Drawings.

2. If no limits of removal are indicated, determine the limits in accordance with the procedures described under "Boundaries – Spalled and Delaminated Concrete Repair."

D. Provide sawcuts in accordance with the procedures described under "Sawcuts – Spalled and Deliminated Concrete Repair."

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E. After removal of the concrete, prepare the area and provide repair concrete in accordance with the details on the Structural Drawings and the requirements of this Section.

F. Unless otherwise indicated, match the finished cross-section of the repaired concrete to the cross-section of the adjacent undamaged concrete.

3.09 PATCHING OF HOLES IN CONCRETE

A. General

1. For the purposes of this Section, holes are defined as penetrations completely through the concrete member and with interior surfaces approximately perpendicular to the surface of the existing member.

2. Interior surface areas which are inclined and do not meet this criteria shall be chipped as needed to meet this requirement.

3. The perimeter of holes at the surface shall form a regular shape composed of curved or straight line segments.

4. Provide the minimum depth of placement for the material used; score the existing concrete by sawcutting, and chip as needed to meet this requirement.

5. Roughen the interior surface of holes less than 12 inches in diameter to a minimum of 0.125-inch amplitude, and roughen larger holes to a minimum of 0.25-inch amplitude.

6. At holes, coat the existing surface to be repaired with a bonding agent.

B. Patching Small Holes: For holes which are less than 12 inches in their least dimension and extend completely through concrete members, fill with non-shrink grout.

C. Patching Large Holes

1. Fill holes which are larger than 12 inches in their least dimension with structural repair grout.

2. Provide large holes which are normally in contact with water or soil with hydrophilic waterstop placed in a groove.

3. Alternatively, bond the hydrophilic waterstop to the surface using an epoxy grout which completely fills all voids and irregularities beneath the waterstop material.

4. Install the waterstop in accordance with the requirements of Section 03 15 00 – Concrete Accessories.

5. Provide reinforcing steel in layers matching existing reinforcement location, size, spacing and cover requirements unless directed otherwise by the Engineer.

6. In locations where NSF/ANSI Standard 61 approval is required by the authority having jurisdiction, use one of the following procedures:

a. Provide Product Data showing the proposed structural repair grout is NSF/ANSI Standard 61 approved.

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b. Complete the repair with structural repair grout. Coat all surfaces required to have NSF/ANSI Standard 61 approval completely with epoxy bonding adhesive.

c. Place the structural repair grout to within 1 ½" of the finished surface of the repair. Complete the remainder of the repair with SikaTop Plus per the repair mortar requirements.

3.10 PATCHING OF LINED HOLES

A. General

1. This Work applies to those openings which have embedded material over all or a portion of their inside edge.

2. The requirements for repairing holes in concrete, as indicated above, apply as modified herein.

3. The Engineer will determine whether the embedded material is allowed to remain.

B. Where embedded material is allowed to remain, trim it back a minimum of 2 inches from the concrete surface.

C. Roughen or abrade the embedded material in order to promote good bonding to the repair material.

D. Remove substances that interfere with good bonding.

E. Completely remove embedded items that are not securely and permanently anchored into the concrete.

F. Completely remove embedded items which are larger than 12 inches in their least dimension, unless they are composed of a metal to which reinforcing steel can be welded; where reinforcement is required, weld it to the embedded metal.

G. The following requirements shall apply to concrete members which are in contact with water or soil:

1. Using epoxy grout, fill lined openings which are less than 4 inches in their least dimension;

2. Using an epoxy bonding agent, coat lined openings which are greater than 4 inches but less than 12 inches in their least dimension, prior to being filled with non-shrink grout.

3. Using an epoxy bonding agent, coat lined openings which are greater than 12 inches in their least dimension, and provide a hydrophilic waterstop bonded to the interior of the opening with epoxy adhesive, prior to being filled with approved repair material.

3.11 APPLICATION OF PROTECTIVE COATINGS

A. Waterproofing

1. Apply waterproofing in accordance with the manufacturer's printed instructions.

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2. Do not begin waterproofing Work until repairs and new construction in the affected area have been completed and adequately cured.

3.12 EXPANSION JOINT REPAIR

A. Repair deteriorated expansion joints as follows:

1. Completely remove existing sealant;

2. Remove defective backer materials in the joint;

3. Sand-blast the joint and prepare the surface in accordance with the sealant manufacturer's instructions;

4. Prepare the wall surface on each side of the joint in accordance with the expansion joint manufacturer's instructions;

5. Ensure that the prepared surface is clean, sound, and bare concrete;

6. Place backer material in the joint;

7. Apply a primer recommended by the sealant manufacturer;

8. Fill the joint with polyurethane sealant;

9. Allow a minimum of 3 days curing prior to installing the expansion joint; and,

10. Install the expansion joint in accordance with the manufacturer's instructions.

END OF SECTION

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SECTION 03 11 00

CONCRETE FORMING

PART 1 -- GENERAL

1.01 SUMMARY

A. The Contractor shall furnish concrete formwork, form liner and surface treatments, bracing, shoring, and supports for cast-in-place concrete and shall design and construct falsework, all in accordance with the Contract Documents.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. The edition of the standards applicable to the Work shall be those editions referenced by the 2015 International Building Code (IBC). If the standard is not referenced by the IBC -referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of signing and sealing of the contract specifications.

B. Reference Specifications

01 33 00	Contractor Submittals
03 30 00	Cast-in-Place-Concrete

C. Reference Standards

American Concrete Institute (ACI)	
ACI 117	Standard Tolerances for Concrete Construction and Materials.
National Institute of Standards and Technology (NIST)	
Voluntary Product Standard PS 20	American Softwood Lumber Standard.
Voluntary Product Standard PS 1	Structural Plywood
NSF International (NSF)	
NSF/ANSI 61	Drinking Water System Components – Health Effects

1.03 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 - Contractor Submittals.

B. Provide manufacturer's information demonstrating compliance with requirements for the following:

1. Form ties and related accessories, including taper tie plugs, if taper ties are used.

2. Form gaskets.

3. Form release agent, including NSF/ANSI 61 certification if not using mineral oil.

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4. Manufacturer's design information on formwork, form materials, and locations for use.

5. Manufacturer's design information on available Form Liner patterns (lannon/ashlar-stone masonry pattern) for Owner consideration and selection.

6. Manufacturer's design information on Surface Treatment.

7. Form Liner Sample Panel: A 50 square foot mock-up sample of the simulated stone masonry texture and pattern, with color(s). Sample is to demonstrate the texture, color and finish described in article DESIGN REQUIREMENTS. Approval of the sample panel by the Engineer is required. Mock-up sample shall include Anti-Graffiti coating.

   Form ties, pattern sample and description, showing method of separation when forms are removed. Sample(s) of final surface finish shall include the same curing, surface rubbing, coloring, anti-graffiti coating, and any other specified surface treatment coating required, as will be used for construction, to ensure compatibility.

8. Shop Drawings: Plan, elevation and details to show overall pattern, joint locations, form tie locations, and end, edge and other special conditions.

1.04 QUALITY ASSURANCE:

A. The variation from required lines or grade shall not exceed 1/4-in. in 10-ft, non-cumulative, and there shall be no offsets or visible waviness in the finished surface. Other tolerances shall be within the tolerances of ACI 117.

B. Manufacturer of simulated stone masonry molds and custom coloring system shall have five years' experience making stone masonry molds and color stains to create formed concrete surfaces to match natural stone shapes, surface textures and colors.

C. Pre-Installation Meeting shall be held with manufacturer representative to assure understanding of simulated stone masonry molds use, color application, requirements for construction of mockup, and to coordinate the work.

D. Manufacturers that may be able to supply the required form liner product include but are not limited to:

1. Custom Rock International, St. Paul, MN, (800) 637-2447.
2. Fitzgerald Formliners, Santa Ana, CA, (800) 547-7760.
3. Spec Formliners, Inc., Santa Ana, CA, (714) 429-9500.
4. Or Approved Equal submitted 14 days prior to bid date

PART 2 -- PRODUCTS

2.01 GENERAL

A. Except as otherwise expressly accepted by the Engineer, lumber brought on the Site for use as forms, shoring, or bracing shall be new material. Forms shall be smooth surface forms and shall be of the following materials:

Walls	Steel, fiberglass, or plywood panel
Columns	Steel, plywood, or fiberglass

Roof and floor	Plywood
All other Work	Steel panels, fiberglass, plywood or tongue and groove lumber

B. Form materials that may remain or leave residues on or in the concrete shall be certified as compliant with NSF 61.

C. Water-based form release agent shall be Clean Strip J1EF by Dayton Superior, or equal.

2.02 FORM AND FALSEWORK MATERIALS

A. Materials for concrete forms, formwork, and falsework shall conform to the following requirements:

1. Lumber shall be Douglas Fir or Southern Yellow Pine, construction grade or better, in conformance with Voluntary Product Standard PS 20.

2. Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Yellow Pine plywood manufactured especially for concrete formwork, shall conform to the requirements of Voluntary Product Standard PS 1 – Exterior Plywood for Concrete Forms, Class I, and shall be edge sealed.

3. Form materials shall be metal, wood, plywood, or other material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade indicated. Metal forms shall accomplish such results. Wood forms for surfaces to be painted shall conform to the requirements of Voluntary Product Standard PS 1 – Exterior Plywood for Concrete Forms, Class I, Medium Density Overlaid (MDO) Grade.

4. Steel leave in place forms shall not be used.

B. Unless otherwise indicated, exterior corners in concrete members shall be provided with 3/4-inch chamfers or be tooled to 1/2-inch radius. Re-entrant corners in concrete members shall not have fillets unless otherwise indicated.

C. Forms and falsework to support the roof and floor slabs shall be designed for the total dead load, plus a live load of 50 psf minimum. The minimum design load for combined dead and live loads shall be 100 psf.

D. Form Liners:

1. Forms for textured finished concrete shall have solid backing and form supports to ensure stability of textured form liners.

2. Design and construction of the concrete form liners shall follow the manufacturer's recommendations. Patterning of simulated stone and stone masonry shall appear natural and non-repeating. The wall mold pattern shall simulate a lannon/ashlar-stone masonry pattern typical to the area. Pattern must be approved by the Owner.

Seam lines or match lines caused from two or more molds coming together shall not be visible when viewing final surface from a distance of 6 feet. Final coloration of the simulated stone surface shall accurately simulate the appearance of natural stone, including the multiple colors, shades, flecking, and veining that is apparent in natural stone. It shall also demonstrate the colors that may be apparent from aging, such as staining from oxidation, rusting and/or organic staining from soil and/or vegetation. Upon approval by Engineer, the submitted mockups shall serve as quality standards for the project.

3. Manufacturers that may be able to supply the required form liner product include but are not limited to:

    Custom Rock International, St. Paul, MN, (800) 637-2447.
    Fitzgerald Formliners, Santa Ana, CA, (800) 547-7760.
    Spec Formliners, Inc., Santa Ana, CA, (714) 429-9500.

E. Surface Treatment:

1. Concrete color stain: Special penetrating stain mix as provided by manufacturer, shall achieve color variations present in the natural stone being simulated for this project, as required by Engineer as referenced in DESIGN REQUIREMENTS. Stain shall create a surface finish that is breathable (allowing water vapor transmission), and that resists deterioration from water, acid, alkali, fungi, sunlight or weathering. Stain mix shall be a water borne, low V.O.C. material, less than 180 grams/liter. The stain shall be multi-colored. The ultimate pattern and color scheme must be approved by the Owner. No more than two multi-colored schemes shall be required. Color stain shall be applied by manufacturer or manufacturer's authorized representative. Materials shall be from the following list of approved products, or equal:

    a. Tri-Sheen Concrete Surfacer, Smooth by TK Products
    b. Tri-Sheen Acrylic, by TK Products
    c. TK-1450 Natural Look Urethane Anti-Graffiti Primers by TK Products
    d. Safe-Cure & Seal EPX by Chem Masters
    e. H&C Concrete Stain Solid Color WaterBased, by Sherwin-Williams

2. Anti-Graffiti Coatings

    a. Graffiti coatings shall be compatible with the substrate, coloring, and curing materials used. Ensure that necessary preparatory steps, such as coating removal by pressure washing, are completed satisfactorily to promote coating bond and subsequent graffiti removal without damage to coatings or surfaces.

    b. Anti-graffiti coatings shall be 2-part hybrid system, consisting of siloxane base coat, followed by one or more sacrificial acrylic topcoats. Coating(s) must be compatible with concrete surface being applied to, including patching materials, coloring materials, curing materials, etc.

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2.03 FORM TIES

A. Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to ensure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties or other removable form tie fasteners having a circular cross-section shall not exceed 1-1/2 inches; and all such fasteners shall be such as to leave holes of regular shape for reaming. Form ties for water-retaining structures shall have integral waterstops that tightly fit the form tie so that they cannot be moved from mid-point of the tie. Form ties shall be ST-4 Hex Head Snaptie by MeadowBurke, A3 Snap-Ties by Dayton Superior, or equal.

B. Removable taper ties may be used when approved by the Engineer. A preformed neoprene or polyurethane tapered plug sized to seat at the center of the wall shall be inserted in the hole left by the removal of the taper tie. Use HD-9 Taper-Tie by MeadowBurke, D9 Taper-Tie by Dayton Superior, or equal.

PART 3 -- EXECUTION

3.01 GENERAL

A. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The Contractor shall assume full responsibility for the adequate design of forms, and any forms that are unsafe or inadequate in any respect shall promptly be removed from the Work and replaced. Provide worker protection from protruding reinforcement bars in accordance with applicable safety codes. A sufficient number of forms of each kind shall be available to permit the required rate of progress to be maintained. The design and inspection of concrete forms, falsework, and shoring shall comply with applicable local, state, and Federal regulations. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be used by Contractor's personnel and by the Engineer and shall be in sufficient number and properly installed. During concrete placement, the Contractor shall continually monitor plumb and string line form positions and immediately correct deficiencies.

B. Concrete forms shall conform to the shape, lines, and dimensions of members required, and shall be substantial, free from surface defects, and sufficiently tight to prevent leakage. Forms shall be properly braced or tied together to maintain their position and shape under a load of freshly-placed concrete. If adequate foundation for shores cannot be secured, trussed supports shall be provided.

C. Forms shall be removed unless approved otherwise by the Engineer.

D. Formliners shall be erected and removed per manufacture recommendations.

E. Stains and coatings shall be applied per manufacturer recommendations.

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3.02 FORM DESIGN

A. Forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. Suitable and effective means shall be provided on forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects in the finished concrete. Plywood, 5/8-inch and greater in thickness, may be fastened directly to studding if the studs are spaced close enough to prevent visible deflection marks in the concrete. The forms shall be tight so as to prevent the loss of water, cement, and fines during placing and vibrating of the concrete. Specifically, the bottom of wall forms that rest on concrete footings or slabs shall be provided with a gasket to prevent loss of fines and paste during placement and vibration of concrete. Such gasket may be a 1- to 1-1/2-inch diameter polyethylene rod held in position to the underside of the wall form. Adequate clean-out holes shall be provided at the bottom of each lift of forms. The size, number, and location of such clean-outs shall be as acceptable to the Engineer. Whenever concrete cannot be placed from the top of a wall form in a manner that meets the requirements of the Contract Documents, form windows shall be provided in the size and spacing needed to allow placement of concrete to the requirements of Section 03 30 00 Cast-in-Place Concrete. The size, number, and location of such form windows shall be as acceptable to the Engineer.

3.03 CONSTRUCTION

A. Vertical Surfaces: Vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is indicated. Not less than 1-inch of concrete shall be added to the indicated thickness of a concrete member where concrete is permitted to be placed against trimmed ground in lieu of forms. Permission to do this on other concrete members will be granted only for members of comparatively limited height and where the character of the ground is such that it can be trimmed to the required lines and will stand securely without caving or sloughing until the concrete has been placed.

B. Construction Joints: Concrete construction joints will not be permitted at locations other than those indicated, except as may be acceptable to the ENGINEER. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete. Pipe stubs and anchor bolts shall be set in the forms where required.

C. Form Ties

1. Removable Ties: Where taper ties are approved for use, the larger end of the taper tie shall be on the wet side of walls in water retaining structures. After the taper tie is removed, the hole shall be thoroughly cleaned and roughened for bond. A precast neoprene or polyurethane tapered plug shall be located at the wall centerline. The hole shall be completely filled with non-shrink grout for water bearing and below-grade walls. The hole shall be completely filled with non-shrink or regular cement grout for above-grade walls that are dry on both sides. Exposed faces of walls shall have the outer 2-inches of the exposed face filled with a cement grout that shall match the color and texture of the surrounding wall surface.

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2. Embedded Ties: Holes left by the removal of form tie cones shall be reamed with suitable toothed reamers so as to leave the surface of the holes clean and rough before being filled with mortar. Wire ties for holding forms will not be permitted. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties that cause spalling of the concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1-inch back from the formed face or faces of the concrete.

3.04 REUSE OF FORMS

A. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on exposed concrete surfaces Exposed concrete surfaces are defined as surfaces which are permanently exposed to view In the case of forms for the inside wall surfaces of hydraulic/water retaining structures, unused tie rod holes in forms shall be covered with metal caps or shall be filled by other methods acceptable to the Engineer.

3.05 REMOVAL OF FORMS

A. Careful procedures for the removal of forms shall be strictly followed, and this Work shall be done with care so as to avoid injury to the concrete. No heavy loading on green concrete will be permitted. In the case of roof slabs and above-ground floor slabs, forms shall remain in place until test cylinders for the roof concrete attain a minimum compressive strength of 75 percent of the 28 Day strength in Section 03 30 00 Cast-in-Place Concrete. No forms shall be disturbed or removed under an individual panel or unit before the concrete in the adjacent panel or unit has attained 75 percent of the 28 Day strength and has been in place for a minimum of 7 Days. The time required to establish said strength shall be as determined by the Engineer who will make several test cylinders for this purpose from concrete used in the first group of roof panels placed. If the time so determined is more than the 7 Day minimum, then that time shall be used as the minimum length of time. Forms for vertical walls of waterholding structures shall remain in place at least 36 hours after the concrete has been placed. Forms for parts of the Work not specifically mentioned herein shall remain in place for periods of time as recommended in ACI 347 - Guide to Formwork for Concrete.

3.06 MAINTENANCE OF FORMS

A. Forms shall be maintained in good condition, particularly as to size, shape, strength, rigidity, tightness, and smoothness of surface. Before concrete is placed, the forms shall be thoroughly cleaned. The form surfaces shall be treated with a nonstaining mineral oil or other lubricant acceptable to the Engineer. Any excess lubricant shall be satisfactorily removed before placing the concrete. Where field oiling of forms is required, the Contractor shall perform the oiling at least 2 weeks in advance of their use. Care shall be exercised to keep oil off the surfaces of steel reinforcement and other metal items to be embedded in concrete.

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3.07 FALSEWORK

A. The Contractor shall be responsible for the design, engineering, construction, maintenance, and safety of falsework, including staging, walkways, forms, ladders, and similar appurtenances, which shall equal or exceed the applicable requirements of the provisions of the OSHA Safety and Health Standards for Construction, and the requirements herein.

B. Falsework shall be designed and constructed to provide the necessary rigidity and to support the loads. Falsework for the support of a superstructure shall be designed to support the loads that would be imposed if the entire superstructure were placed at one time.

C. Falsework shall be placed upon a solid footing, safe against undermining, and be protected from softening. When the falsework is supported on timber piles, the maximum calculated pile loading shall not exceed 20 tons. When falsework is supported on any portion of the structure which is already constructed, the load imposed by the falsework shall be spread, distributed, and braced in such a way as to avoid any possibility of damage to the structure.

END OF SECTION

SECTION 03 15 00

CONCRETE ACCESSORIES

PART 1 -- GENERAL

1.01 SUMMARY

A. The Contractor shall provide joints in concrete, complete and in place, in accordance with the Contract Documents.

B. Joints in concrete structures shall be the types defined below and will be permitted only where indicated, unless specifically accepted by the Engineer.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Reference Specifications

01 33 00	Submittal Procedures
03 30 00	Cast-in-Place-Concrete
07 92 13	Elastomeric Joint Sealants

B. Reference Standards

1. The edition of the standards applicable to the Work shall be those editions referenced by the 2015 International Building Code (IBC). If the standard is not referenced by the IBC -referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of award of this contract.

American Concrete Institute (ACI)	
ACI 330.1	Specification for Unreinforced Concrete Parking Lots and Site Paving
ASTM International (ASTM)	
ASTM A775	Standard Specification for Epoxy Coated Steel Reinforcing Bars
ASTM C920	Standard Specification for Elastomeric Joint Sealants
ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension
ASTM D624	Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM D638	Standard Test Method for Tensile Properties of Plastics
ASTM D746	Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
ASTM D747	Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam
ASTM D1056	Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber

ASTM D1752	Standard Specification for Preformed Sponge Rubber, Cork, and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D2000	Standard Classification System for Rubber Products in Automotive Applications
ASTM D2240	Standard Test Method for Rubber Property – Durometer Hardness
ASTM D2241	Standard Specification for PolyVinylchloride (PVC) Pressure-Rated Pipe (SDR Series)
National Bureau of Standards	
Federal Specification TT-S-0227E	Sealing Compound: Elastomeric Type, Multi-Component (For Caulking, Sealing and Glazing in Buildings and Other Structures)
NSF International (NSF)	
NSF/ANSI 61	Drinking Water System Components – Health Effects
U.S. Army Corps of Engineers	
Specification CRD-C572	Specification for PolyVinylchloride Waterstops

1.03 TYPES OF JOINTS

A. Construction Joints

1. When fresh concrete is placed against a hardened concrete surface, the joint between the pours shall be defined as a construction joint.

2. Construction joints in water-bearing members shall be provided with a waterstop.

3. Construction joints shall have sealant grooves of the shape indicated, except where indicated otherwise.

B. Contraction Joints

1. Contraction joints are similar to construction joints except that the fresh concrete shall not bond to the hardened surface of the earlier pour.

2. The slab reinforcement shall be stopped 4 inches from the joint; which is provided with a sleeve-type dowel, in order to allow shrinkage of the concrete of the later pour.

3. Waterstop and/or sealant groove shall be provided where indicated.

4. At full contraction joints, all reinforcement is terminated clear of the joint. At partial contraction joints, a portion of the reinforcement is terminated clear of the joint, with the remainder being continuous through the joint.

C. Expansion Joints

1. The space shall be obtained by placing a joint filler material against the earlier pour to act as a form for the later pour.

2. Unless otherwise indicated, expansion joints in water bearing members shall be provided with a center-bulb type waterstop.

3. Provide premolded expansion joint filler material with the edge at the indicated distance below or back from the finished concrete surface.

4. Provide a slightly tapered, dressed and oiled wooden strip secured to or placed at the edge of the expansion joint during concrete placement and remove the strip later to form a space for the sealing material.

5. The space so formed shall be filled with a joint sealant material as indicated below. In order to keep the 2 wall or slab elements in line, the joint shall also be provided with a sleeve-type dowel as indicated.

D. Control Joints

1. The function of the control joint is to provide a weaker plane in the concrete where shrinkage cracks would likely occur.

2. Formed Groove

a. A groove, of the shape and dimensions indicated, shall be formed or saw-cut in the concrete and the groove shall then be filled with a joint sealant material.

b. The formed groove shall be placed in the first of the two sections cast at the control joint, in order to assure that the sealant bonds to the second section across the joint and not to the cement paste from the first pour.

1.04 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with the requirements of Section 01 33 00 –Submittal Procedures.

B. Shop Drawings

1. Furnish placement drawings showing the location and types of joints for each structure.

2. Test Reports

a. Furnish certified test reports from the sealant manufacturer on the actual batch of material supplied, demonstrating compliance with the indicated requirements.

b. Furnish the test reports before using the sealant on the Project.

3. Welding Certification

a. Furnish copies of the waterstop welding certification by manufacturer or authorized agent of the manufacturer.

b. Every person who is to be involved with waterstop installation shall be required to have individual certification on file with the Engineer, stating that the named individual is certified and trained to install waterstop in accordance with the manufacturer's recommendations and specifications.

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4. Joint Sealant Installation Certification

    a. Furnish copies of the joint sealant installation certification by manufacturer or authorized agent of the manufacturer.

    b. Every person who is to be involved with joint sealant installation shall be required to have individual certification on file with the Engineer, stating that the named individual is certified and trained to install joint sealant in accordance with the manufacturer's recommendations and specifications.

5. Furnish manufacturer's information demonstrating compliance of the following with the indicated requirements:

    a. bearing pad

    b. neoprene sponge

    c. preformed joint filler

    d. backing rod

    e. waterstop

    f. slip dowels

    g. PVC tubing

C. Samples

1. Prior to production of the material required under this Section, submit qualification samples of waterstops which accurately represent the material being provided.

2. Such samples shall be extruded or molded sections of each size or shape to be installed.

3. The balance of the material to be used shall not be produced until after the Engineer has reviewed the qualification samples.

D. Certificates

1. Furnish written certification from the manufacturer, as an integral part of the shipping form, that the material shipped to the Site meets or exceeds the indicated physical property requirements.

2. Supplier certificates will not be accepted.

1.05 QUALITY ASSURANCE

A. Waterstop Inspection

1. Field joints in waterstops shall be subject to inspection. No such Work shall be scheduled or started without having made prior arrangements with the Engineer for the required inspections.

2. Provide not less than 24 hours notice for the scheduling of such inspections.

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3. Field joints in PVC waterstops shall be subject to inspection for misalignment, bubbles, inadequate bond, porosity, cracks, offsets, and other defects that would reduce the potential resistance of the material to water pressure at any point.

4. Defective field joints shall be replaced with material that passes inspection, and faulty material shall be removed from the Site and destroyed.

B. The following waterstop defects represent a partial list of defects which shall be grounds for rejection:

1. Offsets at joints greater than 1/16 inch or 15 percent of material thickness at any point, whichever is less

2. Exterior cracking at the joint due to incomplete bond, which is deeper than 1/16 inch or 15 percent of material thickness at any point, whichever is less

3. Any combination of offset or exterior cracking that will result in a net reduction in the cross-section of the waterstop in excess of 1/16 inch or 15 percent of material thickness at any point, whichever is less

4. Misalignment of the joint which results in misalignment of the waterstop in excess of 1/2 inch in 10 feet

5. Porosity in the welded joint as evidenced by visual inspection

6. Bubbles or inadequate bonding which can be detected with a penknife test. (If, while prodding the entire joint with the point of a penknife, the knife breaks through the outer portion of the weld into a bubble, the joint shall be considered defective.)

7. Visible signs of separation when the cooled splice is bent by hand at any sharp angle

8. Evidence of burned material

C. Waterstop Samples

1. Prior to use of the waterstop material in the field, a sample of a prefabricated (shop made fitting) mitered cross and a tee constructed of each size or shape of material to be used shall be submitted.

2. Samples shall be prefabricated (shop made fitting) so that the material and workmanship represent the fittings to be provided.

3. In addition, field samples of prefabricated fittings (crosses, tees, and the like) will be selected at random by the Engineer for testing by a laboratory at the Owner's expense.

4. When tested, the tensile strength across the joints shall be at least 1120 psi for PVC waterstops.

D. Construction Joint Sealant

1. The Contractor shall prepare adhesion and cohesion test specimens at intervals of 5 Days while sealants are being installed.

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2. The sealant material shall show no signs of adhesive or cohesive failure when tested in accordance with the following procedure in laboratory and field tests:

    a. Sealant specimen shall be prepared between 2 concrete blocks (1-inch by 2-inch by 3-inch).

    b. Spacing between the blocks shall be one inch.

    c. Coated spacers (2-inch by 1-1/2-inch by 1/2-inch) shall be used to set and hold sealant cross-sections of 1/2-inch by 2-inch with a width of one inch.

    d. The sealant shall be cast and cured in accordance with the manufacturer's recommendations, except that the curing period shall be not less than 24 hours.

    e. Following the curing period, the gap between the blocks shall be widened to 1-1/2 inches, and spacers shall be used to maintain this gap for 24 hours prior to inspection for failure.

1.06 SPECIAL CORRECTION OF DEFECTS REQUIREMENT

A. The Contractor shall furnish a 5-year written warranty of the entire sealant installation against faulty and/or incompatible materials and workmanship, together with a statement that the Contractor agrees to repair or replace, to the satisfaction of the Owner, any defective areas which become evident within the 5-year period.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Joint materials shall be listed as compliant with NSF/ANSI 61.

2.02 WATERSTOPS

A. PVC Waterstops

1. PVC waterstops shall be Earthshield, by JP Specialties, Greenstreak, by Sika, Vinylex PVC Waterstop, by Vinylex, or equal.

2. Waterstops shall be extruded from an elastomeric polyvinyl chloride compound containing the plasticizers, resins, stabilizers, and other materials necessary to meet the indicated requirements of this Section.

3. No reclaimed or scrap material shall be used.

4. The Contractor shall obtain from the waterstop manufacturer and shall furnish to the Engineer for review, current test reports and a written certification of the manufacturer that the material to be shipped to the Site meets the physical requirements as outlined in CRD-C572, and those indicated.

5. Flatstrip and Center-Bulb Waterstops

    a. Flatstrip and center-bulb waterstops shall be manufactured such that at no place shall the thickness of waterstops, including the center bulb type, be less than 3/8 inch.

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b. The waterstop shall be provided with hog rings or eyelets installed at 12 inches on centers along the waterstop.

c. Shapes shall be as indicated, or as acceptable to the Engineer.

6. Multi-Rib Waterstops

a. Multi-rib waterstops shall be as indicated or as acceptable to the Engineer.

b. Prefabricated joint fittings shall be used at intersections of the ribbed-type waterstops.

7. Retrofit Waterstops

a. Retrofit waterstops and batten bars shall be as indicated or as acceptable to the Engineer.

b. The waterstop shall be supplied as a complete system including waterstop, SS batten bar, SS anchor bolts, and epoxy gel.

8. When tested in accordance with the indicated test standards, the waterstop material shall meet or exceed the following requirements:

Physical Property, Sheet Material	**Value**	**ASTM Std**
Tensile Strength-min, psi	2000	D 638, Type IV
Ultimate Elongation-min, percent	300	D 638, Type IV
Low Temp Brittleness, max degrees F	-35	D 746
Stiffness in Flexure, min, psi	600	D 747
Change in Durometer, Shore A	Plus or minus 5	D 2240
Tear Strength, min, lb/inch	300	D 624
Accelerated Extraction (CRD-C572)		
Tensile Strength-min, psi	1500	D 638, Type IV
Ultimate Elongation, min, percent	300	D 638, Type IV
Effect of Alkalies (CRD-C572)		
Change in Weight, percent	plus 0.25/minus 0.10	------

B. Preformed Hydrophilic Waterstop

1. Hydrophilic waterstops shall be HF302-Hydro-Flex Waterstop by Henry Co., Earthshield Type NB 190, by JP Specialties, or equal.

2. The cross-sectional area of the waterstop shall not be less than 0.5 square inch.

3. Hydrophilic waterstop shall be the type that expands in the presence of water to form a watertight joint seal without damaging the concrete in which it is cast.

4. The waterstop shall be manufactured from butyl or modified chloroprene rubber with hydrophilic properties.

5. The waterstop shall have a delay coating to inhibit initial expansion due to moisture present in fresh concrete.

6. The minimum expansion ratio shall be not less than 2-to-1 volumetric change in distilled water at 70 degrees F (21 degrees C).

7. The bonding agent for hydrophilic waterstop shall be the manufacturer's recommended adhesive for wet, rough concrete.

C. When types of waterstops not listed above are indicated, they shall be subjected to the same requirements as those listed in this Section.

2.03 JOINT SEALANT FOR WATER-BEARING JOINTS

A. The joint sealant shall be a polyurethane polymer designed for bonding to concrete which is continuously submerged in water.

B. No material will be accepted which has an unsatisfactory history as to bond or durability when used in the joints of water-retaining structures.

C. Joint sealant material shall meet the following requirements (73 degrees F and 5 percent R.H.):

Work Life, minutes	45 - 180
Time to Reach 20 Shore A Hardness (at 77 degrees F, 200 gram quantity), max	24 hours
Ultimate Hardness (ASTM D 2240, Shore A)	20 - 45
Tensile Strength (ASTM D 412), min	170 psi
Ultimate Elongation (ASTM D 412), minimum	400 percent
Tear Resistance (Die C, ASTM D 624), pounds per inch of thickness, min	75
Color	Light Gray

D. Polyurethane sealants for waterstop joints in concrete shall conform to the following requirements:

1. Sealant shall be a multi-component polyurethane elastomeric sealant with the physical properties of the cured sealant conforming to or exceeding the requirements of ASTM C 920 or Federal Specification TT-S-0227 E(3) , for multi-component material, as applicable.

2. For vertical joints and overhead horizontal joints, only "non-sag" compounds shall be used, conforming to the requirements of ASTM C 920, Class 25, Grade NS, or Federal Specification TT-S-0227 E(3), Type II, Class A.

3. For plane horizontal joints, use the self-leveling compounds meeting the requirements of ASTM C 920 Class 25, Grade P, or Federal Specification TT-S-0227 E(3), Type I.

4. For joints subject to either pedestrian or vehicular traffic, a compound providing non-tracking characteristics and having a Shore A hardness range of 35 to 45 shall be used.

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5. Primer materials, if recommended by the sealant manufacturer, shall conform to the printed recommendations of the manufacturer.

E. Sealant Manufacturers

1. Sealants shall be PSI-270 by Polymeric Systems Inc., Sikaflex 2C SL/NS, by Sika Corporation, Pelseal (with Viton) 2112/2012 by Pelseal Technologies, LLC, or equal.

F. Sealants for non-waterstop joints in concrete shall be in conformance with the requirements of Section 07 92 13 – Elastomeric Joint Sealants.

2.04 JOINT MATERIALS

A. Joint Filler

1. Joint filler for expansion joints in waterholding structures shall be neoprene conforming to ASTM D 1056, Type 2C5-E1.

2. Joint filler material in other locations shall be of the preformed non-extruding type, constructed of cellular neoprene sponge rubber or polyurethane of firm texture.

3. Bituminous fiber type will not be accepted.

4. Non-extruding and resilient-type preformed expansion joint fillers shall conform to the requirements and tests set forth in ASTM D 1752 for Type I, except as otherwise indicated.

2.05 BACKING ROD

A. The backing rod shall be an extruded closed-cell, polyethylene foam rod.

B. The rod material shall be compatible with the joint sealant material, and shall have a tensile strength of not less than 40 psi and a compression deflection of approximately 25 percent at 8 psi.

C. The rod shall be 1/8 inch larger in diameter than the joint width except that a one-inch diameter rod shall be used for a 3/4-inch wide joint.

2.06 BOND BREAKER TAPE

A. Bond breaker tape shall be an adhesive-backed glazed butyl or polyethylene tape that will satisfactorily adhere to the premolded joint filler or concrete surface, as required. The tape shall be the same width as the bottom of the groove.

2.07 SLIP DOWELS

A. Slip dowels in joints shall be smooth epoxy-coated bars conforming to ASTM A 775.

2.08 PVC TUBING

A. PVC tubing in joints shall be SDR 13.5, conforming to ASTM D 2241.

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PART 3 -- EXECUTION

3.01 GENERAL

A. Waterstops shall be embedded in the concrete across joints as indicated.

B. Waterstops shall be fully continuous for the extent of the joint.

C. Splices necessary to provide such continuity shall conform to the printed instructions of the waterstop manufacturer.

D. The Contractor shall take suitable precautions and provide means to support and protect the waterstops during the progress of the Work, and shall repair or replace any waterstops damaged during progress of the Work at no additional cost to the Owner.

E. Waterstops shall be stored so as to permit free circulation of air around the waterstop material.

F. When any waterstop is installed in the concrete on one side of a joint while the other portion of the waterstop remains exposed to the atmosphere for more than 2 Days, suitable precautions shall be taken to shade and protect the exposed waterstop from direct rays of the sun during the entire exposure time until the exposed portion of waterstop is embedded in concrete.

3.02 SPLICES IN PVC WATERSTOPS

A. Splices in PVC waterstops shall be performed by heat sealing the adjacent waterstop sections in accordance with the manufacturer's printed recommendations.

B. It is essential that:

1. The material shall not be damaged by heat sealing.

2. The splices shall have a tensile strength of not less than 80 percent of the unspliced material.

3. The continuity of the waterstop ribs and of its tubular center axis shall be maintained.

4. No welding of edges be performed.

C. Butt joints of the ends of 2 identical waterstop sections may be made while the material is in the forms.

D. Other Joints

1. Joints with waterstops involving more than 2 ends to be jointed together, and joints that involve an angle cut, alignment change, or the joining of 2 dissimilar waterstop sections, shall be prefabricated prior to placement in the forms, allowing not less than 24-inch long strips of waterstop material beyond the joint.

2. Upon inspection and approval, such prefabricated waterstop joint assemblies shall be installed in the forms and the ends of the 24-inch strips shall be butt-welded to the straight run portions of waterstop in place in the forms.

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E. Where a centerbulb waterstop intersects and is jointed with a non-centerbulb waterstop, care shall be taken to seal the end of the centerbulb, using additional PVC material if needed.

3.03 JOINT CONSTRUCTION

A. Setting Waterstops

1. In order to eliminate faulty installation that may result in joint leakage, particular care shall be taken as to the correct positioning of the waterstops during installation.

2. Adequate provisions shall be made to support and anchor the waterstops during the progress of the Work and to ensure proper embedment in the concrete.

3. The symmetrical halves of the waterstops shall be equally divided between the concrete pours at the joints.

4. The center axis of the waterstops shall be coincident with the joint openings.

5. Thoroughly work the concrete in the vicinity of joints for maximum density and imperviousness.

B. Waterstop Placement

1. In placing waterstops in the forms, means shall be provided to prevent them from being folded over by the concrete as it is placed.

2. Waterstops shall be held in place with light wire ties on 12-inch centers, which shall be passed through hog rings or eyelets at the edge of the waterstop and tied to the curtain of reinforcing steel.

3. Horizontal waterstops, with their flat face in a vertical plane, shall be held in place with continuous supports to which the top edge of the waterstop shall be tacked.

4. In placing concrete around horizontal waterstops with their flat face in a horizontal plane, the concrete shall be worked under the waterstops by hand in order to avoid the formation of air and rock pockets.

C. In placing centerbulb waterstops in expansion joints, the centerbulb shall be centered on the joint filler material.

D. Waterstop in vertical wall joints shall terminate 6 inches from the top of the wall, where such waterstop does not connect with any other waterstop and is not to be connected to a future concrete placement.

E. Joint Location

1. Construction joints and other types of joints shall be provided where indicated.

2. If not indicated, construction joints shall be provided at a 25-foot maximum spacing.

3. The location of joints, regardless of type, shall be submitted for acceptance by the Engineer.

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F. Joint Preparation

1. Special Care shall be used in preparing concrete surfaces at joints where bonding between 2 sections of concrete is required.

2. Unless otherwise indicated, such bonding shall be required at every horizontal joint in walls, including at tops and bottoms of walls.

3. Surfaces shall be prepared in accordance with Section 03 30 00 – Cast-in-Place Concrete.

G. Retrofit Joint Preparation

1. Existing surfaces to receive a retrofit waterstop shall be clean and free from any loose or foreign material.

2. The surface shall be given a light sandblast or hydroblast finish to 1/8-inch amplitude prior to the application of epoxy and waterstop.

H. Construction Joint Sealant

1. Construction joints in water-bearing floor slabs and elsewhere, as indicated, shall be provided with tapered grooves which shall be filled with a construction joint sealant.

2. The material used to form the tapered grooves shall be left in the grooves until just before the grooves are cleaned and filled with joint sealant.

3. After removing the forms from the grooves, laitance and fins shall be removed, and the grooves shall be sand blasted.

4. The grooves shall be allowed to thoroughly dry, after which they shall be blown out.

5. Install bond breaker tape at the bottom of the groove.

6. Prime the bonding surfaces and fill the grooves with the construction joint sealant.

7. The primer shall be furnished by the sealant manufacturer, and no sealant shall be used without a primer.

8. Care shall be used to completely fill the sealant grooves.

9. Areas designated to receive a sealant fillet shall be thoroughly cleaned as outlined for the tapered grooves prior to application of the sealant.

I. The primer and sealant shall be placed strictly in accordance with the printed recommendations of the manufacturer, taking special care to properly mix the sealant prior to application.

J. The sides of the sealant groove shall not be coated with bond breaker, curing compound, or any other substance which would interfere with proper bonding of the sealant.

K. The sealant shall achieve final cure at least 7 Days before the structure is filled with water.

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L. The sealant shall be installed by a competent worker certified by the sealant manufacturer.

M. Mixing

1. Catalyst-cured, 2-part materials shall be thoroughly and uniformly mixed, and special care shall be taken to properly mix the sealer before its application.

N. Failure to Cure

1. Any joint sealant that fails to fully and properly cure after the manufacturer's recommended curing time for the conditions of the Work shall be completely removed, and the groove shall be thoroughly sandblasted to remove traces of the uncured or partially cured sealant and primer.

2. The groove shall be re-sealed with the indicated joint sealant.

3. Costs of such removal, joint treatment, re-sealing, and appurtenant Work shall be the Contractor's responsibility as part of the Work.

O. Hydrophilic Waterstop

1. Where a hydrophilic waterstop is indicated, it shall be installed in accordance with the manufacturer's instructions and recommendations except as may be modified in this Section.

2. When requested by the Engineer, the Contractor shall arrange for the manufacturer to furnish technical assistance in the field.

3. Hydrophilic waterstop shall only be used where complete confinement by concrete is provided.

4. Hydrophilic waterstop shall not be used in expansion or contraction joints nor in the first 6 inches of a non-intersecting joint.

5. Location

a. The hydrophilic waterstop shall be located as near as possible to the center of the joint, and it shall be continuous around the entire joint.

b. The minimum distance from the edge of the waterstop to the face of the member shall be 5 inches.

6. Placement

a. Where the thickness of the concrete member to be placed on the hydrophilic waterstop is less than 12 inches, the waterstop shall be placed in grooves formed or ground into the concrete.

b. The groove shall be at least 3/4 inch deep and 1-1/4 inches wide.

c. When placed in the groove, the minimum distance from the edge of the waterstop to the face of the member shall be 2-1/2 inches.

7. Where a hydrophilic waterstop is used in combination with PVC waterstop, the hydrophilic waterstop shall overlap the PVC waterstop for a minimum of 6 inches and shall be adhered to PVC waterstop by a single component water-swelling sealant as recommended by the manufacturer.

8. Follow manufacturer's recommendations for application in cold weather (less than 45 degrees F).

9. Preparation

    a. The concrete surface under the hydrophilic waterstop shall be smooth and uniform, and the concrete shall be ground smooth if needed.

    b. Alternatively, the hydrophilic waterstop shall be bonded to the surface using an epoxy grout that completely fills voids and irregularities beneath the waterstop material.

    c. Prior to installation, the concrete surface shall be wire brushed to remove any laitance or other materials that may interfere with the bonding of epoxy.

10. Securing

    a. The hydrophilic waterstop shall be secured in place with concrete nails and washers at 12-inch maximum spacing.

    b. The above requirement shall be in addition to the adhesive recommended by the manufacturer.

P. Retrofit Waterstop

1. Retrofit waterstops shall be set in a bed of epoxy over a sandblasted surface with stainless steel batten bars and 1/4-inch diameter stainless steel anchors at 6 inches on-center, staggered, and in accordance with the manufacturer's written recommendations.

END OF SECTION

SECTION 03 21 00

REINFORCEMENT BARS

PART 1 -- GENERAL

1.01 SUMMARY

A. Provide reinforcement steel and appurtenant Work, complete and in place, in accordance with the Contract Documents.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Reference Specifications

01 33 00	Submittal Procedures
03 30 00	Cast-in-Place Concrete

B. Reference Standards

1. The edition of the standards applicable to the Work shall be those editions referenced by the 2015 International Building Code (IBC). If the standard is not referenced by the IBC, nor an IBC-referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of signing and sealing of the contract specifications.

American Concrete Institute (ACI)	
ACI 117	Specification for Tolerances for Concrete Construction and Materials
ACI 318	Building Code Requirements for Structural Concrete
ASTM International (ASTM)	
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A 706	Low Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A 775	Epoxy - Coated Reinforcing Steel Bars
ASTM A 1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
American Welding Society (AWS)	
AWS D1.4	Structural Welding Code – Reinforcing Steel

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Concrete Reinforcing Steel Institute (CRSI)	
CRSI	Manual of Standard Practice
International Code Council (ICC)	
IBC	2015 International Building Code
NSF International (NSF)	
NSF/ANSI 61	Drinking Water System Components – Health Effects

1.04 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with the requirements of Section 01 33 00 – Submittal Procedures.

B. Shop Drawings

1. Furnish shop bending diagrams, placing lists, and drawings of reinforcement steel prior to fabrication.

2. Diagrams

a. The shop bending diagrams shall show the actual lengths of bars to the nearest inch, measured to the intersection of the extensions (tangents for bars of circular cross section) of the outside surface.

b. Include bar placement diagrams that clearly indicate the dimensions of each bar splice.

3. Reinforcement

a. Details of the concrete reinforcement steel and concrete inserts shall be submitted at the earliest possible date after receipt by the Contractor of the Notice to Proceed.

b. Said details of reinforcement steel for fabrication and erection shall conform to the CRSI Manual of Standard Practice, and the indicated requirements.

c. Mill certificates, including reinforcing steel yield and tensile strength test data.

4. Mechanical Couplers

a. Where mechanical couplers are required or permitted to be used to splice reinforcement steel, submit the following items:

1) manufacturer's literature containing instructions and recommendations for installation for each type of coupler used;

2) certified test reports that verify the load capacity of each type and size of coupler used; and

3) Shop Drawings that show the location of each coupler with details of how they are to be installed in the formwork.

5. Welding

a. If reinforcement steel is to be spliced by welding at any location, submit mill test reports containing the information necessary for determination of the carbon equivalent per AWS D1.4.

b. Submit a written welding procedure for each type of weld for each size of bar which is to be spliced by welding; merely a statement that AWS procedures will be followed is not acceptable.

c. If reinforcement steel is spliced by welding at any location, submit certifications of procedure qualifications for each welding procedure and certification of welder qualifications, for each welding procedure and for each welder performing on the Work.

1.05 QUALITY ASSURANCE

A. Materials Testing

1. If requested by the Engineer, furnish samples from each heat of reinforcement steel in a quantity adequate for testing.

2. Costs of initial tests will be paid by the Owner.

3. Costs of additional tests if material fails initial tests shall be the Contractor's responsibility.

B. Welding

1. Welder qualifications and procedure qualifications shall be as indicated in AWS D1.4.

2. If requested by the Engineer, furnish samples of each type of welded splice in a quantity and of dimensions adequate for testing.

3. At the discretion of the Engineer, radiographic testing of direct butt-welded splices will be performed.

4. Provide assistance necessary to facilitate testing.

5. Repair welds that fail to meet AWS D1.4.

6. The costs of testing will be paid by the Owner, but the costs of tests that show failure to meet requirements shall be the Contractor's responsibility.

PART 2 -- PRODUCTS

2.01 MATERIAL REQUIREMENTS

A. Materials that may remain or leave residues on or within the concrete shall be certified as compliant with NSF/ANSI 61.

2.02 REINFORCEMENT STEEL

A. Reinforcement steel for cast-in-place reinforced concrete construction shall conform to the following requirements:

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1. Deformed Bar Reinforcement

    a. Deformed bar reinforcement shall conform to ASTM A615 for Grade 60 reinforcement, unless otherwise indicated.

    b. Welded Reinforcement

        1) Deformed bar reinforcement that is welded shall conform to ASTM A706 for Grade 60 reinforcement, unless otherwise indicated.

        2) The carbon equivalent in reinforcing that is welded shall not exceed 0.55 percent.

    c. Welded Reinforcement

        1) Deformed bar reinforcement that is welded shall conform to ASTM A706 for Grade 60 reinforcement, unless otherwise indicated.

        2) The carbon equivalent in reinforcing that is welded shall not exceed 0.55 percent.

2. Welded Wire Reinforcement

    a. Welded wire reinforcement shall conform to ASTM A1064 and the indicated Details.

    b. Welded wire reinforcement with longitudinal wire of W4 size wire and smaller shall be in flat sheets or in rolls with a core diameter of not less than 10-inches.

    c. Welded wire reinforcement with longitudinal wires larger than W4 size shall be in flat sheets only.

B. Accessories

1. Accessories shall include necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers, and other devices to position reinforcement during concrete placement.

2. Bar Supports

    a. Bar supports shall meet the requirements of the CRSI Manual of Standard Practice, including special requirements for supporting epoxy-coated reinforcing bars.

    b. Wire bar supports shall be CRSI Class 1 for maximum protection with a 1/8-inch minimum thickness of plastic coating that extends at least 1/2 inch from the concrete surface.

    c. Plastic shall be gray in color.

3. Concrete Blocks

    a. Concrete blocks (dobies) used to support and position reinforcement steel shall have the same or higher compressive strength as required for the concrete in which they are located.

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b. Wire ties shall be embedded in concrete block bar supports.

C. Epoxy coating for reinforcing and accessories, where indicated, shall conform to ASTM A775.

2.03 MECHANICAL COUPLERS

A. Mechanical couplers shall be provided where indicated and where approved by the Engineer.

B. The couplers shall develop a tensile strength and compressive strength that exceeds 125 percent of the specified yield strength of the reinforcement bars being spliced at each splice and shall develop the specified tensile strength of the reinforcement bars being spliced at each splice.

C. Multi-Component Couplers

1. Where the type of coupler used is composed of more than one component, components required for a complete splice shall be provided.

2. This shall apply to mechanical splices, including those splices intended for future connections.

D. Connection

1. The reinforcement steel and coupler used shall be compatible for obtaining the required strength of the connection.

2. Straight threaded type couplers shall require the use of the next larger size reinforcing bar or shall be used with reinforcing bars with specially forged ends which provide upset threads which do not decrease the basic cross section of the bar.

E. Couplers shall be Lenton Form Saver by Erico Products, Dowel Bar Splicer System by Dayton/Richmond, or equal.

2.04 WELDED SPLICES

A. Welded splices shall be provided where indicated and where approved by the Engineer.

B. Welded splices of reinforcement steel shall develop a tensile strength that exceeds 125 percent of the specified yield strength of the reinforcement bars that are connected.

C. Materials as required to conform the welded splices to AWS D1.4 shall be provided.

2.05 EPOXY GROUT

A. Epoxy for grouting reinforcing bars shall be specifically formulated for such application, for the moisture condition, application temperature, and orientation of the hole to be filled.

B. Epoxy grout shall be in conformance with the requirements of Section 03 60 00 - Grouting.

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PART 3 -- EXECUTION

3.01 GENERAL

A. Reinforcement steel, welded wire fabric, couplers, and other appurtenances shall be fabricated, and placed in accordance with the Building Code and the indicated supplementary requirements.

3.02 FABRICATION

A. General

1. Reinforcement steel shall be accurately formed to the dimensions and shapes indicated, and the fabricating details shall be prepared in accordance with ACI 318 and the CRSI Manual of Standard Practice, except as modified by the Drawings.

2. Bars shall be bent cold.

3. Bars shall be bent in accordance with the requirements of ACI 318.

4. Fabricate reinforcement bars for structures in accordance with accepted bending diagrams, placing lists, and placing drawings.

B. Fabricating Tolerances

1. Bars used for concrete reinforcement shall conform to the following fabricating tolerances:

a. Sheared Length: plus and minus one inch

b. Depth of Truss Bars: plus zero, minus 1/2 inch

c. Stirrups, Ties and Spirals: plus and minus 1/2 inch

d. Other Bends: plus and minus one inch

3.03 PLACEMENT

A. Reinforcement steel shall be accurately positioned as indicated and shall be supported and wired together to prevent displacement using annealed iron wire ties or suitable clips at intersections.

B. Reinforcement steel shall be supported by concrete, plastic or metal support spacers, or metal hangers that are sufficiently strong and rigid to prevent any displacement of the reinforcement steel.

C. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous.

D. Concrete blocks used to support reinforcement steel shall be tied to the steel with wire ties that are embedded in the blocks.

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E. For concrete over formwork, provide concrete, metal, plastic, or other acceptable bar chairs and spacers.

F. Limitations on the use of bar support materials shall be as follows.

1. Concrete Dobies

a. permitted at any location except where architectural finish is required

b. required for slabs on grade and surfaces in contact with or above ozonated process water

2. Wire bar supports will be permitted only at slabs over dry areas, interior dry wall surfaces, and exterior wall surfaces.

3. Plastic bar supports will be permitted at every location except on-grade.

G. Tie wires shall be bent away from the forms in order to provide the required concrete coverage.

H. Bars additional to those indicated that may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at no additional expense to the Owner.

I. Except where in conflict with the Building Code, unless otherwise indicated, reinforcement placing tolerances shall be within the limits indicated in ACI 318.

J. Moving Bars

1. Bars may be moved as necessary to avoid interference with other reinforcement steel, conduits, or embedded items.

2. If bars are moved more than one bar diameter or enough to exceed the above tolerances, the resulting arrangement of bars shall be as reviewed and accepted by the Engineer.

K. Welded Wire Reinforcement

1. Welded wire reinforcement placed over horizontal forms shall be supported on slab bolsters.

2. Slab bolsters shall be spaced not more than 30-inch on centers, shall extend continuously across the entire width of the reinforcement mat, and shall support the reinforcement mat in the plane indicated.

3. Welded wire reinforcement placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than 3 feet on centers in any direction.

4. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

L. Storage and Handling

1. Epoxy-coated reinforcing bars shall be stored, transported, and placed in such a manner as to avoid chipping of the epoxy coating.

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2. Non-abrasive slings made of nylon and similar materials shall be used.

3. Specially coated bar supports shall be used.

4. Chips or cracks in the epoxy coating shall be repaired with a compatible epoxy repair material prior to placing concrete.

M. Accessory Spacing

1. Accessories supporting reinforcing bars shall be spaced such that there is no deflection of the accessory from the weight of the supported bars.

2. When used to space the reinforcing bars from wall forms, the forms and bars shall be located such that there is no deflection of the accessory when the forms are tightened into position.

3.04 SPACING OF BARS

A. The clear distance between parallel bars (except in columns and between multiple layers of bars in beams) shall be not less than the nominal diameter of the bars, nor less than 1-1/3 times the maximum size of the coarse aggregate, nor less than one inch.

B. Where reinforcement in beams or girders is placed in 2 or more layers, the clear distance between layers shall be not less than one inch.

C. In columns, the clear distance between longitudinal bars shall be not less than 1-1/2 times the bar diameter, nor less than 1-1/3 times the maximum size of the coarse aggregate, nor less than 1-1/2 inches.

D. The clear distance between bars shall also apply to the distance between a contact splice and adjacent splices or bars.

3.05 SPLICING

A. General

1. Reinforcement bar splices shall only be used at indicated locations.

2. When it is necessary to splice reinforcement at points other than where indicated, the character of the splice shall be as reviewed and accepted by the Engineer.

3. Unless otherwise indicated, dowels shall match the size and spacing of the spliced bar.

B. Splices of Reinforcement

1. The length of lap for reinforcement bars, unless otherwise indicated, shall be in accordance with ACI 318 for a Class B splice.

2. Welded Wire Reinforcement

a. Laps of welded wire reinforcement shall be in accordance with ACI 318.

b. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each 2 running feet.

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c. Wires shall be staggered and tied in such a manner that they cannot slip.

3. Splices in column spiral reinforcement, when necessary, shall be made by welding or by a lap of 1-1/2 turns.

C. Bending or Straightening

1. Reinforcement shall not be straightened or re-bent in a manner which will injure the material.

2. Bars shall be bent or straight as indicated.

3. Do not use bends different from the bends indicated.

4. Bars shall be bent cold, unless otherwise permitted by the Engineer.

5. No bars partially embedded in concrete shall be field-bent except as indicated or specifically permitted by the Engineer.

D. Couplers

1. Couplers that are located at a joint face shall be of a type that can be set either flush or recessed from the face as indicated.

2. The couplers shall be sealed during concrete placement to completely eliminate concrete, or cement paste from entering.

3. Couplers intended for future connections shall be recessed a minimum of 1/2 inch from the concrete surface.

4. After the concrete is placed, the coupler shall be plugged with plastic plugs which have an O-ring seal and the recess filled with sealant to prevent any contact with water or other corrosive materials.

5. Threaded couplers shall be plugged.

E. Unless indicated otherwise, mechanical coupler spacing, and capacity shall match the spacing and capacity of the reinforcing indicated for the adjacent section.

3.06 CLEANING AND PROTECTION

A. Reinforcement steel shall always be protected from conditions conducive to corrosion until concrete has been placed around it.

B. The surfaces of reinforcement steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

C. Where there is delay in depositing concrete, the reinforcement shall be re-inspected and, if necessary, re-cleaned.

3.07 EMBEDMENT OF DRILLED REINFORCING STEEL DOWELS

A. Hole Preparation

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1. The hole diameter shall be as recommended by the epoxy manufacturer but shall be no larger than 1/4 inch greater than the diameter of the outer surface of the reinforcing bar deformations.

2. The depth of the hole shall be as recommended by the epoxy manufacturer to fully develop the bar but shall not be less than 12 bar diameters, unless indicated otherwise.

3. The hole shall be drilled by methods that do not interfere with the proper bonding of epoxy.

4. Existing reinforcing steel in the vicinity of proposed holes shall be located prior to drilling, and the location of holes shall be adjusted to avoid drilling through or nicking any existing reinforcing bars. Final hole locations shall be as reviewed and accepted by the Engineer.

5. The hole shall be blown clean with clean, dry compressed air to remove dust and loose particles.

B. Embedment

1. Epoxy shall be injected into the hole through a tube placed to the bottom of the hole.

2. The tube shall be withdrawn as epoxy is placed but kept immersed to prevent formation of air pockets.

3. The hole shall be filled to a depth that ensures excess material will be expelled from the hole during dowel placement.

4. Dowels shall be twisted during insertion into the partially filled hole so as to guarantee full wetting of the bar surface with epoxy.

5. The bar shall be inserted slowly enough to avoid developing air pockets.

END OF SECTION

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SECTION 03 30 00

CAST IN-PLACE CONCRETE

PART 1 -- GENERAL

1.01 SUMMARY

A. Provide cast-in-place concrete, as indicated in accordance with the Contract Documents.

B. The following types of concrete are covered in this Section:

1. Structural Concrete

a. Regular Mix: Use for walls, pavements, and other concrete items not otherwise indicated in the Contract Documents.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
1. Refer to Section 01 20 00

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Reference Specifications

01 33 00	Submittal Procedures
03 01 00	Maintenance of Concrete
03 15 00	Concrete Accessories
07 92 13	Elastomeric Joint Sealants
32 34 00	Prefabricated Pedestrian Bridge

B. Reference Standards

1. The edition of the standards applicable to the Work shall be those editions referenced by the 2015 International Building Code (IBC). If the standard is not referenced by the IBC -referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of signing and sealing of the contract specifications.

American Concrete Institute (ACI)	
ACI 117	Specification for Tolerances for Concrete Construction and Materials
ACI 301	Specifications for Structural Concrete
ACI 306.1	Standard Specification for Cold Weather Concreting
ACI 309R	Guide for Consolidation of Concrete
ACI 318	Building Code Requirements for Structural Concrete

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ASTM International (ASTM)	
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C127	Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C128	Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C156	Standard Test Method for Water Loss (from a Mortar Specimen) Through Liquid Membrane-Forming Curing Compounds for Concrete
ASTM C157	Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ASTM C192	Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1116	Standard Specification for Fiber-Reinforced Concrete
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1240	Standard Specification for Silica Fume Used in Cementitious Mixtures

ASTM D1227	Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing
ASTM D2419	Standard Test Methods for Sand Equivalent Value of Soils and Fine Aggregate
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
ASTM E1745	Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
NSF International (NSF)	
NSF/ANSI 61	Drinking Water System Components – Health Effects

1.04 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00– Submittal Procedures

B. Mix Designs

1. Prior to beginning the Work and within 14 Days of the Notice to Proceed, submit preliminary concrete mix designs which shall show the proportions and gradations of materials proposed for each class and type of concrete.

2. Mix designs shall be checked through trial batch and laboratory testing by an independent testing laboratory acceptable to the Engineer.

3. Costs related to trial batch and related laboratory testing shall be Contractor's responsibility as part of the Work.

4. Since laboratory trial batches require 35 calendar days to complete, the Contractor shall test a minimum of 2 mix designs for each class of concrete.

C. Delivery Tickets

1. Where ready-mix concrete is used, the Contractor shall furnish delivery tickets at the time of delivery of each load of concrete.

2. Each ticket shall show the state-certified equipment used for measuring and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, the amount of water in the aggregate added at the batching plant, and the amount allowed to be added at the Site for the specific design mix.

3. In addition, each ticket shall state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to the times when the batch was dispatched, when it left the plant, when it arrived at the Site, when unloading began, and when unloading was finished.

D. Test Data: Test data relating to the cement, aggregate, and admixtures shall be less than 6 months old.

E. Furnish the following submittals in accordance with ACI 301:

1. mill tests for cement

2. admixture certification, including chloride ion content

3. aggregate gradation test results and certification

4. materials and methods for curing

1.05 QUALITY ASSURANCE

A. General

1. Contractor shall employ a testing laboratory to perform testing on component materials and for compressive strength and shrinkage of concrete as indicated.

2. The testing laboratory shall meet or exceed ASTM C1077.

3. Tests for determining slump shall be in accordance with ASTM C143.

4. Testing for aggregate shall include sand equivalence, reactivity, organic impurities, abrasion resistance, and soundness, according to ASTM C33.

5. The cost of trial batch laboratory tests on cement, aggregates, and concrete shall be the Contractor's responsibility.

6. The cost of laboratory tests on field-placed cement, aggregates, and concrete will be the Contractor’s responsibility.

7. The Contractor shall be responsible for the cost of any tests and investigations of Work that is determined to be Defective Work.

B. Inspections

1. Owner will provide an inspector where necessary to conform with Code requirements and compliance with the Contract Documents.

2. Costs of the inspector will be paid by the Owner.

3. In addition, the inspector will observe the preparation and taking of required test specimens and placement of concrete.

C. Field Compression Tests

1. Contractor shall take compression test specimens during construction from the first placement of each type of concrete, at least once per day per type, and at least one set of specimens every 50 CY placed to ensure continued compliance with the Specifications.

2. Each set of specimens shall be a minimum of 5 cylinders.

3. Compression test specimens for concrete shall be made in accordance with Section 9.2 of ASTM C31.

4. Specimens shall be 6-inches diameter by 12-inches tall cylinders.

5. Compression tests shall be performed in accordance with ASTM C39.

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a. One test cylinder shall be tested at 7 Days, and 2 test cylinders tested at 28 Days.

b. The remaining cylinders shall be held to verify test results, if needed.

D. Evaluation and Acceptance of Concrete

1. Evaluation and acceptance of the compressive strength of concrete shall be in accordance with ACI 318, ACI 301, and as indicated.

2. A statistical analysis of compression test results shall be performed according to ACI 301.

3. The standard deviation of the test results shall not exceed 640 psi, when ordered at equivalent water content as estimated by slump.

4. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for subsequent batches of the type of concrete affected.

5. When the standard deviation of the test results exceeds 640 psi, the average strength for which the mix is designed shall be increased by an amount necessary to satisfy the statistical requirement that the probability of any test being more than 500 psi below or the average of any 3 consecutive tests being below the required compressive strength is 1 in 100.

6. The required average strength shall be calculated in accordance with ACI 301.

7. Concrete that fails to meet the ACI requirements and the indicated requirements is subject to removal and replacement.

E. Shrinkage Tests

1. Drying shrinkage tests shall be performed for the trial batches indicated in the Article below entitled "Trial Batch and Laboratory Tests," for the first placement of each class of structural concrete, and during placement to determine continued compliance.

2. Drying shrinkage specimens shall be 4-inch by 4-inch by 11-inch prisms with an effective gauge length of 10-inches, and fabricated, cured, dried, and measured in accordance with ASTM C157, modified as follows:

a. Specimens shall be removed from molds at an age of 23 hours, plus or minus one hour, after trial batching, and shall be placed immediately in water at 73 degrees F, plus or minus 3 degrees F, for at least 30 minutes.

b. Specimens shall be measured within 30 minutes thereafter to determine original length and then shall be submerged in saturated lime water at 73 degrees F, plus or minus 3 degrees F.

c. Measurement to determine expansion expressed as a percentage of original length shall be made at age 7 Days.

d. This length at age 7 Days shall be the base length for drying shrinkage calculations ("0" days drying age).

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e. Specimens then shall be stored immediately in a humidity control room maintained at 73 degrees F, plus or minus 3 degrees F, and 50 percent relative humidity, plus or minus 4 percent, for the remainder of the test.

f. Measurements to determine shrinkage, expressed as percentage of base length, shall be performed and reported separately for 7, 14, 21, and 28 Days of drying after 7 Days of moist curing.

3. The drying shrinkage deformation of each specimen shall be computed as the difference between the base length (at "0" days drying age) and the length after drying at each test age.

4. The average drying shrinkage deformation of the specimens shall be computed to the nearest 0.0001-inch at each test age.

5. If the drying shrinkage of any specimen departs from the average of that test age by more than 0.0004-inch, the results obtained from that specimen shall be disregarded.

6. Results of the shrinkage test shall be reported to the nearest 0.001 percent of shrinkage.

7. Compression test specimens shall be taken in each case from the same concrete used for preparing drying shrinkage specimens.

8. These tests shall be considered a part of the normal compression tests for the project.

9. Allowable shrinkage limitations are indicated in PART 2 - PRODUCTS, below.

F. Aggregate Testing: Aggregate testing shall be performed for the trial batch in the Article below entitled "Trial Batch and Laboratory Tests" prior to construction and every 12 months during construction to determine continued compliance.

G. Construction Tolerances

1. The Contractor shall set and maintain concrete forms and perform finishing operations to ensure that the completed Work is within tolerances.

2. Surface defects and irregularities are defined as finishes and are different from tolerances.

3. Tolerance is the permissible variation from lines, grades, or dimensions indicated on the Drawings.

4. Where tolerances are not indicated, permissible deviations shall be in accordance with ACI 117.

5. The following non-cumulative construction tolerances apply to finished walls, columns and slabs unless otherwise indicated:

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ITEM	TOLERANCE
Variation of the constructed linear outline from the established position in plan.	in 10 feet: ¼-inch in 20 feet or more: 1/2-inch
Variation from the level or from the grades indicated.	in 10 feet: 1/4-inch in 20 feet or more: 1/2-inch
Variation from plumb	in 10 feet: 1/4-inch in 20 feet or more: 1/2-inch
Variation in the thickness of slabs and walls.	minus 1/4-inch plus 1/2-inch
Variation in the locations and sizes of slabs and wall openings	plus or minus 1/4-inch

PART 2 -- PRODUCTS

2.01 CONCRETE MATERIALS

A. General

1. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage.

2. Cement reclaimed from cleaning bags or leaking containers shall not be used.

3. Cement shall be used in the sequence of receipt of shipments.

Materials and storage of materials shall comply with ACI 301, as applicable.

B. Materials for concrete shall conform to the following requirements:

1. Cement

a. Cement shall be standard brand Portland cement conforming to ASTM C150, for Type II or Type V

b. A minimum of 85 percent of cement by weight shall pass a 325 screen.

c. A single brand of cement shall be used throughout the Work, and prior to its use, the brand shall be accepted by the Engineer.

d. The cement shall be suitably protected from exposure to moisture until used.

e. Cement that has become lumpy shall not be used.

f. Sacked cement shall be stored in such a manner so as to permit access for inspection and sampling.

g. Certified mill test reports, including fineness, for each shipment of cement to be used shall be submitted to the Engineer, if requested, regarding compliance with the Specifications.

2. Water

a. Water for mixing and curing shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts, and other impurities.

b. The water shall be considered potable, for the purposes of this Section only, if it meets the requirements of the local governmental agencies.

c. Agricultural water with high total dissolved solids (greater than 1000 mg/L TDS) shall not be used.

3. Aggregates

a. Aggregates shall be obtained from pits acceptable to the Engineer, shall be non-reactive, and shall conform to ASTM C33.

b. The maximum size of coarse aggregate shall be as indicated, and the substitution of lightweight sand for fine aggregate will not be permitted.

c. Coarse Aggregates

1) Coarse aggregates shall consist of clean, hard, durable gravel, crushed gravel, crushed rock, or a combination thereof.

2) The coarse aggregates shall be prepared and handled in 2 or more size groups for combined aggregates, with a maximum size greater than ¾-inch.

3) When the aggregates are proportioned for each batch of concrete, the 2 size groups shall be combined (also refer to the Article below entitled "Trial Batch and Laboratory Tests").

d. Fine Aggregates

1) Fine aggregates shall be natural sand or a combination of natural and manufactured sand that is hard and durable.

2) When tested in accordance with ASTM D2419, the sand equivalency shall not be less than 75 percent for an average of 3 samples, nor less than 70 percent for an individual test.

3) The gradation of fine aggregate shall conform to ASTM C33 when tested in accordance with ASTM C136 for the fineness modulus of the sand used, including the optional grading in Section 6.2.

4) The fineness modulus of sand used shall not be greater than 3.1.

5) When tested in accordance with ASTM C33, the fine aggregate shall produce a color in the supernatant liquid no darker than the reference standard color solution.

e. Combined Aggregates

1) Combined aggregates shall be well graded from coarse to fine sizes and shall be uniformly graded between screen sizes to produce concrete that has optimum workability and consolidation characteristics.

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2) Where a trial batch is required for a mix design, the final combined aggregate gradations will be established during the trial batch process.

3) When tested in accordance with ASTM C33, the coarse aggregate shall show a loss not exceeding 42 percent after 500 revolutions or 10.5 percent after 100 revolutions.

f. When tested in accordance with ASTM C33, the ratio of silica released to reduction in alkalinity shall not exceed 1.0.

g. When tested in accordance with ASTM C33, the loss resulting after 5 cycles of the soundness test shall not exceed 10 percent for fine aggregate and 12 percent for coarse aggregate when using sodium sulfate.

4. Ready-mixed concrete shall conform to the requirements of ASTM C94.

5. Admixtures

a. Admixtures shall be compatible and shall be furnished by a single manufacturer capable of providing qualified field service representation.

b. Admixtures shall be used in accordance with manufacturer's recommendations.

c. If the use of an admixture is producing an inferior end result, the Contractor shall discontinue use of the admixture.

d. Admixtures shall not contain thiocyanates nor more than 0.05 percent chloride ion, and shall be non-toxic after 30 days.

e. Air Content

1) An air-entraining agent meeting the requirements of ASTM C260 shall be used.

2) The Owner reserves the right, at any time, to sample and test the air-entraining agent.

3) The air-entraining agent shall be added to the batch in a portion of the mixing water.

4) The solution shall be batched by means of a mechanical batcher capable of accurate measurement.

5) Air content shall be tested at the point of placement.

6) The air entraining agent shall be Micro-Air by Master Builders; Daravair by W.R. Grace; Sika AEA-15 by Sika Corporation; or equal

f. Set-Controlling and Water-Reducing Admixtures

1) Admixtures may be added at the Contractor's option, subject to the Engineer's approval, to control the set, effect water reduction, and increase workability.

2) The cost of adding an admixture shall be the Contractor's responsibility.

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3) Concrete containing an admixture shall be first placed at a location determined by the Engineer.

4) Admixtures shall conform to ASTM C494.

5) The required quantity of cement shall be used in the mix regardless of whether or not an admixture is used.

6) Concrete shall not contain more than one water-reducing admixture, unless it can be demonstrated that the proposed mix will meet the indicated drying shrinkage requirements.

7) The set-controlling admixture may be either with or without water-reducing properties.

8) Where the air temperature at the time of placement is expected to be consistently greater than 80 degrees F, a set-retarding admixture such as Plastocrete 161MR by Sika Corporation, Pozzolith or Delvo by BASF, Daratard by W.R. Grace, or equal shall be used.

9) Where the air temperature at the time of placement is expected to be consistently less than 40 degrees F, a non-corrosive set accelerating admixture such as Plastocrete 161FL by Sika Corporation, MasterSet FP 20 by BASF, Daraset by W.R. Grace, or equal shall be used.

10) Mid-Range Water Reducers

    a) General use water-reducing admixtures shall be mid-range and shall conform to ASTM C494, Type A and F.

    b) Use Daracem by W.R. Grace, Polyheed by BASF, Sikament by Sika Corporation, or equal.

    c) The quantity of admixture used and the method of mixing shall be in accordance with the manufacturer's instructions and recommendations.

11) High-Range Water Reducers

    a) High-range water reducers shall conform to ASTM C494, Type F or G.

    b) Use ADVA by W.R. Grace, ViscoCrete by Sika Corporation, Glenium by BASF, or equal.

    c) The high-range water reducer shall be added to the concrete after all other ingredients have been mixed and initial slump has been verified.

    d) No more than 14 ounces of water reducer per sack of cement shall be used.

    e) The water reducer shall be considered as part of the mixing water when calculating the water/cement ratio.

    f) If the high-range water reducer is added to the concrete at the Site, it may be used in conjunction with the same water reducer added at the batch plant.

g) Concrete shall have a slump of 3-inches, plus or minus ½-inch, prior to adding the high-range water reducing admixture at the Site.

h) The high-range water reducing admixture shall be accurately measured and pressure injected into the mixer as a single dose by an experienced technician.

i) A standby system shall be provided and tested prior to each day's operation of the primary system.

j) Concrete shall be mixed at mixing speed for a minimum of 70 mixer revolutions or 5 minutes after the addition of the high-range water reducer, unless recommended otherwise by the manufacturer.

g. Other Admixtures

1) Flyash

a) Flyash shall not be used for concrete sections in hydraulic structures.

b) For other concrete, fly ash may be substituted for not more than 15 percent, by weight, of cement in structural concrete and not more than 30 percent, by weight, for sitework concrete, and not more than 50 percent, by weight, of cement in other concrete.

c) Fly ash shall conform to ASTM C618 and shall not have loss-on-ignition greater than 3 percent.

d) The water/cement ratio shall be calculated based on cement plus fly ash.

2) Ground Blast Furnace Slag Cement

a) Slag cement shall not be used for concrete sections in hydraulic structures.

b) Slag cement shall conform to ASTM C989, Grade 100 or 120.

c) Blended cements shall conform to ASTM C595, Type 1S, or ASTM C1157.

d) Slag cement substitution, if used, shall be not less than 25, nor more than 50 percent by weight of cement.

e) Slag cement substitution shall not be used with fly ash substitution.

f) The water/cement ratio shall be calculated based on cement plus slag cement.

h. Silica Fume

1) Silica fume shall conform to ASTM C1240.

2) Use Force 10,000S Silica Fume by W.R. Grace, Sikacrete 950 by Sika Corporation, Rheomac SF 110 by Master Builders, or equal.

3) Blended cements with interground silica fume will not be accepted.

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4) The water content of liquid slurry silica fume admixtures shall be considered as part of the mixing water when calculating the water/cement ratio, which shall be calculated based on cement plus silica fume.

5) Batching

a) Silica fume shall be added at the batch plant as recommended by the manufacturer.

b) Regardless of the type of mixing equipment, mix times shall be increased by 40 percent over the minimum mix time required to achieve mix uniformity as defined by ASTM C94.

For truck-mixed and central-mixed concrete, the maximum allowable batch size shall be 80 percent of the maximum in accordance with ASTM C94.

2.02 CURING MATERIALS

A. General: Curing compounds shall be resin-based and shall be compliant with local VOC requirements, unless otherwise indicated herein.

B. Regular Curing Compound

1. Regular curing compound shall be white-pigmented and shall conform to ASTM C309, Type 2, Class B.

2. Sodium silicate compounds will not be accepted.

3. The concrete curing compound shall be:

a. 1200-White by W.R. Meadows;

b. White Resin Cure J10W by Dayton Superior;

c. Safe-Cure 2000 by ChemMasters, Inc;

d. or equal.

C. Dissipating Curing Compound

1. When the curing compound must be removed for finishes or grouting, compounds shall be of a dissipating type, conforming to ASTM C309, Type 1-D or 2, Class B.

2. The dissipating curing compound shall be:

a. Kurez DR VOX by Euclid Chemical Company;

b. 1100-Clear by W.R. Meadows;

c. 1250-White by W.R. Meadows;

d. SpecRez by SpecChem, LLC.;

e. Resin Cure with Dye J11WD by Dayton Superior;

f. Safe-Cure DR by ChemMasters, Inc.;

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g. or equal.

D. Curing Compound for Applications Requiring NSF/ANSI 61 Compliance

1. When the curing compound is required to conform to NSF/ANSI 61, the curing compound shall be water-based and shall be compliant with all local VOC requirements; shall conform to ASTM C309; and shall be certified to conform to the requirements of NSF/ANSI 61.

2. The NSF/ANSI 61 Certified curing compound shall be:

a. Clear Cure VOC J7WB by Dayton Superior;

b. Lithiumcure 1000 by Sinak;

c. or equal.

E. Concrete Curing Blanket

1. Polyethylene Sheets

a. Polyethylene sheets for use as concrete curing blanket shall be white and shall have a nominal thickness of 6 mils.

b. The loss of moisture when determined in accordance with ASTM C156 shall not exceed 0.055 grams per square centimeter of surface.

2. Polyethylene-Coated Waterproof Paper

a. Polyethylene-coated waterproof paper sheeting for use as concrete curing blanket shall consist of white polyethylene sheeting free of visible defects, uniform in appearance, shall have a nominal thickness of 2-mils, and shall be permanently bonded to waterproof paper conforming to the requirements of Federal Specification UU-B-790A – Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellant and Fire Resistant).

b. The loss of moisture, when determined in accordance with ASTM C156, shall not exceed 0.055 gram per square centimeter of surface.

3. Polyethylene-Coated Burlap

a. Polyethylene-coated burlap for use as concrete curing blanket shall be 4 mils thick, with white opaque polyethylene film impregnated or extruded into one side of the burlap.

b. The burlap shall weigh not less than 9 ounces per square yard.

c. The loss of moisture, when determined in accordance with ASTM C156, shall not exceed 0.055 grams per square centimeter of surface.

F. Curing Mats

1. Curing mats for use in Curing Method 6, below, shall be heavy shag rugs or carpets or cotton mats quilted at 4-inches on center.

2. Curing mats shall weigh a minimum of 12 ounces per square yard when dry.

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G. Evaporation Retardant

1. An evaporation retardant shall be used.

2. The evaporation retardant shall be:

a. MasterKure ER 50 by BASF/Master Builders;

b. Eucobar by Euclid Chemical Company;

c. E-CON by L & M Construction Chemicals, Inc.;

d. or equal.

2.03 NON-WATERSTOP JOINT MATERIALS

A. Materials for non-waterstop joints in concrete shall conform to the following requirements:

1. The preformed joint filler shall be a non-extruding neoprene sponge or polyurethane type conforming to Section 03 15 00 – Concrete Accessories.

2. The elastomeric joint sealer shall conform to Section 07 92 13 – Joint Sealants.

3. Mastic Joint Sealer

a. The mastic joint sealer shall be a material:

1) that does not contain evaporating solvents;

2) that will tenaciously adhere to concrete surfaces;

3) that will remain permanently resilient and pliable;

4) that will not be affected by the continuous presence of water;

5) that will not in any way contaminate potable water;

6) and that will effectively seal the joints against moisture infiltration even when the joints are subject to movement from expansion and contraction.

b. The sealer shall be composed of special asphalts or similar materials blended with lubricating and plasticizing agents to form a tough, durable mastic substance containing no volatile oils or lubricants.

c. The sealer shall be capable of meeting the indicated test requirements if testing is required by the Engineer.

2.04 MISCELLANEOUS MATERIALS

A. Damproofing Agent

1. The damproofing agent shall be an asbestos-free, fibered asphalt emulsion intended for cold application to green concrete, both above- and below-grade.

2. Damproofing shall meet the requirements of ASTM D1227, Type II, Class I.

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3. Dampproofing shall be:

    a. Hydrocide 700 Series by Sonneborn/Degussa Building Systems;

    b. Sealmastic by W. R. Meadows;

    c. HE 789 by Henry Company;

    d. or equal.

B. Bonding Agents

1. Bonding agents shall be epoxy adhesives.

2. Bonding agents for bonding freshly-mixed, plastic concrete to hardened concrete shall be:

    a. Sikadur 32 Hi-Mod Epoxy Adhesive by Sika Corporation;

    b. MasterEmaco ADH 326 by BASF/Master Builders;

    c. BurkEpoxy MV by Edoco;

    d. or equal.

3. Bonding agents for bonding hardened concrete or masonry to steel shall be:

    a. Sikadur 31 Hi-Mod Gel by Sika Corporation;

    b. BurkEpoxy NS by Edoco;

    c. Concresive Paste (LPL) by MBT/Degussa Building Systems;

    d. or equal.

2.05 CONCRETE DESIGN REQUIREMENTS

A. General

1. Concrete shall be composed of cement, admixtures, aggregates, and water of the qualities indicated.

2. The exact proportions in which these materials are to be used for different parts of the Work shall be determined during the trial batches.

3. In general, the mix shall be designed to produce a concrete capable of being deposited to obtain maximum density and minimum shrinkage, and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface.

4. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items.

5. The proportions shall be changed whenever necessary or desirable to meet the required results, and such changes shall be subject to review by the Engineer.

B. Fine Aggregate Composition

1. In mix designs for structural concrete, except for 1/2-inch and 3/8-inch maximum size aggregate, the percentage of fine aggregate in total aggregate by weight shall be as indicated in the following table:

Fine Aggregate	
Fineness Modulus	**Percent (maximum)**
2.7 or less	41
2.7 to 2.8	42
2.8 to 2.9	43
2.9 to 3.1	44

2. For other concrete, the maximum percentage of fine aggregate of total aggregate by weight shall not exceed 50 percent.

C. Structural silica fume concrete shall contain 10 percent silica fume by weight of cement.

D. Water/Cement Ratio

1. The indicated water/cement ratio is for a saturated-surface dry condition of aggregate.

2. Throughout every Day, the added batch water shall be adjusted for the total free water in the aggregates, which shall be determined as follows:

a. The total moisture content of all aggregate shall be calculated by ASTM C566.

b. Subtract the moisture absorbed by the coarse aggregate, calculated by ASTM C127.

c. Subtract the moisture absorbed by the fine aggregate, calculated by ASTM C128.

E. Concrete Property Tables

1. The maximum cement contents, the maximum W/C Ratios and the maximum Water Contents given in the Concrete Property Tables below are intended to minimize drying shrinkage and heat of hydration of the concrete.

2. It is understood that the indicated maximum cement contents and maximum water contents may require additional water reducing agent for the workability required by the Contractor's methods, and may not result in the least costly concrete mix for the required concrete strength.

3. Concrete Mix Design

CONCRETE MIX SCHEDULE		
	CLASS A	CLASS B
Minimum 28 Day Compressive Strength, f'c (psi)	5,000	4,000
Minimum Cementitious Material Content without Flyash (lb/cy)	517	564
Minimum Cementitious Material Content with Flyash (lb/cy)	423	470
Minimum Flyash (lb/cy) if combined with cementitious material	138	150
Water / Cementitious Ratio	0.42	0.45
Slump without High Range Water Reducer (inches +/- 1 inch)	2.5	3
Slump with High Range Water Reducer (inches +/- 1-1/2 inch)	5.5	6
Air Entrainment Exposure Condition (+/- 1-1/2%)	Moderate	Severe
Air Entrainment Percentage	4.50%	6%
Course Agregate Gradation (ASTM C-33)	AASHTO 67	-
2 inch	100%	-
1-1/2 inch	90%-100%	-
1 inch	50%-86%	100%
3/4 inch	45%-75%	90%-100%
1/2 inch	-	-
3/8 inch	38%-55%	20%-55%
No. 4	30%-45%	0%-10%
No. 8	23%-38%	0%-5%
Fine Agregate Gradation (ASTM C-33)		
3/8 inch	100%	100%
No. 4	95%-100%	90%-100%
No. 8	80%-100%	-
No. 16	50%-85%	45%-85%
No. 30	25%-60%	-
No. 50	10%-30%	5%-30%
No.100	2%-10%	0%-10%
No. 200	-	<=3.5%
Other Additives	Air-Entraining Admixture per ASTM C260 / C260M-10a and Water-Reducing Admixture per ASTM C494 Type A *	Air-Entraining Admixture per ASTM C260 / C260M-10a and Water-Reducing Admixture per ASTM C494 Type A *
Location	All walls and top slabs, all foundations and all other structural concrete not listed in schedule	Pedestrian Bridge Deck

* Additional admixures may be incorporated into mix upon engineer's approval (Accelerator per ASTM C494, Type C; Pozzolan per ASTM C618; Corrosion Inhibiting Admixes per ASTM C1582 and ASTM C494 / AASHTO M194 Type C; Silica Fume per ASTM C1240 / AASHTO M307; etc

* Additional admixures may be incorporated into mix upon engineer's approval (Accelerator per ASTM C494, Type C; Pozzolan per ASTM C618; Corrosion Inhibiting Admixes per ASTM C1582 and ASTM C494 / AASHTO M194 Type C; Silica Fume per

ASTM C1240 / AASHTO M307; etc. NOTE: the Contractor is cautioned that the limiting parameters above are not a mix design. Admixtures may be required to achieve workability required by the Contractor's construction methods and aggregates. The Contractor shall be responsible for providing concrete with the required workability and strength.

F. Adjustments to Mix Design

1. The Contractor may elect to decrease the water/cement ratio to achieve the strength and shrinkage requirements and/or add water reducers, as required to achieve workability.

2. The mixes shall be changed whenever such change is necessary or desirable to secure the required strength, density, workability, and surface finish, and the Contractor shall be entitled to no additional compensation because of such changes.

3. Any changes to the accepted concrete mix design shall be submitted to the Engineer for review and shall be tested again in accordance with the indicated requirements.

2.06 CONSISTENCY

A. The quantity of water in a batch of concrete shall be just sufficient, with a normal mixing period, to produce a concrete that can be worked properly into place without segregation and which can be compacted by vibratory methods to give the desired density, impermeability, and smoothness of surface.

B. The quantity of water shall be changed as necessary, with variations in the nature or moisture content of the aggregates, in order to maintain uniform production of a desired consistency.

C. The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C143.

D. The slumps shall be as indicated with the concrete properties.

2.07 TRIAL BATCH AND LABORATORY TESTS

A. The Contractor shall only use a mix design for construction that has first met the trial batch testing requirements.

B. Before placing any concrete, an approved testing laboratory shall prepare a trial batch of each class of structural concrete, based on the preliminary concrete mixes submitted by the Contractor.

C. Aggregate Proportions

1. During the trial batch the aggregate proportions may be adjusted by the testing laboratory using the two coarse aggregate size ranges to obtain the required properties.

2. If one size range produces an acceptable mix, a second size range need not be used.

3. Such adjustments will be considered refinements to the mix design and will not be the basis for extra compensation to the Contractor.

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4. Concrete shall conform to the indicated requirements whether the aggregate proportions are from the Contractor's preliminary mix design or whether the proportions have been adjusted during the trial batch process.

5. The trial batch shall be prepared using the aggregates, cement, and admixture proposed for the project.

D. The trial batch materials shall be of a quantity such that the testing laboratory can obtain 3 drying shrinkage and 6 compression test specimens from each batch.

E. The determination of compressive strength shall be made by testing 6-inch diameter by 12-inch high cylinders, which have been made, cured, and tested in accordance with ASTM C192 and ASTM C39.

F. The testing schedule shall be 3 compression test cylinders tested at 7 Days and 3 at 28 Days.

G. The average compressive strength for the 3 cylinders tested at 28 Days for any given trial batch shall be not less than the required average compressive strength indicated below:

Specified compressive strength f'c (psi)	**Required average compressive strength f'cr (psi)**
Less than 3000	f'c + 1000
3000 to 5000	f'c + 1200
Over 5000	1.1f'c + 700

H. A sieve analysis of the combined aggregate for each trial batch shall be performed according to the requirements of ASTM C136, and values shall be provided for percent passing each sieve.

2.08 SHRINKAGE LIMITATION

A. General

1. The Contractor shall only use a mix design for construction that has first met the trial batch shrinkage requirements.

2. Shrinkage limitations shall apply only to structural concrete.

B. Maximum Shrinkage

1. The maximum concrete shrinkage for specimens cast in the laboratory from the trial batch, as measured at 21 Day drying age or at 28 Day drying age, shall be 0.036 percent or 0.042 percent, respectively.

2. Standard deviation will not be considered.

3. The maximum concrete shrinkage for specimens cast in the field shall not exceed the trial batch maximum shrinkage requirement by more than 25 percent.

C. If the required shrinkage limitation is not met during construction, the Contractor shall take any or all of the following actions to reestablish compliance:

1. changing the source of aggregates, cement and/or admixtures;
2. reducing water/cement ratio;
3. washing of coarse and/or fine aggregate to reduce fines;
4. increasing the number of construction joints;
5. modifying the curing requirements; or
6. other actions to minimize shrinkage or the effects of shrinkage.

2.09 MEASUREMENT OF CEMENT AND AGGREGATE

A. The amount of cement and of each separate size of aggregate entering into each batch of concrete shall be determined by direct weighing equipment furnished by the Contractor and acceptable to the Engineer.

B. Weighing Tolerances

Material	**Percent of Total Weight**
Cement	1
Aggregates	3
Admixtures	3

2.10 MEASUREMENT OF WATER

A. The quantity of water entering the mixer shall be measured by a suitable water meter or other measuring device of a type acceptable to the Engineer and capable of measuring the water in variable amounts within a tolerance of one percent.

B. The water feed control mechanism shall be capable of being locked in position in order to constantly deliver the required amount of water to each batch of concrete.

C. A positive, quick-acting valve shall be used for a cut-off in the water line to the mixer, and the operating mechanism shall prevent leakage when the valve is closed.

2.11 READY-MIXED CONCRETE

A. General

1. At the Contractor's option, ready-mixed concrete may be used if it meets the indicated requirements as to materials, batching, mixing, transporting and placement, and is in accordance with ASTM C94 and the following supplementary requirements.

2. Ready-mixed concrete shall be delivered to the Work, and discharge shall be completed within one hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever occurs first.

3. The use of non-agitating equipment for transporting ready-mixed concrete will not be permitted.

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4. Combination truck and trailer equipment for transporting ready-mixed concrete will not be permitted.

5. The quality and quantity of materials used in ready-mixed concrete and in batch aggregates shall be subject to continuous inspection at the batching plant by the Engineer.

B. Counters

1. Truck mixers shall be equipped with electrically-actuated counters by which the number of revolutions of the drum or blades may be readily verified.

2. The counter shall be of the resettable, recording type and shall be mounted in the driver's cab.

3. The counters shall be actuated at the time of starting the mixers at mixing speeds.

C. Mixing

1. Each batch of concrete shall be mixed in a truck mixer for not less than 70 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment.

2. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed.

3. Materials, including the mixing water, shall be in the mixer drum before actuating the revolution counter for determining the number of revolutions of mixing.

D. Uniformity

1. Truck mixers and their operation shall be such that the concrete throughout the mixed batch as discharged is within acceptable limits of uniformity with respect to consistency, mix, and grading.

2. If slump tests taken at approximately the 1/4- and 3/4-point of the load during discharge result in slumps differing by more than 1-inch when the required slump is 3-inches or less, or if they differ by more than 2-inches when the required slump is more than 3-inches, the mixer shall not be used on the Work unless the causative condition is corrected and satisfactory performance is verified by additional slump tests.

3. Mechanical details of the mixer, such as water measuring and discharge apparatus, condition of the blades, speed of rotation, general mechanical condition of the unit, and clearance of the drum, shall be checked before a further attempt to use the unit will be permitted.

E. Each batch of ready-mixed concrete delivered to the Site shall be accompanied by a delivery ticket that is furnished to the Engineer in accordance with the Paragraph in Part 1 of this Section entitled "Delivery Tickets."

PART 3 -- EXECUTION

3.01 PROPORTIONING AND MIXING

A. Proportioning of the mix shall conform to ACI 301.

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B. Mixing shall conform to ACI 301.

C. Slumps shall be as indicated.

D. Re-tempering of concrete or mortar that has partially hardened will not be permitted.

3.02 PREPARATION OF SURFACES FOR CONCRETING

A. General

1. Earth surfaces shall be thoroughly wetted by sprinkling prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon.

2. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. Joints in Concrete

1. Construction joints are defined as concrete surfaces upon which or against which concrete is to be placed, but placement of concrete has been stopped or interrupted and the Engineer has determined that the new concrete cannot be incorporated integrally with the concrete previously placed.

2. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bonding.

3. Except where coated joint surfaces have been indicated, the joint surfaces shall be cleaned of laitance, loose or defective concrete, foreign material, and be roughened to a minimum 1/4-inch amplitude.

4. Cleaning and roughening shall be accomplished by hydroblasting or sandblasting (exposing aggregate) followed by thorough washing.

5. Pools of water shall be removed from the surface of construction joints before the new concrete is placed.

C. Placement Interruptions

1. When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means that will secure proper union with subsequent Work.

2. Such construction joints shall be made only where acceptable to the Engineer.

D. Embedded Items

1. No concrete shall be placed until the formwork, the installation of parts to be embedded, the reinforcement steel, and the preparation of surfaces involved in the placing have been completed and accepted by the Engineer at least 4 hours before the placement of concrete.

2. Surfaces of forms and embedded items that have become encrusted with dried grout from previous usage shall be cleaned before the surrounding or adjacent concrete is placed.

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3. Inserts or other embedded items shall conform to the indicated requirements.

4. Reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms at locations as indicated or shown by Shop Drawings, and shall be acceptable to the Engineer before any concrete is placed.

5. Accuracy of placement shall be the responsibility of the Contractor.

E. Casting New Concrete Against Old Concrete

1. Where concrete is to be cast against old concrete (defined as any concrete which is greater than 60 days old), the surface of the old concrete shall be thoroughly cleaned and roughened by hydroblasting or sandblasting to expose aggregate.

2. The joint surface shall be coated with an epoxy bonding agent unless determined otherwise by the Engineer.

F. Water

1. No concrete shall be placed in any structure until water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes or other means, and carried out of the forms, clear of the Work.

2. No concrete shall be deposited underwater nor shall the Contractor allow still water to rise on any concrete until the concrete has attained its initial set.

3. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete.

4. Pumping or other necessary dewatering operations for removing ground water, if required, shall be subject to review by the Engineer.

G. Corrosion Protection

1. Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be positioned and supported prior to placement of concrete such that there will be a minimum of 2-inches clearance between said items and any part of the concrete reinforcement.

2. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.

H. Openings for pipes, inserts for pipe hangers and brackets, and anchors shall be provided, where practicable, during the placement of concrete.

I. Anchor bolts shall be accurately set and shall be maintained in position by templates while embedded in the concrete.

J. Cleaning: The surfaces of metalwork to be in contact with the concrete shall be thoroughly cleaned of dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

3.03 HANDLING, TRANSPORTING, AND PLACING

A. General

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1. The placement of concrete shall conform to the applicable portions of ACI 301 and the indicated requirements.

2. No aluminum materials shall be used in conveying any concrete.

B. Non-Conforming Work or Materials

1. Concrete which during or before placing is found not to conform to the indicated requirements will be rejected and shall be immediately removed from the Work.

2. Concrete that is not placed in accordance with these requirements or which is of inferior quality shall be removed and replaced.

C. Unauthorized Placement

1. No concrete shall be placed except in the presence of an authorized representative of the Engineer.

2. The Contractor shall notify the Engineer in writing at least 24 hours in advance of the placement of any concrete.

D. Casting New Concrete Against Old

1. An epoxy adhesive bonding agent shall be applied to the old surfaces according to the manufacturer's written recommendations.

2. This provision shall not apply to joints where waterstop has been provided.

3. Refer to Section 03 15 00 – Concrete Accessories, for other requirements.

E. Conveyor Belts and Chutes

1. Ends of chutes, hopper gates, and other points of concrete discharge throughout the Contractor's conveying, hoisting, and placement system shall be designed and arranged such that concrete passing from them will not fall separated into whatever receptacle immediately receives it.

2. Conveyor belts, if used, shall be of a type acceptable to the Engineer.

3. Chutes longer than 50 feet will not be permitted.

4. The minimum slopes of chutes shall be such that concrete of the indicated consistency will readily flow in them.

5. If a conveyor belt is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted.

6. Conveyor belts and chutes shall be covered.

F. Placement in Wall and Column Forms

1. Concrete shall not be dropped through reinforcement steel or into any deep form, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete.

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2. In such cases, means such as hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation.

3. In no case shall the free fall of concrete below the ends of ducts, chutes, or buggies exceed 4 feet in walls and 8 feet in columns.

4. Concrete shall be uniformly distributed during the process of deposition, and in no case after deposition shall any portion be displaced in the forms more than 6 feet in the horizontal direction.

5. Concrete in wall forms shall be deposited in uniform horizontal layers not deeper than 2 feet, and care shall be exercised to avoid inclined layers or inclined construction joints except where such are required for sloping members.

6. Each layer shall be placed while the previous layer is still soft.

7. The rate of placing concrete in wall forms shall not exceed 5 feet of vertical rise per hour.

8. Sufficient illumination shall be provided in the interior of forms such that the concrete at the places of deposit is visible from the deck or runway.

G. Placement in Slabs

1. Concrete placement in sloping slabs shall proceed uniformly from the bottom of the slab to the top for the full width of the placement.

2. As the Work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screeded in an up-slope direction.

H. Temperature of Concrete

1. The temperature of concrete when it is being placed shall be not more than 90 degrees F nor less than 50 degrees F.

2. For sections less than 12-inches thick, the temperature of concrete when placed shall be not less than 55 degrees F.

I. Hot or Cold Weather Procedures

1. If required by the Engineer, the Contractor shall submit detailed procedures for the production, transportation, placement, protection, curing, and temperature monitoring of concrete during hot or cold weather.

2. The submittal shall include procedures to be implemented upon abrupt changes in weather conditions or equipment failures.

3. The Contractor shall not be entitled to additional compensation for satisfying the hot weather placement or the cold weather placement requirements below.

J. Hot Weather Placement

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1. If the temperature of the concrete is 85 degrees F or greater, the time between introducing the cement into the aggregates and discharge shall not exceed 45 minutes.

2. If the concrete is placed when the weather is such that the temperature of the concrete would exceed 90 degrees F, the Contractor shall employ effective means such as pre-cooling of aggregates, using ice as mixing water, or placing at night as necessary to maintain the temperature of the concrete below 90 degrees F as it is placed.

3. During the curing period, the maximum temperature decrease measured at the surface of the concrete shall not exceed 50 degrees F in 24 hours nor 5 degrees F in one hour.

K. Cold Weather Placement

1. The placement of concrete shall conform to ACI 306.1 and the following requirements:

a. Remove snow, ice, and frost from the surfaces, including reinforcement, against which concrete is to be placed.

b. Before beginning concrete placement, thaw the subgrade to a minimum depth of 6-inches.

c. Reinforcement and embedded items shall be warmed to above 32 degrees F prior to concrete placement.

d. Maintain the concrete temperature above 50 degrees F for at least 72 hours after placement.

e. Concrete ingredients shall not be heated more than necessary to prevent the temperature of the mixed concrete, as placed, from falling below the minimum temperature criterion.

3.04 PUMPING OF CONCRETE

A. General: If the pumped concrete does not produce satisfactory end results, the Contractor shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

B. Pumping Equipment

1. The pumping equipment shall have 2 cylinders and shall be designed to operate with one cylinder in case the other one is not functioning.

2. In lieu of this requirement, the Contractor may have a standby pump on the Site during pumping.

3. The minimum diameter of the hose conduits shall be 4-inches, unless approved otherwise by the Engineer.

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a. For thin walls and columns and other elements which do not have sufficient clear space to accommodate a 4 -inch diameter conduit, the Contractor shall submit details for a smaller diameter conduit along with confirmation that the smaller conduit can functionally place the approved concrete mix in accordance with the Concrete Specifications.

4. Pumping equipment and hose conduits that are not functioning properly shall be replaced.

5. Aluminum conduits for conveying the concrete will not be permitted.

C. Field Control: Concrete samples for slump, air content, and test cylinders shall be taken at the placement end of the hose.

3.05 ORDER OF PLACING CONCRETE

A. General

1. The order of placing concrete in the Work shall be acceptable to the Engineer.

2. In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints at the indicated locations.

B. The placing of units shall be done by placing alternate units in a manner such that each unit placed shall have cured at least 5 Days for hydraulic structures and 2 Days for all other structures before the contiguous unit or units are placed, except that the corner sections of vertical walls shall not be placed until the 2 adjacent wall panels have cured at least 10 Days for hydraulic structures and 4 Days for all other structures.

C. Concrete Surfaces

1. The surface of the concrete shall be level whenever a run of concrete is stopped.

2. For a level, straight, intermediate joint on the exposed surface of walls, a wood strip at least 3/4-inch thick shall be tacked to the forms on these surfaces.

3. The concrete shall be carried approximately 1/2-inch above the underside of the strip.

4. The strip shall be removed one hour after the concrete is placed, and any irregularities in the edge formed by the strip shall be leveled with a trowel and laitance shall be removed.

3.06 TAMPING AND VIBRATING

A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted throughout the entire depth of the layer, which is being consolidated, into a dense and homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete.

B. Vibrators

1. Vibrators shall be high speed power vibrators of an immersion type in sufficient number and with at least one standby unit as required.

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2. Vibrators shall have the following characteristics and performance attributes:

    a. Diameter of head: 2- to 3-1/2-inches;

    b. Operating frequency in concrete: 8,000 to 12,000 vibrations per minute;

    c. Eccentric moment: 0.20 to 0.70 in-lbs (calculated in accordance with ACI 309R-05 Fig. A.2 – Action of rotary vibrator);

    d. Average amplitude operating in air (half of the peak-to-peak amplitude): 0.025- to 0.05-inches;

    e. Centrifugal force using frequency of vibrator while operating in concrete: 700 to 2000 lbs (calculated in accordance with ACI 309R-05 Fig. A.2– Action of rotary vibrator);

    f. Radius of influence: 7- to 14-inches.

3. Vibrators for plastic concrete in thin walls, columns, beams, thin slabs, along construction joints, and to supplement larger vibrators in confined areas shall have the following characteristics and performance attributes:

    a. Diameter of head: 1-1/4- to 2-1/2-inches;

    b. Operating frequency in concrete: 8,500 to 12,500 vibrations per minute;

    c. Eccentric moment: 0.08 to 0.25 in-lbs (calculated in accordance with ACI 309R-05 Fig. A.2 – Action of rotary vibrator);

    d. Average amplitude operating in air (half of the peak-to-peak amplitude): 0.02 to 0.04-inches;

    e. Centrifugal force using frequency of vibrator while operating in concrete: 300 to 900 lbs (calculated in accordance with ACI 309R-05 Fig. A.2– Action of rotary vibrator);

    f. Radius of influence: 5- to 10-inches.

C. Waterstops

1. Care shall be exercised when placing concrete around waterstops.

2. The concrete shall be carefully worked by rodding and vibrating to make sure that air and rock pockets have been eliminated.

3. Where flat-strip type waterstops have been placed horizontally, the concrete shall be worked under the waterstops by hand, making sure that air and rock pockets have been eliminated.

4. Concrete that is surrounding the waterstops shall be given additional vibration over and above that used for adjacent concrete placement to ensure complete embedment of the waterstops in the concrete.

D. Concrete in Walls

1. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against each surface.

2. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly.

3. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the required results within 15 minutes after concrete of the prescribed consistency has been placed in the forms.

4. The vibrating head shall not contact the surfaces of the forms.

5. Care shall be exercised not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.07 FINISHING CONCRETE SURFACES

A. General

1. Surface defects are defined as fins, bulges, ridges, offsets, honeycombing, roughness of any kind, and surface holes larger than 1/2-inch in diameter or deeper than 1/2-inch.

2. Concrete surfaces shall be free from surface defects and shall present a finished, smooth, continuous hard surface.

3. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions are defined as tolerances and shall be as indicated.

4. These tolerances are to be distinguished from irregularities in finish as indicated.

5. Aluminum finishing tools shall not be used.

B. Formed Surfaces

1. Where the finish is a form lined finish, treatment shall be as indicated in Sec. 03 11 00 – Concrete Forming.

2. Formed surfaces without form liner shall be treated to provide a "Smooth Form Finish", which consists of finishing the surfaces as necessary to produce smooth, even surfaces of uniform texture and appearance, free of surface defects, depressions and other imperfections.

3. Form tie holes and defective concrete shall be repaired.

3.08 CURING AND DAMPPROOFING

A. General: Concrete shall be cured for not less than 7 Days after placement, in accordance with the methods indicated below for the different parts of the Work.

Surface to be Cured	**Method**
unstripped forms	1

construction joints between footings and walls	2
wall sections with forms removed	3

B. Method 1

1. Wooden forms shall be wetted immediately after concrete has been placed and shall be kept wet with water until removal.

2. If steel forms are used the exposed concrete surfaces shall be kept continuously wet until the forms are removed.

3. If forms are removed within 7 Days of placing the concrete, curing shall be continued in accordance with Method 3, below.

C. Method 2

1. The surface shall be covered with burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed.

2. No curing compound shall be applied to surfaces cured under Method 2.

D. Method 3

1. Method 3 shall apply to both walls and slabs.

2. The concrete shall be kept continuously wet by the application of water for a minimum period of at least 7 Days, beginning immediately after the concrete has reached final set or the forms have been removed.

3. Until the concrete surface is covered with the curing mats, the entire surface shall be kept damp by applying water using nozzles that atomize the flow such that the surface is not marred or washed.

4. Curing Mats

   a. Heavy curing mats shall be used as a curing medium to retain the moisture during the curing period.

   b. The curing mats shall be weighted or otherwise held substantially in contact with the concrete surface to prevent dislodging by wind or other causes.

   c. Edges shall be continuously held in place.

5. The curing mats and concrete shall be kept continuously wet by the use of sprinklers or other means both during and after normal working hours.

6. Immediately after the application of water has terminated at the end of the curing period, the curing mats shall be removed, the entire concrete surface shall be wetted, and curing compound shall be immediately applied to the entire surface.

7. The Contractor shall dispose of excess water from the curing operation in order to avoid damage to the Work.

3.09 PROTECTION

A. The Contractor shall protect the concrete against damage until final acceptance.

B. Weather Protection

1. Fresh concrete shall be protected from damage due to rain, hail, sleet or snow.

2. The Contractor shall provide such protection while the concrete is still plastic and whenever precipitation is imminent or occurring.

3.10 CURING DURING COLD WEATHER

A. Water curing of concrete may be reduced to 6 Days during periods when the mean daily temperature in the vicinity of the Site is less than 40 degrees F, provided that during the prescribed period of water curing, when temperatures are such that concrete surfaces may freeze, water curing has been temporarily discontinued.

B. Compound-Cured Concrete

1. Concrete that is to be cured by an application of curing compound shall require no additional protection from freezing if the protection at 50 degrees F for 72 hours is obtained by means of approved insulation in contact with the forms or concrete surfaces.

2. Otherwise, the concrete shall be protected against freezing temperatures for 72 hours immediately following 72 hours protection at 50 degrees F.

C. Concrete cured by water shall be protected against freezing temperatures for 72 hours immediately following the 72 hours of protection at 50 degrees F.

D. Discontinuance of Protection

1. Discontinuance of protection against freezing temperatures shall be such that the drop in temperature of any portion of the concrete will be gradual and will not exceed 40 degrees F in 24 hours.

2. In the spring, when the mean daily temperature rises above 40 degrees F for more than 3 successive Days, the required 72 hour protection at a temperature not lower than 50 degrees F may be discontinued for as long as the mean daily temperature remains above 40 degrees F, provided that the concrete shall be protected against freezing temperatures for not less than 48 hours after placement.

E. Artificial Heat

1. Where artificial heat is employed, special care shall be taken to prevent the concrete from drying.

2. The use of unvented heaters will be permitted only when unformed surfaces of concrete adjacent to the heaters are protected for the first 24 hours from an excessive carbon dioxide atmosphere by application of curing compound, provided that the use of curing compound for such surfaces is otherwise permitted.

3.11 TREATMENT OF SURFACE DEFECTS

A. General

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1. Surface defects are defined in Finishing Concrete Surfaces, above.

2. As soon as forms are removed, the exposed concrete surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in order to secure a smooth, uniform, and continuous surface satisfactory to the Engineer.

3. Plastering or coating of surfaces to be smoothed will not be permitted.

4. No repairs shall be made until after inspection by the Engineer.

5. In no case will extensive patching of honeycombed concrete be permitted.

6. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall be repaired as indicated below.

7. Concrete containing extensive voids, holes, honeycombing, or similar depression defects shall be completely removed and replaced.

8. Repairs of surface defects shall be performed promptly.

B. Preparation

1. Defective surfaces to be repaired shall be cut back from trueline a minimum depth of 1/2-inch over the entire area.

2. Feathered edges will not be permitted.

3. Where chipping or cutting tools are not required in order to deepen the area properly, the surface shall be prepared for bonding by the removal of laitance and soft material, plus not less than 1/32-inch depth of the surface film from hard portions by means of an efficient sandblast.

4. After cutting and sandblasting, the surface shall be wetted sufficiently in advance of shooting with shotcrete or with cement mortar such that while the repair material is being applied the surfaces underneath will remain moist but not so wet as to overcome the suction upon which a good bond depends.

C. Materials

1. The material used for repair shall consist of a mixture of one sack of cement to 3 cubic feet of sand.

2. For exposed walls, the cement shall contain such a proportion of Atlas White Portland cement as is required to make the color of the patch match the color of the surrounding concrete.

D. Holes

1. Holes left by tie-rod cones shall be reamed with suitably toothed reamers in order to leave the surfaces of the holes clean and rough.

2. Holes then shall be repaired in an approved manner with dry-packed cement grout.

3. Holes left by form-tying devices having a rectangular cross section and other imperfections having a depth greater than their least surface dimension shall not be reamed but shall be repaired in an approved manner with dry-packed cement grout.

E. Repairs

1. Repairs shall be built up and shaped in such a manner that the completed Work will conform to the indicated requirements, using approved methods which will not disturb the bond, cause sagging, or cause horizontal fractures.

2. The surfaces of repaired concrete shall receive the same kind and amount of curing treatment as required for the concrete in the repaired section.

F. Cracks: Prior to filling any structure with water, cracks shall be repaired in accordance with the requirements of Section 03 01 00 – Maintenance of Concrete.

3.12 CONCRETE REPAIR AND REHABILITATION

A. All defects and repairs not covered under Treatment of Surface Defects shall be repaired per Section 03 01 00 - Maintenance of Concrete.

3.13 CARE AND REPAIR OF CONCRETE

A. The Contractor shall protect concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until Final Acceptance.

B. Particular care shall be exercised in order to prevent the drying shrinkage damage of concrete and to avoid roughening or otherwise damaging the concrete surface.

C. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed Work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be repaired or removed and replaced with acceptable materials to the satisfaction of the Engineer.

END OF SECTION

SECTION 03 34 00

LOW DENSITY CONCRETE

PART 1 -- GENERAL

1.01 SUMMARY

A. The Contractor shall provide Low Density Concrete in accordance with the Contract Documents. Low Density Concrete shall have a high slump, non-segregating consistency that readily flows and fills voids and difficult to reach places, and shall be either:

1. Controlled Low Strength Material (CLSM). CLSM shall be placed where indicated for structure cavity fill, pipe zone fill, trench zone fill, and structure backfill.

2. Cellular Concrete. Cellular Concrete shall be placed where indicated for culvert and pipe abandonment.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
1. Refer to Section 01 20 00

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Reference Specifications

01 33 00	Submittal Procedures
31 30 00	Earthwork Methods
02 41 13	Selective Site Demolition

B. The edition of the standards applicable to the Work shall be those editions referenced by the 2015 International Building Code (IBC). If the standard is not referenced by the IBC -referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of signing and sealing of the contract specifications.

C. Reference Standards

ASTM International (ASTM)	
ASTM C94	Ready Mixed Concrete
ASTM C138	Unit Weight, Yield and Air Content (Gravimetric) of Concrete
ASTM C150	Portland Cement
ASTM C260	Air-Entraining Admixtures for Concrete
ASTM C403	Time of Setting of Concrete Mixtures by Penetration Resistance
ASTM C494	Chemical Admixtures for Concrete

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ASTM C618	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C803	Standard Test Method for Penetration Resistance of Hardened Concrete
ASTM D4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4832	Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders
International Code Council (ICC)	
IBC	2015 International Building Code

1.04 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Mix Designs and Testing Program:

1. Submit Low Density Concrete mix designs which show the proportions and gradations of materials proposed for each type of Low Density Concrete indicated. Each mix design shall be accompanied by independent laboratory test results of the indicated properties.

2. Submit additional correlation tests as required.

3. For Cellular Concrete:

a. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, curing, and appropriate uses for Cellular Concrete.

b. Documentation indicating that the Cellular Concrete contains no chlorides or other chemicals that cause corrosion.

c. Manufacturer's Safety Data Sheet documenting composition of Cellular Concrete.

d. Submit manufacturer's written warranty as indicated herein.

1.05 QUALITY ASSURANCE

A. Contractor is responsible for testing performed by a testing laboratory approved by the Owner.

B. If tests of the Low Density Concrete show non-compliance with the specifications, the Contractor shall make changes as may be required to achieve compliance.

C. For CLSM: Sampling of CLSM for compression testing shall be at least once a day, and at least once for each 150 cubic yards of CLSM placed each day.

1. Setting test shall be in accordance with ASTM C403.

2. Density tests shall be in accordance with ASTM C138.

3. Compression tests shall be performed in accordance with ASTM D4832.

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a. Each set of specimens shall be a minimum of 5 cylinders.

b. One test cylinder shall be tested at 7 days and 2 test cylinders shall be tested at 28 days.

c. The remaining test cylinders shall be held to verify test results, if needed.

D. For Cellular Concrete:

1. During placement of the initial batches, check the density and adjust the mix as required to obtain the specified cast density at the point of placement. Take four (4) test specimens for each 300 cubic yards of Cellular Concrete placed or every four (4) hours of placing.

2. Test in accordance with ASTM C495. NOTE: do not oven dry load test specimens. The specimens shall be 3" diameter x 6" high cylinders covered after casting to prevent damage and loss of moisture. Moist cure the specimens at least up to 3 days prior to a 28-day compressive strength test. Specimens may be tested at any age to monitor the compressive strength.

PART 2 -- PRODUCTS

2.01 CONTROLLED LOW STRENGTH MATERIAL

A. CLSM shall be a mixture of cement, pozzolan, coarse and fine aggregate, admixtures, and water, mixed in accordance with ASTM C94.

B. Composition: The following parameters shall be within the indicated limits and as necessary to produce the indicated compressive strengths.

1. Mix proportions as necessary.

2. Entrained air content shall be between 6 and 15 percent.

3. Water reducing agent content as necessary.

C. Properties

1. Density shall be between 120 PCF minimum and 145 PCF maximum.

2. Slump shall be as required by the Contractor's methods but shall not promote segregation nor shall slump exceed 9 inches.

3. Compressive strength at 28 Days: Between 100 psi minimum and 300 psi maximum.

D. Cement

1. Cement shall be Type I or II in accordance with ASTM C150.

E. Pozzolan

1. Pozzolan shall be Type F or C in accordance with ASTM C618. Pozzolan content, by weight, in CLSM shall not be greater than cement content,

F. Aggregate

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1. Aggregate shall consist of a well graded mixture of crushed rock, soil, or sand, with a nominal maximum size of 3/8-inch. One hundred percent shall pass the 1/2-inch sieve; no more than 30 percent shall be retained on the 3/8-inch sieve; and no more than 12 percent shall pass the number 200 sieve. If more than 5 percent of the aggregate passes the number 200 sieve, the material passing the number 200 sieve shall have a plasticity index of less than 0.73 (liquid limit-20), when tested in accordance with ASTM D4318. Aggregate shall be free from organic matter and shall not contain more alkali, sulfates, or salts than the native materials at the Site.

G. Admixtures

1. Air entraining admixtures shall be in accordance with ASTM C260.

2. Water reducing admixtures shall be in accordance with ASTM C494.

H. Water

1. Water shall be potable, clean, free from objectionable quantities of silt, organic matter, alkali, salt, and other impurities.

2.02 CELLULAR CONCRETE

A. Cellular Concrete shall be a mixture of Portland cement, water and pre-formed foam.

B. Composition: The following parameters shall be within the indicated limits and as necessary to produce the indicated compressive strengths.

1. Mix proportions as necessary.

2. Entrained air content shall be between 60 and 80 percent.

C. Properties

1. Density shall be between 35 PCF minimum and 45 PCF maximum.

2. Slump per mix designer.

3. Compressive strength at 28 Days: Between 30 psi minimum and 150 psi maximum.

D. Cement

1. Cement shall be in accordance with ASTM C150, C595 or C1157.

2. Water Cement Ratio per recommendations of foaming agent manufacturer.

E. Aggregate

1. Aggregate per recommendations of foaming agent manufacturer.

F. Admixtures

1. Foaming agents per ASTM C869.

G. Water

1. Water shall be potable, clean, free from objectionable quantities of silt, organic matter, alkali, salt, and other impurities.

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PART 3 -- EXECUTION

3.01 CLSM

A. Preparation

1. Subgrade and compacted fill to receive CLSM shall be prepared according to Section 31 30 00 – Earthwork Methods.

B. Batching, Mixing And Delivery

1. Batching, mixing, and delivery of CLSM shall conform to ASTM C94. CLSM shall be mixed at a batch plant acceptable to the Engineer and shall be delivered in standard transit mix trucks.

C. Placement

1. CLSM shall be placed by tailgate discharge, conveyor belts, pumped, or other means. CLSM shall be directed in place by vibrator, shovel, or rod to fill crevices and pockets. Avoid over-consolidation which causes separation of aggregate sizes.

2. CLSM shall be continuously placed against fresh material unless otherwise approved by the Engineer. When new material is placed against existing CLSM, the placement area shall be free from loose and foreign material. The surface of the existing material shall be soaked a minimum of one hour before placement of fresh material, but no standing water shall be allowed when placement begins.

3. Temperature of the CLSM shall be between 50 and 90 degrees F, when placed. CLSM shall not be placed when the air temperature is below 40 degrees F. No CLSM shall be placed against frozen subgrade or other materials having temperature less than 32 degrees F.

4. CLSM shall be placed in accordance with Section 31 30 00 – Earthwork Methods.

D. Finishing

1. The finish surface shall be smooth and to the grade indicated or directed by the Engineer. Surfaces shall be free from fins, bulges, ridges, offsets, and honeycombing. Finishing by wood float, steel trowel, or similar methods is not required.

E. Curing

1. CLSM shall be kept damp for a minimum of 7 Days or until final backfill is placed.

F. Protection

1. CLSM shall be protected from freezing for 72 hours after placement.

2. No fill or loading shall be placed on CLSM until probe penetration resistance, as measured in accordance with ASTM C803, exceeds 650 psi.

3. CLSM shall be protected from running water, rain, and other damage until the material has been accepted and final fill completed.

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3.02 CELLULAR CONCRETE

A. Preparation

1. Bulkheads shall be provided according to Section 02 41 13 – Selective Site Demolition.

2. Air pressure release shall be provided at bulkheads as necessary to ensure complete filling of the fill area.

3. The fill area shall not have standing water in it.

4. Items encased in the fill shall be set and stable prior to installing the Cellular Concrete.

B. Batching, Mixing And Delivery

1. Batching, mixing, and delivery of Cellular Concrete shall be according to manufacturer's recommendations.

C. Placement

1. Convey and place Cellular Concrete according to manufacturer's recommendations.

2. Ensure entire volume to be abandoned is filled.

END OF SECTION

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SECTION 03 60 00

GROUTING

PART 1 -- GENERAL

1.01 SUMMARY

A. The Contractor shall provide grout, complete and in place, in accordance with the Contract Documents. For concrete repair material and procedures, reference Section 03 01 00 – Maintenance of Concrete.

B. Grout provided as a base support for mechanical and electrical equipment shall conform to manufacturer's requirements and the requirements of this section.

C. The following types of grout are covered in this Section:

1. Neat Cement Grout

2. Non-Shrink Grout

3. High Strength Non-Shrink Grout

4. Non-Shrink Epoxy Grout

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
1. Refer to Section 01 20 00

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. The edition of the standards applicable to the Work shall be those editions referenced by the 2015 International Building Code (IBC). If the standard is not referenced by the IBC -referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of signing and sealing of the contract specifications.

B. Reference Specifications

01 33 00	Submittal Procedures
03 01 00	Maintenance of Concrete
03 30 00	Cast-in-Place Concrete
05 05 19	Post-Installed Concrete Anchors

C. Reference Standards

ASTM International (ASTM)	
ASTM C109	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)

ASTM C307	Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings
ASTM C531	Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
ASTM C579	Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
ASTM C580	Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
ASTM C827	Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures
ASTM C882	Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear
ASTM C1090	Standard Test Method for Measuring Changes in Height of Cylindrical Specimens from Hydraulic-Cement Grout
ASTM C1107	Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C1116	Standard Specification for Fiber-Reinforced Concrete
ASTM C1339	Standard Test Method for Flowability and Bearing Area of Chemical-Resistant Polymer Machinery Grouts
International Concrete Repair Institute (ICRI)	
ICRI 310.2R-2013	Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

1.04 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures.

1. Certified testing lab reports for tests indicated herein.

2. Test results and service report from the field tests and the demonstration and training session verifying the requirements indicated herein.

3. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, curing, and appropriate uses for each type of grout used in the Work, and location of use.

4. Documentation indicating that the grouts contain no chlorides or other chemicals that cause corrosion.

5. Manufacturer's Safety Data Sheet documenting composition of grouts.

6. Submit manufacturer's written warranty as indicated herein.

1.05 QUALITY ASSURANCE

A. Field Tests

1. Compression test specimens will be taken from the first placement of each type of grout, and at intervals thereafter selected by the Engineer. The specimens will be made by the Engineer or its representative.

2. Compression tests and fabrication of specimens for cement based non-shrink grout will be performed in accordance with ASTM C1107 at intervals during construction selected by the Engineer.

3. Compression tests and fabrication of specimens for benching grout and grout fill will be performed in accordance with Section 03 30 00 - Cast-in-Place Concrete at intervals during construction selected by the Engineer.

4. Compression tests and fabrication of specimens for epoxy grouts will be performed in accordance with ASTM C579, Method B, at intervals during construction selected by the Engineer. A set of 3 specimens will be made for testing at 7 Days and each earlier time period as appropriate.

5. The cost of laboratory tests on grout will be paid by the OWNER except where test results show the grout to be defective. In such case, the Contractor shall pay for the tests, removal and replacement of Defective Work, and re-testing, all as part of the Work.

6. The Contractor shall assist the Engineer in obtaining specimens for testing and shall furnish materials necessary for fabricating the test specimens.

B. Construction Tolerances: Construction tolerances shall be as indicated in Section 03 30 00 - Cast-in-Place Concrete unless indicated otherwise.

C. Pre-Installation Demonstration and Training

1. Non-Shrink Grouts

a. The grout manufacturer shall give a demonstration and training session for the cement based and epoxy non-shrink grouts to be used on the project before any installation of grout is allowed.

b. The Contractor shall transport the test cubes to an independent test laboratory, obtain the test reports, and report these demonstration and training test cube strengths to the Engineer.

1.06 SPECIAL CORRECTION OF DEFECTS PROVISIONS

A. Manufacturer's Warranty

1. Furnish one year warranty for Work provided under this section.

2. Manufacturer's warranty shall not contain a disclaimer limiting responsibility to the purchase price of products or materials.

PART 2 -- PRODUCTS

2.01 APPLICATION

A. Unless indicated otherwise, grouts shall be provided as listed below whether indicated on the Drawings or not.

Application	**Type of Grout**
Filling blockout spaces for embedded items such as railing posts, gate guide frames, etc.	Non-Shrink
Benching and grout fill less than 3-inches thick	Non-shrink
Anchor bolts, anchor rods and reinforcing steel required to be set in epoxy or adhesive.	Post Installed Anchors in Concrete per Section 05 05 19 - Post-Installed Concrete Anchors
Repair of holes and defects in concrete members.	Concrete Repair and Rehabilitation per Section 03 01 00 - Maintenance of Concrete

2.02 NEAT CEMENT GROUT

A. Neat cement grout shall be composed of one 94 pound bag of cement and 5 gallons minimum to 6 gallons maximum of clean water to obtain the desired consistency.

B. Cement material and water shall be as indicated in 03 30 00 - Cast-in-Place Concrete.

2.03 NON-SHRINK GROUTS

A. General

1. All non-shrink grout shall be cement based unless otherwise noted.

2. Cement-based non-shrink grout shall be a prepackaged, inorganic, fluid, non-gas liberating, non-metallic, cement type grout requiring only the addition of water. Cement from kilns burning metal-rich hazardous waste fuel shall not be used.

3. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each non-shrink grout shall be as recommended by the manufacturer for the particular application.

4. The manufacturer’s product information shall state the acceptability of the non-shrink grout for the intended purpose and location.

5. Grout shall not contain chlorides or additives that may contribute to corrosion.

6. Grout placed in continuously wet environments or in exterior conditions shall not contain gypsum or calcium salt.

7. All cement-based non-shrink grout shall have the following general properties:

a. Meet the requirements of ASTM C1107.

b. Have a maximum early age height change of 4.0 percent expansion, and shall have no shrinkage (0.0 percent) in accordance with ASTM C827. The grout when tested shall not bleed or segregate at maximum allowed water.

c. No shrinkage (0.0 percent) and a maximum of 0.3 percent expansion in the hardened state when tested in accordance with ASTM C1090.

d. A minimum bond strength (concrete to grout) of 1900 psi per modified ASTM C882.

8. Environmental and ambient conditions shall be a factor in the selection of non-shrink grout. If a non-shrink grout is to be used in a high temperature environment or freeze/thaw environment, the manufacturer's product information shall state the acceptability for each environmental condition.

9. Grout shall be suitable for use in freeze/thaw environments.

B. Non-Shrink Grout

1. Non-Shrink Grout shall have a minimum 28 Day compressive strength of 5000 psi when mixed at a fluid consistency and tested per ASTM C109.

2. Non-Shrink Grout shall be Five Star Grout by Five Star Products, Inc., Fluid Grout 100 by Five Star Products, Inc., Sikagrout 212 by Sika Corporation, or approved equal.

C. High Strength Non-Shrink Grout

1. High Strength Non-Shrink Grout shall have a minimum 28-Day compressive strength of 10,000 psi when mixed at a fluid consistency and tested per ASTM C109.

2. High Strength Non-Shrink Grout shall be High Strength Grout by Five Star Products, Inc., Sikagrout 428 FS by Sika Corporation, or approved equal.

2.04 NON-SHRINK EPOXY GROUT

A. Non-shrink epoxy grout shall develop a minimum compressive strength of 9000 psi in 24 hours and 13,000 psi in seven days when tested in accordance with ASTM C579, method B.

B. Non-shrink epoxy grout shall be a flowable, non-shrink, 100 percent solids system. The epoxy grout system shall have 3 components: resin, hardener, and specially blended aggregate, each premeasured and prepackaged. The resin component shall not contain any non-reactive diluents.

C. The manufacturer's product information shall state the acceptability of the epoxy grout for the intended purpose and location.

D. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Manufacturer's instructions shall be printed on each container in which the materials are packaged.

E. Resins containing butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable.

F. Non-shrink epoxy grout shall have a negligible (less than 0.0006 in/in) length change after hardening, and a coefficient of thermal expansion less than 0.00003 in/in F when tested in accordance with ASTM C531.

G. The effective bearing area shall be a minimum of 85 percent effective bearing area (EBA) in accordance with ASTM C1339, for bearing area and flow.

H. The chemical formulation of the non-shrink epoxy grout shall be that recommended by the manufacturer for the particular application. Do not reduce aggregate loading or add solvents to increase flowability.

I. Non-shrink epoxy grout shall have the following minimum properties when tested at 7 Days:

1. Minimum bond strength to concrete of 3000 psi per ASTM C882 modified.

2. Minimum bond strength to steel of 1700 psi per ASTM C882 modified.

3. Minimum flexural strength of 2500 psi per ASTM C580.

4. Minimum tensile strength of 2000 psi per ASTM C307.

J. Non-shrink epoxy grout shall be DP Epoxy Grout by Five Star Products, Inc., MasterFlow 648 by BASF/Master Builders, Sikadur 42 Grout-Pak by Sika Corporation, or approved equal.

2.05 BENCHING GROUT AND GROUT FILL

A. Benching grout and grout fill for built-up surfaces of sewer structures, channels, and basin bottoms shall be composed of cement, fine aggregate, coarse aggregate, water, and admixtures proportioned and mixed as indicated. Materials and procedures indicated for structural concrete in Section 03 30 00 - Cast-in-Place Concrete, shall apply unless indicated otherwise

B. For benching grout and grout fill thickness greater than 3-inches, ready-mix concrete may be used with the following requirements:

1. Minimum of 564 pounds of cement per cubic yard with a maximum water/cement ratio of 0.45.

2. Coarse aggregate shall be as follows:

U.S. Standard Sieve Size	**Percent By Weight Passing**
1/2 in	100
3/8 in	90-100
No. 4	20-55
No. 8	5-30
No. 16	0-10
No. 30	0

C. Final mix design shall be as determined by trial mix design as indicated in Section 03 30 00 - Cast-in-Place Concrete, except that drying shrinkage tests are not required.

D. Benching grout and grout fill shall contain air-entraining agent per Section 03 30 00 - Cast-in-Place Concrete.

2.06 CURING MATERIALS

A. Curing materials shall be in accordance with Section 03 30 00 - Cast-in-Place Concrete and as recommended by the manufacturer of prepackaged grouts.

2.07 CONSISTENCY

A. The consistency of grout shall be as necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is defined such that the grout is plastic and moldable but will not flow. Where "dry pack" is called for in the Contract Documents, it shall mean a grout of that consistency; the type of grout to be used shall be as indicated herein for the particular application.

B. The slump for benching grout and grout fill shall be adjusted to match placement and finishing conditions but shall not exceed 4-inches.

2.08 MEASUREMENT OF INGREDIENTS

A. Measurements shall be made accurately by volume using containers. Shovel measurements are not allowed.

B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

PART 3 -- EXECUTION

3.01 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Grout shall be stored in accordance with manufacturer's recommendations.

3.02 GENERAL

A. Contractor shall arrange for the manufacturer of prepackaged grouts to provide on-site technical assistance within 72 hours of request, as part of the Work.

B. Grout shall not be placed until base concrete or masonry has attained its design strength, unless authorized otherwise by the Engineer.

C. When cementitious grouts are used on concrete surfaces, the concrete surface shall be saturated with water for 24 hours prior to placement. Upon completion of the saturation period, excess water shall be removed with clean, oil free compressed air prior to grouting. Concrete substrate shall not be wet prior to placement of epoxy grouts.

D. Surface preparation, curing, and protection of cement based grout shall be in accordance with Section 03 30 00 - Cast-in-Place Concrete. The finish of the grout surface shall match that of the adjacent concrete unless otherwise indicated.

E. Surfaces that will be in contact with grout shall be free of dirt, loose rust, oil, wax, grease, curing compounds, laitance, loose concrete, and other deleterious materials.

F. Shade the Work from sunlight for at least 24 hours before and 48 hours after grouting.

G. Contact the grout manufacturer's representative for assistance on hot and cold weather grouting techniques and precautions if applicable.

3.03 GROUTING PROCEDURES

A. General: Mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

B. Structural, equipment, tank, and piping support bases shall be grouted, unless indicated otherwise.

1. The original concrete shall be blocked out or finished off a sufficient distance below the plate to provide for a minimum one-inch thickness of grout or other thickness if indicated.

2. After the base plate has been set in position at the proper elevation by steel wedges or double nuts on the anchor bolts, the space between the bottom of the plate and the original pour of concrete shall be filled with non-shrink-type grout through a headbox of appropriate size. The mixture shall be of a fluid consistency and poured continuously into the space between the plate and the base concrete. Forms for grout shall be tight against retaining surfaces, and joints shall be sealed as recommended by the grout manufacturer to be liquid-tight. Forms shall be coated as recommended by the grout manufacturer for easy form release. Where this method of placement is not practical or where required by the Engineer, alternate grouting methods shall be submitted by the Contractor for acceptance by the Engineer.

3. Concrete equipment pads for equipment bases that will be epoxy-grouted shall be sized so that, when the equipment base is fully grouted, the epoxy grout is stopped not less than 4-inches from the edge of the pad.

C. Benching Grout and Grout Fill

1. Mechanical, electrical, and finish Work shall be completed prior to placement of benching grout or grout fill.

2. To ensure bonding to the base slab, the base slab shall have a roughened surface to a ¼-inch amplitude. The base slab shall be thoroughly cleaned and wetted to saturated surface dry (SSD) condition per ICRI 310.2R-2013 prior to placing benching grout and grout fill. No benching grout shall be placed until the slab is completely free from standing pools or ponds of water. A thin coat of neat cement grout shall be broomed into the surface of the slab just before benching or fill placement. The neat cement grout shall not be allowed to dry before benching placement. If it does dry, it must be immediately removed using wet stiff brooms and reapplied.

3. The benching and fill shall be compacted by rolling or thorough tamping, brought to established grade, and floated. Grouted fill for tank and basin bottoms where scraping mechanisms are to be installed shall be screeded by blades attached to the revolving mechanism of the equipment in accordance with the procedures outlined by the equipment manufacturer after the grout is brought to the established grade. Coat surface with evaporation retardant as needed to prevent plastic shrinkage cracks.

4. The minimum thickness of grout benching and grout fill shall be one-inch. Where the finished surface of grout fill is to form an intersecting angle of less than 45 degrees with the concrete surface it is to be placed against, a key shall be formed in the concrete surface at the intersection point. The key shall be a minimum of 3-1/2 inches wide by 1-1/2 inches deep.

5. Benching grout placed on sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement.

6. The surface shall be tested with a straight edge to detect high and low spots which shall be immediately eliminated. When the benching or fill has hardened sufficiently, it shall be steel troweled to a smooth surface free from pinholes and other imperfections. An approved type of mechanical trowel may be used as an assist in this operation, but the last pass over the surface shall be by hand-troweling. During finishing, no water, dry cement, or mixture of dry cement and sand shall be applied to the surface.

7. As soon as benching or fill finishing is completed, coat surface with curing compound. After the benching is set and sufficiently hard in clarifiers and where required by the Engineer, the tank shall be filled with sufficient water to cover the entire floor for 14 days.

3.04 CONSOLIDATION

A. Grout shall be placed in such a manner, for the consistency necessary for each application, to assure that the space to be grouted is completely filled.

END OF SECTION

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SECTION 05 05 19

POST-INSTALLED CONCRETE ANCHORS

PART 1 -- GENERAL

1.01 SUMMARY

A. Provide post-installed anchors and appurtenances, complete and in place, as indicated in accordance with the Contract documents.

B. Unless otherwise indicated, drilled concrete anchors shall be adhesive anchors.

C. Section Includes:

1. Adhesive anchors
2. Expansion anchors
3. Screw anchors

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
1. Refer to Section 01 20 00

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Definitions

1. Epoxy anchors are considered to be adhesive anchors.
2. Expansion anchors and screw anchors are considered to be mechanical anchors.

B. Reference Specifications

01 33 00	Submittal Procedures
03 21 00	Reinforcement Bars
03 30 00	Cast-in-Place Concrete
05 50 00	Metal Fabrications

C. Reference Standards

1. The edition of the standards applicable to the Work shall be the edition referenced by the 2015 International Building Code (IBC). If the standard is not referenced by the IBC -referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of signing and sealing of the contract specifications.

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American Concrete Institute (ACI)	
ACI 318	Building Code Requirements for Structural Concrete and Commentary
ACI 350	Code Requirements for Environmental Engineering Concrete Structures and Commentary
ACI 355.2	Qualification of Post Installed Mechanical Anchors in Concrete and Commentary
ACI 355.4	Qualification for Post-Installed Adhesive Anchors in Concrete and Commentary
American Society of Civil Engineers (ASCE)	
ASCE 7	ASCE/SEI 7 - Minimum Design Loads for Buildings and Other Structures
ASCE 41	ASCE/SEI 41 - Seismic Evaluation and Retrofit of Existing Buildings
International Code Council (ICC)	
IBC	International Building Code
ICC ES AC193	Mechanical Anchors in Concrete Elements
ICC ES AC308	Post Installed Adhesive Anchors in Concrete Elements
NSF International (NSF)	
NSF/ANSI 61	Drinking Water System Components - Health Effects

1.04 SUBMITTALS

A. Furnish submittals in accordance with Section01 33 00 – Submittal Procedures.

B. Submit the following:

1. Product data and technical information

2. Safety Data Sheets (SDS) for adhesives

3. Manufacturer's literature containing installation instructions and appropriate uses for each type of post-installed anchor and location of use

4. Current International Code Council Evaluation Service (ICC-ES) or International Association of Plumbing and Mechanical Officials Uniform Evaluation Service (IAPMO-UES) Evaluation Reports

5. Certification for each installer demonstrating that they have been qualified in accordance with the Quality Assurance requirements below

C. No substitution for the indicated anchors will be considered unless accompanied with an ICC-ES or IAPMO-UES report verifying strength and material equivalency.

D. Complete structural calculations and anchorage details shall be prepared and submitted by the Contractor for all anchors and anchor groups that are shown but not completely detailed (type, size, location, spacing and embedment) on the Contract Documents.

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a. Method 1: The minimum depth of embedment shall be greater than or equal to the development length (l_d) determined in accordance with ACI 318 for a cast in place reinforcing bar of the same diameter and grade, unless it can be shown by calculation that the anchor spacing and edge distance is sufficient to develop the tensile strength of the anchor in a lesser depth of embedment.

b. Method 2: Adhesive anchors in concrete that cannot develop the tensile capacity of the steel element may be used to transfer forces, provided that:

1) For new structures, the anchor is designed in accordance with ACI 318

2) For existing structures, the anchor is designed in accordance with ASCE 41.

1.05 QUALITY ASSURANCE

A. Contractor shall provide Special Inspection for all post-installed anchor installations:

1. As recommended or required by the ICC-ES or IAPMO-UES report.

2. As required by the enforceable building code.

3. As otherwise indicated in the Contract Documents.

B. The most stringent of the above requirements shall be used. Contractor shall pay for the cost of Special Inspection of post-installed anchors.

C. Before installing adhesive anchors in the Work, anchor installers shall be trained and qualified at the Site by the manufacturer's representative. Training and qualification for each installer shall include at least:

1. Hole drilling procedure, hole preparation and cleaning techniques, adhesive injection technique and dispenser training/maintenance, rebar dowel preparation and installation, and proof loading if required.

2. Each installer shall be re-qualified every 6 months for the duration of the project by the same qualifying procedure.

D. Before installing mechanical anchors in the Work, anchor installers shall be trained and qualified at the Site by the manufacturer's representative. Training and qualification for each installer shall include at least:

1. Hole drilling procedure, hole preparation and cleaning techniques, and torquing.

2. Each installer shall be re-qualified every 6 months for the duration of the project by the same qualifying procedure.

E. Defective anchors noted by the Special Inspector shall be replaced and re-installed by the Contractor without any additional compensation.

F. Anchors installed in both the vertical and horizontal positions in a mock-up concrete panel of adequate size and thickness. Anchors shall be tested in tension using the minimum loads described below. A minimum of 3 anchors shall be tested for each installation position.

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1. Anchors shall be tested at 2 times the published allowable tension load or 1-1/4 times the maximum design strength of the anchors in tension as calculated using values in the ICC-ES or IAPMO-UES report. The test load need not exceed 80 percent of the nominal yield strength of the anchor, based on steel strength, as determined by ACI 318.

2. If any of the 3 test anchors in any installation position fail to reach the test loads, the installer shall be re-tested with the same procedure. Re-testing is required only for the failed installation position.

3. An installer who has 3 consecutive successful anchor tests in the first or second trial is considered qualified for post-installed anchor installation for this project. The manufacturer's representative shall issue a certificate to the qualified installer, and a copy of the certificate shall be filed with the Contractor and be submitted to the Engineer.

4. The test anchor size for each type of post-installed anchor shall be the largest size for that anchor type used on the project. The anchor embedment length and edge distances shall be adequate to resist the test loads listed above.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to job site in manufacturer's or distributor's packaging undamaged, complete with installation instructions.

B. Protect and handle materials in accordance with manufacturer's recommendations to prevent damage or deterioration.

C. Anchoring adhesives shall be stored at temperatures prescribed by the manufacturer and must not be used beyond the expiration date.

1.07 SITE CONDITIONS

A. Post-installed anchors shall be installed in concrete having a minimum age of 21 days at time of anchor installation.

B. The anchor or fastener coating, plating, or steel type must provide suitable corrosion resistance for the environment in which the anchor or fastener is installed. Anchors, nuts, and washers in the locations listed below shall be fabricated from type 304 stainless steel:

1. buried locations

2. submerged locations

3. locations subject to seasonal or occasional flooding

4. inside hydraulic structures below the top of the structure

5. inside buried vaults, manholes, and structures that do not drain through a gravity sewer or to a sump with a pump

6. chemical handling areas

7. inside trenches, containment walls, and curbed areas

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8. locations indicated or designated by the Engineer to be provided with stainless steel anchors.

PART 2 -- PRODUCTS

2.01 ADHESIVE ANCHORS

A. General

1. The adhesive anchor system shall consist of: 1) adhesive product; and 2) threaded rod or reinforcing bar insert. The complete system shall be compatible as required by the adhesive manufacturer.

2. Adhesives shall be injectable, two-component, cartridge-type systems dispensed and mixed through a static mixing nozzle supplied by the manufacturer.

3. The evaluation report issued by ICC-ES or IAPMO-UES shall state the acceptability of the adhesive anchor for the intended purpose and location.

4. Adhesive anchors shall be permitted when regular ambient temperatures are consistent with manufacturer's recommendation for long and short term temperatures.

5. Adhesive anchors shall not be used where anchors are subject to vibration or fire.

6. Adhesive anchors shall not be used in overhead applications, unless specifically called out on the construction documents.

7. Where required, adhesive shall be capable of being used in submerged applications once cured.

8. Adhesive shall have a current NSF/ANSI 61 listing.

B. Adhesive Anchors in Concrete

1. Threaded rod inserts shall meet the requirements of Section 05 50 00 - Metal Fabrications.

2. Reinforcing dowel inserts shall meet the material requirements of Section 03 21 00 – Reinforcement Bars and Section 03 30 00 – Cast-in-Place Concrete.

3. Adhesive for use in concrete adhesive anchors shall be certified for use in resisting seismic loads in cracked concrete applications in accordance with ICC-ES AC308.

4. Where not detailed on the drawings, adhesive anchors shall be designed in accordance with ACI 318 as amended by the specific design provisions of ICC-ES AC308.

5. Adhesive anchors shall have an evaluation report issued by ICC-ES or IAPMO-UES and have been tested and qualified for performance in cracked and uncracked concrete in accordance with ICC-ES AC308 and ACI 355.4. Adhesive anchors to be used for structures, nonbuilding structures and/or nonstructural components assigned to Seismic Design Categories C through F shall have been tested and qualified for earthquake loading performance in cracked and uncracked concrete in accordance with ICC-ES AC308 and ACI 355.4.

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6. Adhesive anchors for concrete shall be HIT-RE 500 V3 by Hilti or SET-3G by Simpson Strong-Tie, or equal.

2.02 EXPANSION ANCHORS

A. General

1. Expansion anchors are post-installed torque-controlled mechanical expansion anchors used to resist structural loads.

2. Expansion anchors shall be an imperial sized, threaded stud with an integral cone expander, expansion clip, nut and washer.

3. Lead caulking anchors will not be permitted.

4. Non-embedded buried or submerged anchors shall be fabricated from stainless steel.

5. The evaluation report issued by ICC-ES or IAPMO-UES shall state the acceptability of the expansion anchor for the intended purpose and location.

6. Anchors subjected to dynamic or vibratory loading shall be suitable for the intended loading and location as indicated in the manufacturer's technical product data.

B. Expansion Anchors for Concrete

1. Anchors shall be designed in accordance with ACI 318, which requires post-installed mechanical anchors to be qualified according to ACI 355.2.

2. Anchors shall have an evaluation report issued by ICC-ES or IAPMO-UES and have been tested and qualified for performance in cracked and uncracked concrete in accordance with ICC-ES AC193 and ACI 355.2. Anchors to be used for structures, nonbuilding structures and/or nonstructural components assigned to Seismic Design Categories C through F shall have been tested and qualified for earthquake loading performance in cracked and uncracked concrete in accordance with ICC-ES AC193 and ACI 355.2.

3. Expansion anchors shall be Strong-Bolt 2 by Simpson Strong-Tie, Kwik-Bolt TZ by Hilti, Power-Stud+ SD1 by Powers Fasteners, or equal.

2.03 SCREW ANCHORS

A. General

1. Screw anchors used in exterior and corrosive environments shall be fabricated from stainless steel.

2. The evaluation report issued by ICC-ES or IAPMO-UES shall state the acceptability of the screw anchor for the intended purpose and location.

3. Anchors subjected to dynamic or vibratory loading shall be suitable for the intended loading and location as indicated in the manufacturer's technical product data.

B. Screw Anchors for Concrete

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1. Anchors shall be designed in accordance with ACI 318 as amended by the specific design provisions of ICC-ES AC193.

2. Anchors shall have an evaluation report issued by ICC-ES or IAPMO-UES and have been tested and qualified for performance in cracked and uncracked concrete in accordance with ICC-ES AC193.

3. Screw anchors for concrete shall be Titen HD by Simpson Strong-Tie, Kwik HUS-EZ (KH-EZ) by Hilti, or equal.

PART 3 -- EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Post-installed anchors shall be installed in strict accordance with the manufacturer's instructions, the ICC-ES or IAPMO-UES report, and project specific design requirements indicated on the Contract Documents or in the design calculations provided by the Contractor.

B. Where holes are drilled in concrete, holes shall be accurately drilled and vertically aligned, and the holes shall be cleaned in accordance with the manufacturer's recommendations.

C. Post-installed anchors shall not be installed until the concrete has reached the required age of 21 days or per manufacturer's requirements, whichever is longer.

D. Acceptable installation and performance temperature ranges shall be verified with manufacturer's literature prior to installation. Minimum substrate temperatures shall be maintained during the full curing period as required by the manufacturer.

E. Adhesive anchors shall not be loaded until the adhesive has reached its indicated strength in accordance with the manufacturer's instructions.

F. The Contractor shall locate existing items and identify the position of reinforcing steel and other embedded items prior to drilling holes. Care shall be exercised in drilling to avoid damaging existing reinforcing or embedded items. The location of drilled holes shall be adjusted to avoid drilling through or cutting any existing reinforcing bars or embedded items. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging prestressing tendons, electrical and communications conduit, and piping.

G. Core drilling of holes is not allowed.

H. Bending of and welding to post installed anchors is not allowed.

I. Identification of reinforcing steel and/or embedded items, relocation of drilled holes and adjustments or modifications to anchored or fastened items shall be considered part of the Work and shall be provided at no additional cost to the Owner.

J. All abandoned drilled holes shall be repaired in accordance with Section 03 01 00 – Maintenance of Concrete at no additional cost to the Owner.

END OF SECTION

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SECTION 05 50 00

METAL FABRICATIONS

PART 1 -- GENERAL

1.01 SUMMARY

A. Provide metalwork and appurtenances, complete and in place, as indicated in accordance with the Contract Documents.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Referenced Specifications

01 33 00	Submittal Procedures
03 60 00	Grouting
05 05 19	Post Installed Concrete Anchors

B. References herein to "Building Code" shall mean the 2015 International Building Code (IBC). The edition of the standards applicable to the Work shall be those editions referenced by the IBC. If the standard is not referenced by the IBC -referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of award of this contract.

Aluminum Association (AA)	
AA DAF-45	Designation System for Aluminum Finishes
American Association of State Highway and Transportation Officials (AASHTO)	
AASHTO	LRFD Bridge Design Specifications
American Institute of Steel Construction (AISC)	
AISC	Steel Construction Manual
AISC	Detailing for Steel Construction
American Iron and Steel Institute (AISI)	
AISI S100	North American Specification for the Design of Cold - Formed Steel Structural Members
ASTM International (ASTM)	
ASTM A36	Standard Specification for Carbon Structural Steel
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

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ASTM A153	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A193	Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A194	Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service
ASTM A307	Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
ASTM A500	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A572	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A780	Standard Specification for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A992	Standard Specification for Structural Steel Shapes
ASTM C478	Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
ASTM C497	Standard Test Methods for Concrete Pipe, Concrete Box Sections, Manhole Sections, or Tile
ASTM D4101	Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials
ASTM F1554	Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
ASTM F3125	Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength
American Welding Society (AWS)	
AWS B1.5	Standard for the Qualification of Welding Inspectors
AWS D1.1	Structural Welding Code – Steel
AWS D1.2	Structural Welding Code - Aluminum
AWS D1.3	Structural Welding Code - Sheet Steel
AWS QC1	Qualification and Certification of Welding Inspectors
International Code Council (ICC)	
IBC	2015 International Building Code

1.04 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with the requirements of Section 01 33 00 – Submittal Procedures.

B. Shop Drawings

1. Shop Drawings shall conform to AISC Detailing for Steel Construction, and shall show all holes, material grades, and location of parts/pieces in the completed Work.

2. Shop Drawings shall include complete details of members and connections, anchor bolt layouts, schedules for fabrication procedures, and diagrams for the sequence of erection.

C. Anchor Submittals

1. For post installed anchors in concrete other than powder-driven pins or impact anchors, refer to Section 05 05 19 – Post Installed Concrete Anchors.

2. For cast-in-place anchors, powder-driven pins or impact anchors, complete structural calculations and anchorage details shall be prepared and submitted by the Contractor for all anchors and anchor groups that are shown but not completely detailed (type, size, location, spacing and embedment) on the Contract Documents. Calculations and anchorage details shall be signed and stamped by a Professional Engineer registered in the state in which the project is located.

D. Coatings

1. Manufacturer's data sheet for each product proposed, including statements on the suitability of the material for the intended use.

2. Technical and performance information that demonstrates compliance with the system performance and material requirements.

3. Manufacturer's instructions and recommendations on surface preparation and application.

4. Statement from Manufacturer indicating approval of the Contractor’s application equipment and procedures to be used.

5. Colors available for finish coat for Owner review and selection.

6. Compatibility between shop and field applied coating materials (where applicable).

7. Material Safety Data Sheet for each product.

1.05 QUALITY ASSURANCE

A. Weld procedures and welder qualifications shall be available in the Contractor’s field office for review.

PART 2 -- PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Steel

Wide Flange Shapes	ASTM A992
Shapes, Plates, Bars	ASTM A36 unless indicated otherwise

Pipe, Pipe Columns, Bollards	ASTM A53, Type E or S, Grade B standard weight unless indicated otherwise
HSS	ASTM A500 Grade B

2.02 STEEL GUARD RAILS

A. Steel guard railing shall be standard structural shapes made up by welding and shall be coated after fabrication.

2.03 BOLTS AND ANCHORS

A. Standard Service (Non-Corrosive Application)

1. Bolts, anchor rods, anchor bolts, washers, and nuts shall be fabricated from steel as indicated.

2. Threads on galvanized bolts, rods and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing.

3. Except as otherwise indicated, steel for bolt material, anchor rods, anchor bolts, and cap screws shall be in accordance with the following requirements:

a. Structural Connections: ASTM A307, Grade A or B, hot-dip galvanized.

b. Headed Anchor Rods and Anchor Bolts: ASTM F1554, Grade 36, hot-dip or mechanically galvanized with Grade A matching nuts.

c. High-Strength Bolts, where indicated: ASTM F3125, Grade A325.

d. Pipe and Equipment Flange Bolts: ASTM A193, Grade B7.

B. Bolt Requirements

1. The bolt and nut material shall be free-cutting steel.

2. The nuts shall be capable of developing the full strength of the bolts.

3. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads.

4. Bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.

5. Bolts and nuts shall be installed with washers fabricated from material matching the base material of bolts, except that hardened washers for high-strength bolts shall conform to the requirements of the AISC Specification.

6. Lock washers fabricated from material matching the bolts shall be installed where indicated.

7. The length of each bolt shall be such that the bolt extends at least 1/8 inch beyond the outside face of the nut before tightening, except for anchor bolts which shall be flush with the face of the nut before tightening.

2.04 GALVANIZING

A. All steel shall be hot-dip galvanized.

2.05 COATING

A. Two coat system shall be a primer coat and a finish coat.

1. Primer: Macropoxy 646 Fast Cure Epoxy Primer by Sherwin Williams or approved equal, 5.0-10.0 mils DFT.

2. Finish: Acrolon 218 HS Acrylic Polyurethane Semi-Gloss by Sherwin Williams or approved equal, 3.0-6.0 mils DFT.

B. Color

1. Black.

PART 3 -- EXECUTION

3.01 FABRICATION AND INSTALLATION REQUIREMENTS

A. Fabrication and Erection: Except as otherwise indicated, the fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction "Manual of Steel Construction."

B. Steel Railings: Field welding of steel guard railing joints will be permitted only if approved by the Engineer, and then only in accordance with the Engineer's instructions.

C. Method

1. Welding shall be performed by the metal-arc method or gas-shielded arc method as described in the American Welding Society "Welding Handbook" as supplemented by other pertinent standards of the AWS.

2. The qualification of the welders shall be in accordance with the AWS Standards.

D. Coating:

1. Follow all manufacturer's recommendations for surface preparation, including cleaning, degreasing, etching or sweep blasting, rinsing and drying.

2. Painted structures require special fabrication details to ensure that all exposed surfaces receive the proper surface preparation and correct amount of paint. When overlapping steel surfaces occur, a space of 1.5" or greater must be maintained. If this space cannot be maintained, then steel spacers shall be inserted to eliminate the space. All overlapping steel surfaces with a space less than 1.5" shall be seal welded all around to prevent access by water. Caulking of overlapping surfaces shall not be allowed.

E. Quality

1. In assembly and during welding, the component parts shall be adequately clamped, supported, and restrained in order to minimize distortion and for control of dimensions.

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2. Weld reinforcement shall be as indicated by the AWS Code.

3. Upon completion of welding, remove weld splatter, flux, slag, and burrs left by attachments.

4. Welds shall be repaired in order to produce a workmanlike appearance, with uniform weld contours and dimensions.

5. Sharp corners of material that is to be painted or coated shall be ground to a minimum of 1/32 inch on the flat.

END OF SECTION

SECTION 07 92 13

ELASTOMERIC JOINT SEALANTS

PART 1 -- GENERAL

1.01 SUMMARY

A. Section Includes:

1. Sealants and caulking.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
1. Refer to Section 01 20 00

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Where reference is made to any of the below, the revision in effect at the time of bid opening shall apply.

B. Reference Codes

01 33 00	Submittal Procedures
03 15 00	Concrete Accessories

C. Reference Standards

American Society for Testing and Materials (ASTM)	
ASTM C 920	Elastomeric Joint Sealants
ASTM D 1752	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

1.04 SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. The Contractor shall coordinate color samples with other Sections through the submittal process, as required by the Engineer.

1.05 ACTION SUBMITTALS

A. Product Data

1. Manufacturer's specifications, technical data, installation methods, and maintenance instructions, and the following:

2. Joint width and depth tables.

3. Manufacturer's full range color charts, indicating custom color availability, for color selection by Owner.

B. Samples

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1. When requested by the Engineer, submit samples of the materials proposed. Samples shall be clearly marked to show the Manufacturer's name, product identification, finish and color. New samples shall be resubmitted of each, as required, until approved by the Engineer. Upon approval, the samples shall become the standard for acceptance for the project with regard to color, finish, and quality of each item. Approval of samples shall not relieve the Contractor from compliance with the Contract Documents.

1.06 QUALITY ASSURANCE

A. Single Source Responsibility

1. Sealants and Caulking shall be provided by a single Manufacturer, each.

B. Qualifications

1. Manufacturer

a. Sealants and caulking Manufacturer shall have a minimum of 20 years of sealants and caulking manufacturing experience.

2. Installer

a. Installer shall have a minimum of 5 years' experience in the successful completion of at least 5 projects of similar size and scope, employing similar products, materials, applications, and performance requirements.

C. Sealant and caulking Work shall comply with the following references:

1. ASTM C 920.

1.07 WARRANTY

A. Manufacturer

1. Furnish Manufacturer's 5-year written warranty to cover defects in materials, products, and manufacturing workmanship.

B. Warranties shall be non-prorated for the entire warranty period.

C. The term of the warranties shall begin on the date of Substantial Completion.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Sealant and caulking, including compressible filler and joint backing, shall be recommended by the Manufacturer for the installation indicated.

B. Sealant and caulking, including compressible filler and joint backing, shall be suitable for, and compatible with, the required installation.

C. Sealant and caulking, including compressible filler and joint backing, shall be suitable for, and compatible with, the substrates and surfaces indicated.

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D. Refer to Section 03 15 00 – Concrete Accessories for joint treatment in concrete hydraulic structures.

E. Colors for sealants and caulking above grade and exposed to view shall be selected by the Owner from Manufacturer's full color range, including custom colors.

2.02 INTERIOR AND EXTERIOR SEALANTS (HORIZONTAL OR SLOPED PLANES)

A. Manufacturer and Product, or Equal:

1. Subject to the requirements indicated, provide Manufacturer and product listed below, or equal:

a. Sikaflex SL2 by Sika Corporation, including primer as recommended by Manufacturer.

B. Description: Two part, pour grade polyurethane base, ASTM C 920, Type M, Grade P, Class 25, Use T, NT, M, A, and I.

2.03 INTERIOR AND EXTERIOR SEALANTS (VERTICAL PLANE)

A. Manufacturer and Product, or Equal:

1. Subject to the requirements indicated, provide Manufacturer and product listed below, or equal:

a. Sikaflex NP2 by Sika Corporation, including primer as recommended by Manufacturer.

B. Description: Multi-component, gun grade, polyurethane ASTM C 920, Type M, Grade NS Class 25, Use NT, T, M, A, G, and O.

2.04 COMPRESSIBLE FILLER

A. Manufacturer and Product, or Equal:

1. Subject to the requirements indicated, provide Manufacturer listed below, or equal:

a. WR Meadows, Inc.

B. Description:

1. Compressible filler shall be an impregnated preformed compressible sealant, produced by combining permanently elastic, high density open cell, polyurethane foam with stabilizing acrylics. Compressible filler shall be supplied pre-compressed in a tape form with a PSA on one side.

2. Compressible filler shall be compatible with sealant Manufacturer's product and shall not stain the sealant nor the materials to which applied. Compressible filler shall comply with ASTM D 1752, Type II or III.

2.05 JOINT BACKING (BACKER ROD)

A. Description:

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1. Joint backing for joints in superstructure shall be approved, resilient, closed cell polyethylene rods of diameters to suit joint conditions. Joint backing shall comply with ASTM C 1330 and ASTM D 5249.

2. Where joint depth will not allow for a rod and still provide 3/8-in minimum depth of sealant, provide approved bond breaker tape at the bottom of the joint.

3. Joint backing shall be compatible with sealant Manufacturer's product and shall not stain the sealant nor the materials to which applied.

PART 3 -- EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Site in Manufacturer's original, unopened packages, containers, or bundles with labels intact, which clearly identify contents.

B. Store materials carefully in accordance with the Manufacturer's written instructions, in an area that is protected from deleterious elements, and in a manner that will prevent damage to the products.

C. Handle materials in strict accordance with Manufacturer's written instructions.

3.02 APPLICATION SCHEDULE

A. Joints noted as "caulk," "caulking," or "sealant" shall be caulked as specified herein.

B. Sealants and caulking shall be provided at wall joints, caps, and other joints and penetrations indicated or required for the completion of the Work.

C. Sealants and caulking shall also be installed elsewhere, where indicated on the Contract Drawings.

3.03 PROJECT CONDITIONS

A. Comply with Manufacturer's written instructions, and referenced standards, for environmental conditions before, during, and after installation.

B. Protect surrounding Work from damage that may result from operations under this Section.

3.04 INSPECTION

A. The Contractor shall be totally responsible for the proper performance and completion of the Work under this Section.

B. Systems and components shall be inspected before installation.

1. Damaged or defective items shall be rejected and marked as such and shall be removed from the Site.

C. The Contractor shall verify dimensions, tolerances, and method of attachment with adjacent Work.

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1. Examine substrates, areas, and conditions where sealants and caulking will be installed for compliance with the requirements for installation, taking into account tolerances, and other conditions affecting performance of installed sealants and caulking.

    a. Surfaces to receive sealants and caulking, including compressible filler and joint backing, shall be dry, free of oil, dirt, dust and other contaminants and loose materials, and shall be in the proper condition as indicated by the Manufacturer prior to the application of the sealant and caulking materials.

    b. Masonry, concrete, and cementitious products shall have been completely cured and the surface shall be dry and free from frost at the time of application.

    c. Joint shapes and sizes shall be as indicated. Where not indicated, joint shapes and sizes shall be as necessary for job conditions, as directed by the Engineer.

2. Notify the Engineer in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3. Commencement of the installation by the Contractor shall indicate Contractor's acceptance of the substrate, areas, and conditions.

3.05 SURFACE PREPARATION

A. Surface preparation shall be in compliance with the applicable references and with the Manufacturer's written instructions.

B. Coatings, including curing compounds, form release agents, and other substances shall be removed as recommended by the sealant and caulking Manufacturer.

C. Protrusions, bumps, ridges, and loose substrate surface materials shall be removed by sanding or grinding.

D. Laitance, efflorescence, and loose mortar shall be removed from the joint cavity.

E. Ferrous metal surfaces shall be cleaned of rust, mill scale, and other coatings by wire brush, grinding, or sandblasting.

F. Protective coatings shall be removed from surfaces to receive sealants and caulking.

    1. Solvents used to remove protective coating shall be as recommended by the sealant and caulking Manufacturer, shall be compatible with the adjacent materials and surfaces, shall not damage adjacent finishes, and shall be non-staining.

G. Bituminous or resinous materials shall be removed from surfaces to receive sealants and caulking.

H. Immediately before application of sealant and caulking materials, scrape surfaces to be covered free from foreign materials and brush clean.

I. Substrate shall be swept to remove all loose materials prior to beginning sealant and caulking installation.

3.06 PREPARATION

A. Sequence installation properly with the installation and protection of other WORK, so that neither will be damaged by the installation of the other.

3.07 INSTALLATION

A. Installation shall comply with the requirements of the Contract Documents, with applicable references, and with Manufacturer's written instructions. Where a conflict occurs among these requirements, the more stringent shall apply, as directed by the Engineer.

B. Primer, if recommended by the Manufacturer for the application, shall be applied per the Manufacturer's recommended procedures.

1. Primer shall be used on concrete masonry units, wood, or other porous surfaces in accordance with instructions furnished with the sealant. Primer shall be applied to the joint surfaces to be sealed. Surfaces adjacent to joints shall not be primed.

C. Multi-component sealants shall be mixed according to Manufacturer's printed instructions. Sealant in guns shall be applied with a nozzle of proper size to fit the width of joint. Sealant shall be installed to the required depth without displacing the backing. Unless otherwise indicated or recommended by the Manufacturer, the installed sealant shall be tooled so that the surface is uniformly smooth and free of wrinkles and to assure full adhesion to the sides of the joint. Sealants shall be installed free of air pockets, foreign embedded matter, ridges, and sags. Sealer shall be applied over the sealant if recommended by the sealant Manufacturer.

D. Sealant depth in joints shall be half of the width of joint, but not less than 1/8-in deep and ¼-in wide nor more than 1/2-in deep and 1-in. For joints greater than 1-in wide, provide sealant in a 2 to 1 width-to-depth ratio.

E. Joints shall have a rigid filler material installed to proper depth prior to application of sealant.

F. Masking film shall be placed on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or sealant smears. Masking shall be removed as soon as possible after joint has been filled and tooled.

G. Backing shall be installed to provide the indicated sealant depth. The installation tool shall be shaped to avoid puncturing the backing.

H. Bond-breaker shall be applied to fully cover the bottom of the joint without contaminating the sides where sealant adhesion is required.

I. A full bead of sealant shall be applied into the joint under sufficient pressure, with the nozzle drawn across sealant, to completely fill the void space and to ensure complete wetting of contact area to obtain uniform adhesion. During application, the tip of the nozzle shall be kept at the bottom of the joint thereby forcing the sealant to fill from the bottom to the top. Sealants shall be tooled immediately after exposure with a caulking tool or soft bristled brush moistened with solvent. The finished sealant-filled joint shall be slightly concave unless otherwise indicated.

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3.08 CLEANING, FINISHING, AND PROTECTION

A. Adhesive papers used for masking which become firmly bonded when exposed to heat and/or light shall not be used.

   1. Remove masking film and temporary labels as soon as possible after installation. Films and labels left in place after installation shall be the responsibility of the Contractor.

   2. Residue shall not be left on any surfaces.

   3. The surfaces of materials adjoining caulked joints shall be cleaned free of smears of sealant or other soiling due to caulking operations.

B. Sealants and caulking shall be protected from damage from subsequent construction operations.

C. The Contractors shall make adjustments required until accepted.

D. Damaged or defective items shall be removed and replaced at the direction of the Engineer.

E. When sealant and caulking Work is completed, remove unused materials, containers, and equipment, and clean the Site of sealant and caulking debris.

END OF SECTION

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SECTION 31 23 00

EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

A. This Section covers the work necessary for earthwork associated with channel construction, general site grading and fill, backfill around concrete structures, disposal of excess materials, disposal and management of contaminated and non-contaminated materials, and related items.

B. On site soil availability: It is anticipated that adequate quantities of soil required for new structure and sewer backfill and for existing structure and channel abandonment are available on site resulting from channel excavation, and that imported fill will not be required for these purposes.

C. Excess soil disposal: A Soil Management Plan describing allowable soil uses and excess soil disposal approaches is included in the Drawings on Drawing No. GR-1.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment

1. Refer to Section 01 20 00.

1.03 REFERENCES

A. Reference Specifications

02 41 13	Selective Site Demolition

B. Reference Standards

1. State of Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" - most current edition including all current supplements (WisDOT Standard Specification).

1.04 QUALITY ASSURANCE

A. Contractor shall hire an independent testing firm and analytical laboratory to conduct the required soil classification and compaction testing.

1. The Contractor's technician performing soil classifications tests and soil compaction tests shall have a minimum of 3 years of experience performing similar tests.

B. Contractor shall assist the testing laboratory with obtaining material samples and necessary surface preparation for density tests.

1.05 SUBMITTALS

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A. Schedule showing sequence and duration of the various earthwork operations for Engineer review and Owner approval.

B. Proposed haul routes and offsite disposal area locations for Exempt materials.

C. Documentation of offsite disposal at Licensed Landfill(s) for Non-Exempt materials.

D. Documentation of soil classification and compaction test results, and locations of tests, shall be submitted to the engineer on a weekly basis.

E. Certifications that the following materials conform to the material specifications.

1. Foundation Stabilization Material

1.06 SOIL CONTAMINATION

A. Some of the soil to be excavated is contaminated and requires disposal at a Subtitle D landfill. Soil volumes requiring landfill disposal are identified in the Soil Management Plan on Drawing No. GR-1.

1. Contaminated soil is referred to as Non-Exempt soil.

2. It is assumed that all soil is non-hazardous.

3. Landfill Waste Profiles for Non-Exempt soil have been obtained from two landfills and are listed on Drawing No. GR-1.

PART 2 PRODUCTS

2.01 MATERIALS

A. General Fill: General Fill shall be used for abandonment of existing culvert and channel, storm sewer and utility backfill, backfill over proposed Wall Street culvert, and for backfill adjacent to proposed pedestrian bridge abutments.

General Fill shall consist of onsite materials having the following material properties:

1. USCS soil classification of either CL, SC, SM, SW, SP, GC, GM, GW, GP or a combination of thereof.

2. Free of rocks and gravel larger than three inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

3. Compactable to 95 percent maximum dry density as determined by ASTM D698 (standard Proctor).

B. Impervious Fill: Impervious Fill shall be used as the lower component of the soil cap at SMU-1 beneath the topsoil layer.

Impervious Fill shall consist of onsite materials having the following material properties:

1. USCS soil classification of either CL, CH, or a combination of thereof.

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2. Free of rocks and gravel larger than three inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

3. Compactable to 95 percent maximum dry density as determined by ASTM D698 (standard Proctor).

C. Structural Fill: Structural Fill shall be used as backfill behind the proposed retaining walls.

Structural Fill shall consist of onsite materials having the following material properties:

1. USCS soil classification of either SW, SP, GW, GP or a combination of thereof.

2. Free of rocks and gravel larger than three inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

3. Compactable to 95 percent maximum dry density as determined by ASTM D698 (standard Proctor).

D. Foundation Stabilization Material shall be used to correct inadequate subgrade material beneath pavement base course material or channel bed material.

1. Foundation Stabilization Material shall consist of imported 3-inch dense graded base conforming to WisDOT Standard Specification Section 305.2

PART 3 EXECUTION

3.01 GENERAL

A. Establish traffic control prior to excavations. Notify utility companies of progress schedule so they can accomplish relocations, removals, and holding of lines.

B. Fill holes or depressions resulting from removal or salvage immediately.

3.02 PREPARATION

A. Conform to WisDOT Standard Specification 207.3, or as modified herein: Engineer's approval is required of all areas where preparation work has been performed prior to the placement of fill material. Where embankment is to be constructed over locations where the foundation material is unstable, the foundation shall be excavated to remove all or part of the unstable material.

B. Remove topsoil from all areas of the site and stockpile clear of the construction area. Reuse topsoil following completion of proposed work.

C. Prior to abandoning existing Underwood Creek channel upstream of Wall Street by filling, Contractor shall clear vegetation and debris and strip topsoil.

3.03 GENERAL GRADING OPERATIONS

A. Conform to WisDOT Standard Specification 205.3.

3.04 STRUCTURE EXCAVATION

A. Conform to WisDOT Standard Specification 206.3.

3.05 CHANNEL EXCAVATION

A. Excavation and fill shall be done to the lines, grades, typical sections, and details shown on the Drawings or established by the Engineer. Final channel and floodplain area shall meet the stream profile and spot elevations, and stream dimensions shall meet the typical sections and cross sections within the tolerances stated on the Drawings

B. Over excavation of the channel bottom will be required in areas of unsuitable foundation for channel structures (glide, riffle, or boulder brush runs). The requirement of over excavation will be determined by the Engineer. Areas requiring over excavation shall be backfilled with Foundation Stabilization Material as defined in this section.

C. Grade transitions between riffle and pool to create a gentle transition and no abrupt vertical changes. Slope transitions between top of channel bank, floodplain bench, and terrace slope to provide a smooth rounded transition.

D. Proposed channel segment(s) constructed on a new alignment, outside the limits of the existing channel, may be constructed completely or partially "in the dry" prior to allowing flow to enter into the newly constructed stream channel. If the proposed channel excavation and grading work is within or partially within the banks of the existing channel segment the Contractor may work completely and/or partially "in the wet". The Contractor may use temporary coffer dams/berms and/or they may pump-around to facilitate construction of the channel "in the wet." When working in the existing channel, the contractor shall control water conforming to Section 01 57 13 - Temporary Erosion, Sediment, and Water Control.

E. Channel excavation tolerances shall conform to the Typical Cross Section Notes on the Drawings.

3.06 USE AND DISPOSAL OF EXCAVATED MATERIAL

A. The Soil Management Plan included on Drawing No. GR-1describes the allowable placement of excavated existing soils within the project site and the off-site disposal of excess excavated soil.

B. Disposal of excess non-contaminated (Exempt) materials:

1. Dispose of excess excavated Exempt materials at location(s) chosen by the Contractor.

2. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment, including obtaining and executing all permits necessary.

C. Disposal of contaminated (Non-Exempt) materials:

1. Dispose of excavated Non-Exempt materials at a licensed Subtitle D landfill.

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2. Landfill Waste Profiles for Non-Exempt soil have been obtained from two landfills and are listed on Drawing No. GR-1. The Contractor is responsible for negotiating costs associated with landfill disposal tipping fees and including those costs in the appropriate bid item.

3.07 FILL MATERIAL TESTS PRIOR TO PLACEMENT

A. The Contractor shall determine classification of on-site soils intended to be used for fill materials defined in this Section.

B. The Contractor shall perform a Standard Proctor compaction test and a soil classification (gradation for granular soils and Atterberg Limits for cohesive soils) at the frequency specified below.

C. Tests shall be performed when different types of fill are encountered and, at a minimum, per 500 cubic yards of soil excavated and intended to be used for fill.

D. The Contractor shall document tests and submit results of all tests to the Engineer a minimum of two weeks prior to placing the material.

3.08 FILL MATERIAL PLACEMENT

A. Place fill materials free from roots, organic material, trash, and stones in excess of 3 inches.

B. Place fill to elevations as shown in the Drawings leaving adequate room for topsoil or pavement sections.

C. Place materials in loose lifts not to exceed 8 inches. Spread individual lifts evenly to a uniform thickness throughout and approximately parallel with the finish grade.

D. Compact each lift of fill to a minimum of 95 percent of maximum dry density as determined by ASTM D698 (standard Proctor). The moisture content of the material placed shall be controlled such that it is within 2 percent of the optimum moisture content as determined by ASTM D698.

E. Protect existing structures from damage during placement of fill adjacent to existing structures. If existing structures are damaged during the work, they shall be restored at the Contractor's cost to a condition equal to or better than the condition prior to commencement of the work and to the satisfaction of the Engineer.

F. Backfill around concrete structures in accordance with WisDOT Standard Specification Section 207.3.10.

3.09 COMPACTION TESTS DURING PLACEMENT

A. The Contractor shall determine in-place density and moisture content for compacted fill at the frequency specified below.

B. Along the abandoned creek reaches, along proposed retaining walls, and along proposed storm sewers: The Contractor shall perform a minimum of one test per 150 linear feet of fill placed, with a minimum of two tests per lift.

C. At proposed Wall Street culvert, proposed pedestrian bridge abutments, and other areas: The Contractor shall perform a minimum of one test per 100 cubic yards of fill placed, with a minimum of two tests per lift.

3.10 FINISH OPERATIONS

A. Cut, fill, and grade site to allow drainage and match adjacent existing conditions.

END OF SECTION

SECTION 32 11 20

SUBGRADE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Grading, shaping, and compacting subgrade prior to placing base or surface course materials.

B. RELATED SECTIONS
   1. Section 32 11 23 – Aggregate Base.

1.02 PRICE AND PAYMENT PROCEDURES

A. MEASUREMENT AND PAYMENT
   1. Refer to Section 01 20 00

1.03 REFERENCES

A. State of Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" - most current edition including all current supplements (WisDOT Spec):
   1. 205 – Roadway and Drainage Excavation.
   2. 207 – Embankment.
   3. 211 – Preparing the Foundation.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

3.01 GENERAL

A. Subgrade preparations shall be performed to produce the required density, grade, and cross-section.

3.02 SEQUENCING AND SCHEDULING

A. Subgrade preparation must be completed prior to placement of bituminous/aggregate base course.

3.03 PREPARATION

A. Conform to WisDOT Spec. 207.3.6.3, or as modified herein:
   1. Subgrade shall be rolled and compacted to meet a 95% Standard Proctor density.
   2. Subgrade material shall be dry before aggregate base course is installed.

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3. Prior to the installation of stone, the subgrade shall pass a proof rolling with a fully loaded quad-axle dump truck. Schedule the proof roll with the Engineer at least one day prior to the event. Proof rolling shall not occur unless witnessed by the Engineer.
4. During proof rolling, deflections greater 1 1/2" may be corrected by over excavating affected areas and backfilling with Foundation Stabilization material as specified in Section 31 23 00 Earthwork.

3.04 FINISH OPERATIONS

A. Finished grades shall provide for matching the existing adjacent elevations.

B. Subgrade Tolerance:
   1. A tolerance of ±0.05 foot from the proposed subgrade elevations will be allowed.

END OF SECTION

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SECTION 32 11 23

AGGREGATE BASE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Production and placement of base aggregate dense base course for asphalt pavement and concrete flatwork.

B. Related Sections
1. Section 31 23 13 – Subgrade Preparation.
2. Section 32 12 16 – Hot Mix Asphalt.
3. Section 32 16 13 – Concrete Sidewalk and Curbs and Gutters

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
1. Refer to Section 01 20 00.

1.03 REFERENCES

A. State of Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" most current edition and all current Supplements (WisDOT Specification):
1. 301 – Base, Subbase, and Subgrade Aggregates.
2. 305 – Dense Graded Base.

1.04 SUBMITTALS

A. Contractor shall submit certifications that the following materials conform to the material specifications.
1. Each type of Base Aggregate Dense

B. Contractor shall submit weight tickets for all base aggregates to the Engineer on a daily basis.

1.05 SEQUENCING AND SCHEDULING

A. Construct aggregate base only after all of the following have been completed:
1. Subgrade has been corrected for instability problems and successfully passed a proof rolling test performed by the Contractor and witnessed by the Engineer.
2. Subgrade has been checked for conformance to line and grade tolerances.

PART 2 PRODUCTS

2.01 MATERIALS

A. Base Aggregate Dense: Conform to the requirements of WisDOT Section 305.2

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PART 3 EXECUTION

3.01 PREPARATION

A. Prepare the subgrade in accordance with Section 32 11 20 Subgrade Preparation.

B. Subgrade to be completed and approved by the Engineer prior to installation of aggregate base.

3.02 EXAMINATION

A. Perform removal work without damage to adjacent retained work. Where such work is damaged, the Contractor shall patch, repair, or otherwise restore same to its original condition at no expense to the Owner.

B. Remove debris from the work area as often as necessary, but not less than at least once at the end of each workday. Debris shall be placed in approved containers to prevent the spread of dust and dirt.

C. Execute the work in a careful and orderly manner with the least possible disturbance to the public and occupants of buildings.

3.03 PROTECTION

A. Take all necessary precautions to adequately protect personnel, and public and private property in the areas of work.

B. All street signs, traffic control signs, guy wires, mailboxes, posts, etc. which may interfere with construction shall be removed, stored safely, and replaced.

C. Approved barriers or warning signs shall be provided as necessary.

D. Provide and maintain protection of existing structures and culverts designated to remain where work is being done, connections made, materials handled, or equipment moved.

E. Do not close or obstruct sidewalks or roadways. Do not store or place materials in passageways or other means of egress. Conduct operations with minimum traffic interference.

F. Take reasonable precautions to limit damage to existing turf to remain.

G. Holes or depressions created by removals shall not be left open for more than one day. Any hole within 10 feet of road edge shall be filled, suitably marked, or covered immediately.

H. Avoid disturbance to any material beyond the limits required for new construction.

I. Keep aggregate base free of ruts and irregularities until covered by surface paving.

J. Place water on base material for dust control as required for eliminating nuisance conditions for adjacent properties.

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3.04 CONSTRUCTION REQUIREMENTS

A. Construct the Base Aggregate Dense in accordance with the requirements of WisDOT Spec. 305.3 and the details in the Drawings.

END OF SECTION

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SECTION 32 12 16

HOT MIX ASPHALT PAVEMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Hot plant mixed asphalt-aggregate mixtures for asphalt binder and surface courses.
   2. Asphaltic tack coat.

B. Related Sections
   1. Section 32 11 23 – Aggregate Base

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer Section 01 20 00.

1.03 REFERENCES

A. State of Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" - latest edition including all current supplements (WisDOT Spec.), except as modified herein:
   1. 450 – General Requirements for Asphaltic Pavements.
   2. 455 – Asphaltic Materials.
   3. 460 – Hot Mix Asphalt Paving.
   4. 465 – Asphaltic Surface.

1.04 SUBMITTALS

A. Refer to section 01 33 00.

B. The Contractor shall submit asphalt mix design(s) at least 15 days before commencement of paving.

C. The Contractor shall submit weight tickets for asphalt pavement to the Engineer on a daily basis.

1.05 QUALITY CONTROL

A. Provide and maintain a QC Program conforming to WisDOT Section 460.2.8 – Quality Management Program, except as modified below:
   1. Engineer shall have authority to increase frequency of testing.

1.06 SEQUENCING AND SCHEDULING

A. Aggregate base to be completed and approved by the Engineer prior to placement of asphalt binder.

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B. The Contractor shall provide a 48-hour notice for scheduling and noticing of adjacent properties prior to paving operations.

C. Install asphalt pavement conforming to WisDOT Section 460.

D. The Village reserves the right to require the Contractor to test the pavement using asphalt cores if issues with the paving operations warrant testing.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphaltic and aggregate materials shall conform to WisDOT Standard Specification Sections 455.2 and 460.2.

B. Conform to the mix designation as shown on the Drawings. All mix designations shall conform to WisDOT Standard Specification Section 460.2.

C. Asphaltic Materials for Tack Coat: Conform to WisDOT Standard Specification Section 455.2.5.

PART 3 EXECUTION

3.01 GENERAL

A. Install asphalt pavement in accordance with WisDOT Standard Specification Section 460.3.

B. The Contractor to review the proposed paving sequence with the Engineer prior to placement of each hot mix asphalt course (lift).

C. The proposed sequence shall address longitudinal seams, compaction, traffic control, hauling routes, and placement of pavement markings.

D. Preparation of Asphalt Binder Course
   1. Perform final cleanup of the pavement surface using a power pickup broom and front-end loader.

E. Joints:
   1. Where new construction meets existing asphalt surfacing, the existing surface shall be uniformly milled or saw-cut straight, and asphaltic tack coat applied prior to placement of each hot mix asphalt course (lift). For joint construction, an existing hot mix asphalt surface shall be considered to include any hot mix asphalt surface not paved on the same day as the new construction. The Owner may require milling or sawcutting on surfaces paved the same day, if, in the opinion of the Owner, the mix has cooled to a point where a new milled or sawed edge is necessary.
   2. Proper traffic safety shall be implemented where required to protect joints from damage.

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3.02 RESTRICTIONS

A. All surfaces shall be checked and approved by the Engineer prior to paving.

B. Existing asphalt surfaces and aggregate bases must be dry prior and during placement of any asphalt pavements.

C. Asphalt shall not be placed when the air temperature in the shade and away from artificial heat is 50 degrees or less, unless otherwise approved by the Engineer.

D. Diesel fuel shall not be used to coat rubber tires or hand tools to prevent asphalt from sticking.

3.03 PREPARATION

A. Base: Prepare base as required in Section 32 11 23 Aggregate Base.

B. Hot Mix Asphalt:
   1. Apply tack at the rate of 0.05 to 0.07 gallon per square yard.
   2. Tack the full surface of in-place street before paving.
   3. Tack full face of existing asphaltic transitions, including patches.

3.04 PAVEMENT DENSITY

A. Conform to the requirements of WisDOT Section 460.3.3 "Minimum Required Density," except as modified:
   1. Measurement of pavement density shall be by nuclear density gauge.
   2. Required minimum compaction is 91.5 percent of the target maximum density. Target maximum density shall be determined each day by the Contractor using a Standard Rice Test. Contractor shall provide the target maximum density to the Engineer at the start of paving operations. Contractor shall verify degree of compaction and submit a report to the Engineer as to date paved, date tested, location, and degree of compaction.
   3. All costs for the tests and report shall be included in the unit price bid.

END OF SECTION

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SECTION 32 16 13

CONCRETE SIDEWALK AND CURBS AND GUTTERS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Cast-in-place concrete curb and gutter, concrete sidewalk.

B. Related Sections
   1. Section 31 23 13 – Subgrade Preparation.
   2. Section 32 11 23 – Aggregate Base.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to section 01 20 00.

1.03 REFERENCES

A. American Society of Testing Materials (ASTM)
   1. C260 - Air-Entraining Admixtures for Concrete.

B. State of Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" - Latest Edition and all current Supplements (WisDOT Spec.):
   1. 415 – Concrete Pavement.
   2. 416 – Concrete Pavement – Appurtenant Construction.
   3. 501 – Concrete.

1.04 SUBMITTALS

A. Submit design mix for concrete that will be used for curb & gutter and sidewalk according to Section 03 30 00 Cast In-Place Concrete.

A. Submit one 7-day and two 28-day concrete cylinder test results for all concrete pours in any given day. All costs for testing will be paid by Contractor.

1.05 SEQUENCING AND SCHEDULING

A. Concrete curb and gutter construction shall precede installation of hot mix asphalt pavement.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete shall be Class B conforming to Section 03 30 00 Cast In-Place Concrete

B. Pre-Formed Joint Filler: Conform to WisDOT Spec. 415.2.3.

C. Curing Compound: Conform to WisDOT Spec. 415.2.4.

D. Dense Graded Base
   1. Dense Graded shall be required below all concrete:
      a. Base shall be as shown on Drawings.
      b. Conform to Section 32 11 23 Aggregate Base.

PART 3 EXECUTION

3.01 GENERAL

A. Provide copies of batch tickets for concrete mix at the time of material delivery to Site.

B. Construct concrete curb and gutter and concrete sidewalk at the locations and elevations indicated on the Drawings.

C. Construct the style or type of curb and gutter as shown on the Drawings.

D. Construct sidewalk to conform to typical section shown on the Drawings.

E. Construct intersection curb radii and transitions sections to conform to the detail on the Drawings.

F. Construct concrete curb ramp depressions to conform to the detail on the Drawings.

G. Construct curb transitions for walkways and driveways to conform to the Drawings.

H. The completed concrete work shall give the appearance of uniformity in surface contour and texture, and shall be accurately constructed to line and grade. The required joints, edges, and flow lines shall show neat workmanship.

I. Retempering of the concrete which has partially hardened with or without additional materials or water is prohibited.

J. Full curb and gutter panels shall be removed and replaced for all major cracks, breaks, or chips.

K. All handwork to streets, sidewalks, driveways, and curb and gutter, including around catch basins, shall be mechanically vibrated with no voids or honey-combing allowed.

3.02 FOUNDATION PREPARATIONS

A. Support on a compacted aggregate base.
   1. Conform to sections as shown on the Drawings.
   2. Conform to Section 32 11 23 Aggregate Base.

3.03 FORMS

A. For curb and gutter, conform to WisDOT Standard Specification Section 601.3.3.

B. For sidewalk, conform to WisDOT Standard Specification Section 602.3.2.2.

4.04 JOINT CONSTRUCTION

A. For curb and gutter, conform to WisDOT Standard Specification Section 601.3.6, except as modified herein:
   1. Maximum spacing of expansion joints for slip formed shall be 50 feet.
   2. Place expansion joints at the PC and PT of horizontal curves.
   3. Place expansion joints 3 feet from each side of drainage structures
   4. Control joints at 10-foot intervals.
   5. All expansion joints and control joints shall be uniform and cleaned 1/4 inch to 3/8 inch in depth.
   6. All expansion and control joints shall be tooled along entire top and front face of curb and gutter.
   7. All control joints shall be knifed 2 inches in depth.
   8. All expansion joints shall be vertical, tooled, clean and flush with felt, no voids accepted.

B. For sidewalk, conform to WisDOT Standard Specification Section 602.3.2.5.

3.05 PLACING AND FINISHING

A. For curb and gutter, conform to WisDOT Standard Specification Section 601.3.4 and 601.3.5, except as modified herein:
   1. The top surface of the curb and gutter shall have a brush finish at right angles to the curb line.
B. For sidewalk, conform to WisDOT Standard Specification Section 602.3.2.3.

3.06 CONCRETE CURING AND PROTECTION

A. Conform to WisDOT Standard Specification Section 415.3.12.2 and 415.3.16, except as modified herein:
   1. All surfaces shall be coated with membrane curing compound within 30 minutes after finishing at the specified rate.
   2. The membrane curing compound must contain a fugitive dye and be applied in 2 different directions perpendicular to each other.
   3. The freshly finished surface shall be protected, surfaces pitted by rain will be considered unacceptable.
   4. Removal and replacement of any curb section damaged by traffic, rain, cold weather, or other causes occurring prior to the 72-hour curing period or final acceptance shall the responsibility of the Contractor.

B. Mixing and Protection During Cold Weather: Comply with WisDOT Standard Specification Section 415.3.15 - Cold Weather Concreting:
   1. A curing material that has water resistance, strength, and insulation properties will be required.

3.07 BACKFILLING

C. Backfill according to the Drawings and requirements of Section 31 23 00 Earthwork.

3.08 WORKMANSHIP

A. Conform to WisDOT Standard Specification Section 601.3, except as modified herein:
   1. Any deviation in the design curvature of concrete edges in excess of 3/8 of an inch, measured with a 10-foot straight edge, will be considered unacceptable.
   2. Acceptance of work by price reduction will not be allowed.

END OF SECTION

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Pavement markings for control and guidance of traffic and parking lot parking space delineation.

B. Related Sections
   1. Section 32 12 16 – Hot Mixed Asphalt.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00.

1.03 REFERENCES

A. State of Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" - latest edition including all current supplements (WisDOT):
   1. 646 – Pavement Markings
   2. 647 – Special Pavement Markings

1.04 SUBMITTALS

A. Chosen epoxy lot or batch formulation.

B. Pavement Marking Contractor Qualifications/Certifications.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver epoxy and materials to the job side unopened, in manufacturer's containers legibly marked with the contents by color, batch number, date manufactured, and manufacturer's name and address. Do not use material more than one year old.

PART 2 PRODUCTS

2.01 MATERIALS

A. Glass Beads
   1. Conform to WisDOT Spec 646.2.3.

B. Epoxy
   1. Conform to WisDOT Spec 646.2.4.

2.02 EQUIPMENT

A. Use specified equipment, as stated in WisDOT Spec. 646.3.2.2 and 646.3.2.3.

PART 3 PART 3 EXECUTION

3.01 GENERAL

A. Prepare pavement for epoxy per WisDOT Spec. 646.3.1.1.

B. The pavement marking crew shall include at least one technical expert knowledgeable in the following areas:
   1. Equipment operation.
   2. Application techniques.
   3. Traffic control.
   4. Safety regulations.

C. The filling of tanks, pouring of materials, or cleaning of equipment shall not be performed on unprotected pavement surfaces, unless adequate provisions are made to prevent spillage of material.

3.02 SCHEDULE

A. Epoxy Pavement Markings
   1. Place following completion of asphalt surface course:
      a. No sooner than 24 hours after placement of asphalt.
      b. Within 5 working days of completion of asphalt placement.

3.03 PREPARATION

A. Locations
   1. Contractor shall be responsible for documenting existing pavement markings prior to any pavement demolition to ensure replacement markings match the existing markings.
   2. Pavement Markings and Symbols shall be installed to match existing markings or as shown on the Drawings.

B. Street Surface
   1. Engineer may direct cleaning of surface as necessary immediately prior to marking application:
      a. Brushing with non-metallic rotary broom.
      b. Other cleaning method approved by Engineer.
      c. Air blast following cleaning.
   2. Surface must be dry.
   3. Minimum surface temperature of 50 degrees F.

3.04 APPLICATION

A. Apply epoxy and glass beads per WisDOT Spec. 646.3.3.2 over all pavement marking locations.

B. General
   1. Tolerance
      a. Width: A tolerance of 1/4 inch under or 1/4 inch over the specified width will be allowed for striping provided the variation is gradual and does not detract from the general appearance.

b. Length: Broken line segments may vary up to 2-3/4 inches from the specified lengths provided the over and under variations are reasonably compensatory.
c. Alignment: Deviations from the control guide shall not exceed 2 inches.
d. Establishment of application tolerances shall not relieve the Contractor of his responsibility to comply as closely as practicable with the planned dimensions.

2. Material shall not be applied over longitudinal joints.
3. 4-inch broken line consists of 10 feet of paint and 40 feet space (1 cycle).
4. If same equipment used for different color material with change in color, an amount of material equal to fifteen 10-foot long stripes shall be wasted prior to beginning application with the new color.
5. Conditions
   a. Markings shall not be applied when wind or other conditions cause a film of dust to be deposited on the pavement surface after cleaning and before the marking material can be applied.
   b. Except when used as a temporary marking, pavement markings shall only be applied in seasonable weather when air temperature is 50 degrees F or higher.

3.05 CORRECTION OF DEFECTS

A. All pavement markings not conforming to the requirements of the Specifications shall be removed and replaced or otherwise repaired to the satisfaction of the Engineer.

B. Where yield computations show a deficiency in material usage of not more than 20 percent, Owner may require satisfactory repair or may accept the Work at a reduced Bid Unit Price that is in direct proportion to the percent of the deficiency.

C. Where yield computations show a deficiency in material usage in excess of 20 percent, Owner will require removal and replacement to the satisfaction of the Engineer, unless other means are approved by the Engineer.

D. If removal and replacement is required, at least 90 percent of the deficient line shall be removed.

E. Width of removal shall be 1 inch wider on all sides than the nominal width of the marking to be removed.

F. Removal of unacceptable Work shall be accomplished with suitable blasting or grinding equipment, unless other means are authorized by the Engineer. Asphalt street surfacing shall not be damaged by the removal operation.

END OF SECTION

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SECTION 32 34 00

PREFABRICATED PEDESTRIAN BRIDGE

1.0 GENERAL

1.1 Scope

These specifications are for fully engineered half through truss (no overhead bracing) bridge of steel construction and shall be regarded as minimum standards for design and fabrication. The work included under this item shall consist of design, fabricating, finishing, transporting and installing the steel truss bridge superstructure including bearings.

1.2 Definitions

- *Owner*: Entity who ultimately will own the bridge.
- *Engineer*: Engineering Entity or Firm who will be representing the Owner.
- *Contractor*: Entity who will be installing the bridge.
- *Bridge Manufacturer*: Firm who will be designing and supplying the bridge in accordance with these specifications.

1.3 Submittals Prior to Construction

1.3.1 Qualified Bridge Manufacturer

Contractor shall identify their intended supplier. Qualified Bridge Manufacturers must have at least 5 years of experience fabricating these types of structures and shall have an up-to-date quality certification by AISC per Section 14.1 of these specifications. All suppliers shall fabricate their product utilizing a modern fabrication facility owned and operated by the Bridge Manufacturer that includes the use of computer numerical control (CNC) beam drilling machines.

Bridge Manufacturers that may be able to supply the required bridge include but are not limited to:

Contech Engineered Solutions LLC
1-800-338-1122
E-mail: info@conteches.com

Wheeler
1-800-545-8020
E-mail: info@wheeler1892.com

Anderson Bridges
1-877-934-2800
E-mail: kory@andersonbridges.com

Bridge Manufacturers, other than those listed above, may be used provided the Engineer receives a written request that includes the following information:

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- Bridge Manufacturer's Product Literature,
- Name and resume of Bridge Manufacturer's design professional who will be signing and sealing the engineering submittals,
- Copy of current AISC certification,
- Representative copies of detailed drawings, field procedures, calculations, quality control manual, welder's certifications, proof of in-house certified welding inspector (CWI),
- Listing of projects including owner, location, size, year of fabrication, contact person,
- Certification by the Bridge Manufacturer's Design Professional that the bridge proposed will be in accordance with all project development done up to the date of these specifications.

The above will be evaluated by the Engineer for accuracy and ability to provide the bridge in accordance with these specifications. Bridge Manufacturers other than those listed above may only be used if the Engineer provides written approval. The Engineer's ruling shall be final.

1.3.2 Bridge Manufacturer's Design Professional

The Bridge Manufacturer shall have as a direct employee, an engineer who is experienced in bridge design to be in responsible charge of all engineering related task and design. The engineer shall have a minimum of 10 years of experience in bridge design and be a currently licensed civil or structural Professional Engineer in the State of Wisconsin and shall be the engineer who will seal and sign the plans.

1.3.3 Engineering Drawings and Calculations

Engineering drawings, 11x17 format, shall be prepared and submitted for review. Submittal drawings shall be unique drawings, prepared to illustrate the specific portion of the bridge being fabricated. All relative design information such as member size, ASTM/AASHTO material specification, dimensions necessary to fabricate and required welding shall be clearly shown on the drawings. Drawings shall have referenced details and sheet numbers. All drawings shall be stamped, signed and dated by the Bridge Manufacturer's Design Professional.

Structural calculations for the design of the bridge superstructure shall be prepared by the Bridge Manufacturer and submitted for review after receipt of the order. Calculations shall include complete design, analysis and code checks for the controlling members, connectivity and support conditions, truss stability checks, deck design, deflection checks, bearings and all splices.

2.0 APPLICABLE CODES AND STANDARDS

2.1 Governing Specifications

Bridge shall be designed in compliance with the AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges, 2009 (*AASHTO Ped*). Calculations shall be in accordance with this document, and formulas shall reference the appropriate sections.

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2.2 Other Reference Codes, Specifications and Standards

- AASHTO LRFD Bridge Design Specifications, 9th Edition, 2020 (*AASHTO LRFD*)
- AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, First Edition, 2005 (*AASHTO Signs*)
- AISC Steel Construction Manual, 15th Edition, 2017 (*AISC*)
- ANSI/AISC 360-16 Specification for Structural Steel Buildings, 2016 *(AISC 360)*
- American Welding Society, Structural Welding Code, D1.1, 2015 (*AWS D1.1*)
- ASCE/SEI 7-10 Minimum Design Loads for Buildings and Other Structures, 2010 (*ASCE 7*)
- Setra Technical Guide for Footbridges, 2006 (Setra)
- ANSI/AWC NDC-2015 National Design Specification for Wood Construction, 2015 (*NDS*)
- Tropical Timbers of the World, US Forest Products Laboratory

The AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges shall control if any conflicting requirements occur with the Other Reference Documents and/or other local Codes.

3.0 BRIDGE SYSTEM TYPE

3.1 Truss Style

The vertical trusses shall be designed such that the top and bottom chord members are parallel for the entire length of bridge. The interior verticals of the trusses shall be perpendicular to the top face of the bottom chord and the end verticals of the trusses shall be plumb. Trusses shall be laid out such that diagonals shall be at an angle of 30-degrees or more with respect to the bottom chord.

3.2 Diagonal Style

The vertical truss shall use a single-diagonal, Pratt configuration, where all the diagonals are in tension for gravity loads.

3.3 Floor Beam Location

The bridge shall utilize an H-Section configuration where the ends of the floor beams are welded only to the interior face of the verticals. The distance from the top of deck to the bottom of the bottom chord shall be determined by the Bridge Manufacturer during final design.

4.0 BRIDGE GEOMETRY

4.1 Span Length

The bridge span length shall be 55'-0" (horizontal straight line dimension) and measured from end to end of the bridge truss, not including the end dam, any deck extension or bearing that extends beyond the end of the truss.

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4.2 Width

The bridge width shall be 10‘-0” and shall be as measured from the inside face of structural truss elements at the deck level.

4.3 Top of Truss Height Above Deck

The top of the top chord shall not be less than 48" above the deck (measured from the high point of the deck). Note that this dimension may be exceeded due to truss height requirements for structural, deflection and vibration requirements.

4.4 Lower Steel Clearance

The Bridge Manufacturer shall determine the distance from the top of the deck (measured from the highest point of the deck) to the bottom of any steel member.

4.5 Truss Bay Spacing

The number of bays and the dimension of the panel points shall be determined by the Bridge Manufacturer.

4.6 Camber

A single simple-span bridge shall have a vertical camber dimension at the mid-span determined by the Bridge Manufacturer such that the deck slopes at any point on the bridge do not exceed the ADA requirements of 8.33%.

4.7 Elevation Difference

The top of the decks shall be at the same elevation at each end of the bridge.

5.0 STRUCTURAL DESIGN LOADS

5.1 Dead Load

The bridge structure shall be designed for the total bridge weight including the final deck system.

5.2 Pedestrian Loading (PL)

The bridge structure shall be designed for a uniform pedestrian loading of 90 psf. This loading shall be patterned to produce the maximum load effects. Consideration of dynamic load allowance is not required with this loading.

5.3 Vehicle Load (VL)

When vehicular access is not prevented by permanent physical methods, the superstructure and deck system shall be designed for each of the following concentrated/vehicular loads:

- A concentrated load of 1,000 pounds placed on any area 2.5' by 2.5'

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square.

- A single truck shall be placed to produce the maximum load effects and shall not be placed in combination with the pedestrian load. The dynamic load allowance need not be considered for this loading. The truck shall be the following:
    - 10,000-pound vehicle with 60% of the load distributed to the rear two wheels and 40% of the load distributed to the front two wheels.

5.4 Wind Load (WS)

Pedestrian bridges shall be designed for wind loads as specified in *AASHTO Signs*, Articles 3.8 and 3.9. The loading shall be applied over the exposed area in front elevations of both trusses including all enclosures.

In addition to the wind load specified above, a vertical uplift line load as specified in *AASHTO LRFD* Article 3.8.2 and determined as the force caused by a pressure of 20 psf over the full deck width, shall be applied concurrently. This loading shall be applied at the windward quarter point of the deck width.

5.5 Seismic (EQ)

The bridge structure shall be designed for seismic loading as specified in Section 3.10 of *AASHTO LRFD*. The transverse loads shall be calculated considering the transverse period of the bridge and longitudinal loads shall be calculated using a period of zero. A response modification factor of 0.8 shall be used for the calculation of forces applied to the bridge anchorage. A response modification factor of 1.0 shall be used for the calculation of bearing reactions. The transverse seismic load shall be applied to all the bearings and the longitudinal seismic load shall be applied to the fixed bearings only. The vertical bearing reactions shall be calculated using an overturning force on the bridge based on the center of gravity of the bridge times the transverse seismic load.

5.6 Fatigue Load (FL)

The fatigue loading shall be as specified in Section 11 of *AASHTO Signs*. The Natural Wind Gust specified in Article 11.7.1.2 and the Truck-Induced Gust specified in Article 11.7.1.3 of *AASHTO Signs* only need only be considered, as appropriate.

5.7 Snow Load

The bridge structure shall be designed for a snow loading of 40 psf over the deck area. The snow load shall not be combined with the pedestrian load.

5.8 Combination of Loads

The load combinations and load factors to be used shall be as specified in *AASHTO LRFD* Table 3.4.1-1, with the following exceptions:

- Load combinations Strength II, Strength IV, and Strength V need not be considered.
- The load factor for Fatigue I load combination shall be taken as 1.0, and

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Fatigue II load combination need not be considered.

6.0 STRUCTURAL DESIGN CRITERIA

6.1 Modeling

The bridge shall be modeled and analyzed utilizing a three-dimensional computer software which shall account for moments induced in members due to joint fixity where applicable. Moments due to both truss deflection and joint eccentricity must be considered. All loads listed in Section 5 of these specifications shall be applied to the model and analyzed appropriately.

6.2 Lateral Frame and Member Design

The bridge shall be designed and proportioned such that appropriate lateral stiffness is provided locally and globally, to ensure that the structure is stable.

For bridges without any overhead members (Half-Through Trusses), the vertical truss members, the floor beams and their connections shall be proportioned to resist a lateral force applied at the top of the truss verticals at the center of the top chord. This lateral force shall be applied as an additional load to the top of the vertical at the center of the top chord, creating a cantilever moment, which is then added to the forces obtained from the three-dimensional model. The magnitude of this lateral force shall not be less than 0.01/K times the average factored design compressive force in the two adjacent top chord members increased by a factor of safety of 1.33.

The top chord shall be analyzed as a column with elastic lateral supports at the panel points, considering all moments due to in-plane and out-of-plane bending, along with moments due to eccentricities of the members.

The U-Frame Stiffness of the verticals and floor beams shall be as specified in *AASHTO Ped* Article 7.1.2, assuming that the vertical and floor beam connection is rigid. This means that the following must be met:

- On H-Section floor beam connections, the floor beam width shall be at least 80% of the vertical face width in order to prevent any deformation due to tube wall plastification of the vertical member faces under service loads. The connection design will be checked at Strength I & Strength III load combinations.
- On Underhung floor beam connections, the vertical width shall match the bottom chord width in order to transfer vertical moments through the walls of the bottom chord to the verticals with no deformation of the chord side walls due to sidewall yielding or crippling under service loads. The connection design will be checked at Strength I & Strength III load combinations.
- The vertical and floor beam members shall not be connected to faces of the bottom chord at a 90-degrees to one another.
- All fixed end moments in the floor beams and verticals due to floor beam rotations, in addition to the loads derived from a U-Frame analysis have been accounted for in the strength design of the connections.

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The vertical and floor beam members shall be proportioned such that the effective length factor, K, used in the design of the top chord shall not be greater than 2.0.

The end verticals shall be designed as a simple cantilever to carry the loads obtained from the three-dimensional model, plus the cantilever moment due to a lateral load of 0.01 times the axial force in the end vertical, applied laterally at the top end of the end vertical at the center of the top chord.

The floor beams shall be sized for the forces obtained from a simple span, pinned end analysis, or from the forces obtained from the three-dimensional model, whichever controls.

The diagonals and brace diagonals shall be analyzed as pinned-end connection members.

Interior verticals shall be analyzed as pinned-end connections unless longitudinal forces are applied to the verticals such as when the brace diagonals are connected to floor beams on an H-Section floor beam configuration. When longitudinal forces are applied to the verticals they shall be analyzed as fixed-end connections.

All other members shall be analyzed as fixed-end connections.

HSS member connections shall be evaluated per the requirements of *AISC 360* Chapters J & K.

6.3 Deflections

The vertical deflection of the bridge due to the unfactored pedestrian live loading shall not exceed 1/360 of the span length.

The horizontal deflection of the bridge under unfactored wind loading shall not exceed 1/360 of the span length.

6.4 Fracture

The fracture toughness requirements and designation of Fracture Critical Member and Main Member designation are hereby waived for these structures.

6.5 Vibrations

Vibration of the structure shall not cause discomfort or concern to the users of the bridges. To assure this, the fundamental frequency (f) of the pedestrian bridge in the vertical direction, without live load, shall be greater than 3.0 hertz (Hz) to avoid the first harmonic. The fundamental frequency of the pedestrian bridge in the lateral direction, shall be greater than 1.3 Hz. If the fundamental frequency cannot satisfy these limitations, then the bridge should be proportioned such that either of the following criteria are satisfied:

$$f \geq 2.86 * \ln(180/W)$$

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or

$$W \geq 180 * e^{(-0.35 * f)}$$

Where W is the weight of the bridge in kips and f is the fundamental frequency in the vertical direction in Hz.

7.0 DECK SYSTEM

7.1 Deck System

Deck to be comprised of Reinforced Concrete designed to span from floor beam to floor beam.

Reinforced concrete shall be Class B concrete as specified in Section 03 30 00 Cast-in-Place Concrete.

The surface of deck concrete shall be finished with a sidewalk finish per Section 552.14(c) of FP-14.

Stay-in-place galvanized (G90 coating) metal form deck shall be used and shall be designed to support the weight of the wet concrete plus a 20 pounds per square foot construction load. Form deck shall be shop attached to floor beams via self-drilling fasteners, welding or power actuated fasteners. Welding shall not be used on painted or galvanized bridges. The longitudinal sheet laps shall be attached with self-drilling self-tapping fasteners at 36-inch maximum spacing. The attachment of the form deck to the floor beams is only necessary to keep the form deck in place during transportation and during the concrete placement. The form deck is not to be used for diaphragm action or composite action and provides no structural benefit to the truss or the deck after the concrete is set. Metal form deck panels shall be of a length to span a minimum of two bays of the truss supports. The top of deck to bottom of form deck shall be as required to support the anticipated loads but shall not be less than 5".

The concrete deck shall be designed to span longitudinally from floor beam to floor beam and to support the loads specified in Section 5.0 of these specifications.

A distribution width of deck is allowed, to support the anticipated vehicle wheel loads. This distribution width (E in feet) shall be the narrower of the following:

- E = 4 + .06S
    - Where S is the floor beam spacing minus one-half of the floor beam width.
- One-half of the total driving width of the bridge deck.
- 0.75 times the lateral wheel spacing of the vehicle.
- 0.6S + Wheel Width
    - Where S is the floor beam spacing minus one-half of the floor beam width.
    - The Wheel Width (in inches) is $2.5 * \sqrt{(\frac{0.01*P}{2.5})}$, where P is the wheel load in pounds

Reinforcing steel shall be ASTM A615 Grade 60 epoxy coated bars. All bar bends,

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anchorage and splices shall be in accordance with AASHTO Specifications. Top reinforcing shall have a minimum clearance of 2" to the top of deck.

Bridge Manufacturer shall designate the estimated slab thickness and reinforcing requirements at time of quotation. These estimates are to be used for quoting purposes only. Actual quantities may vary during the final design process, with costs variances due to any changes to the quantities being the sole responsibility of the contractor. Contractor shall supply all concrete and reinforcing materials.

8.0 MATERIALS OF CONSTRUCTION

8.1 Structural Steel

All members of the truss and deck support system shall be fabricated from square or rectangular hollow structural shapes (HSS), with the exception that floor beams may be wide flange shapes. All open ends of end posts and floor support beams shall be capped. Drain holes shall be provided for all sections at the low point of the member that may become filled with water.

All bridges shall be fabricated using A847 for HSS sections and A588 for structural shapes and plates.

Minimum nominal thickness of primary hollow structural shapes shall be 1/4". Rolled shapes shall have a minimum thickness of 1/4".

8.2 Fasteners

Structural bolts used to field splice or connect all main members shall be ASTM F3125 Grade A325. The nuts for these structural bolts shall be ASTM A563. The Bridge Manufacturer shall determine the finish of the structural bolts. They will be either Type 3 (Weathering) or Type 1 (Hot-Dipped or Mechanically Galvanized) as specified by the Bridge Manufacturer.

Bolts used for the connection of a wood rub rail shall be 18-8 or 316 Stainless Steel, ¼" diameter carriage bolts.

Screws for the attachment of wood deck shall be steel, 5/16" diameter, six lobe drive, self-tapping screws. The screws shall have flat heads for the screws in the wood and round heads for the screws on the edge cover. The screws shall have a protective coating that will prevent corrosion due to contact with treated wood and environmental exposure.

Self-drilling fasteners for attachment of the form decking shall be #14 x 1" zinc plated hex washer head Tek screws.

Power Actuated fasteners shall be Hilti sheet metal nail X-ENP-19 fastener.

Other miscellaneous fasteners shall be ASTM A307 zinc plated or galvanized, as determined by the Bridge Manufacturer.

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9.0 FINISH

For corrosion resistant high-strength low-alloy (weathering) steel no surface finish treatment is necessary. All surfaces of structural steel to be cleaned in accordance with Steel Structures Painting Council Surface Preparation Specifications No. 6, SSPC-SP6 commercial blast cleaning. The steel will be allowed to form a protective weathering patina over time.

10.0 ATTACHMENTS

10.1 Safety Rails

Safety rail system shall be placed on the inside or outside of the structure, spaced so as to prevent a 4" sphere from passing through the side truss for the full height of the side truss, or 48" , whichever is less. The top of the top chord may be considered the top of the rail system.

Rails system shall consist of horizontal rails. Rails shall be HSS 1 x 1 x 1/8 welded to truss verticals and a maximum unsupported length of 7'-0" if placed on the inside of the structure and 8'-0" if placed on the outside of the structure. If the truss vertical spacing is greater than the maximum unsupported length, mid-bay supports will be required. When safety rails are placed on the inside of the structure and not covered by the end vertical, the ends of rail near the end of the bridge shall be capped and ground smooth. No solid plate covering all rails as a unit will be allowed.

Each element of the pedestrian rail system shall be designed to support a uniformly applied load of 50 pounds per lineal foot, both transversely and vertically, acting simultaneously. In addition, each longitudinal element shall be designed to support a concentrated load of 200 pounds, which will act simultaneously with the above uniform loads at any point and in any direction at the top of the longitudinal element.

The posts of the pedestrian rail system shall be designed for a concentrated load applied at either the center of gravity of the upper longitudinal element or 60" above the top of the walkway, whichever is less. This concentrated load shall be equal to 200 pounds plus 0.05 times the post spacing in feet.

10.2 Toe Plate

Toe Plates shall be HSS4x2x3/16 tube welded all around to the inside face of the truss verticals. The maximum unsupported length shall be 12'-0". When the ends of the toe plates near the end of the bridge are not covered by the end verticals, they shall be capped and ground smooth. The bottom of the toe plate shall be placed 2" above the finished height of the deck. All seams of the toe plates shall be fully welded to give the appearance of a continuous member (welding should be located at a support member). If toe plates are incorporated into a safety rail system, they may be modified as needed but shall be a minimum of 4" high.

10.3 Rub Rail

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Rub Rails shall be provided at a height of 3'-6" from top of the deck to the top of rub rail. Rub Rails shall be nominal 5/4x6 Ipe hardwood. If the vertical spacing exceeds 7'-0" then mid-bay supports will be required. Rub rails shall be supplied S4S, E4E. All exposed surfaces shall be smooth with no exposed sharp edges. Rub rails shall be attached using two ¼" diameter carriage bolts with lock nuts at each attachment. Attachment shall be to a structural angle welded directly to the side of the vertical. Where a seam occurs between two adjacent pieces of rub rail, two structural angles shall be used, one on each side of the truss vertical.

10.4 Expansion Joint

The gap between the end of the bridge deck and the back wall of the foundation system be sized to accommodate bridge movements due to thermal expansion of the bridge over the design temperature range. The gaps shall be covered with a steel cover which attaches to the bridge and extends over the gap and onto the top of the foundation system back wall. The steel cover shall have its edges rounded or beveled at a 45-degree angle. A compression seal sized for movement and rated for pedestrian traffic may be used in place of the steel cover.

11.0 BEARINGS

11.1 Bearing Type

Bearing type and size shall be designed by the Bridge Manufacturer based on anticipated loads and movements.

11.2 Design Temperature Range

The Design Temperature Range will be site specific and will be determined per *AASHTO LRFD* Article 3.12.2.

11.3 Non-Shrink Grouting

The bridge will be supplied with a lower setting plate. This setting plate shall be leveled and shimmed to the proper elevation. The space between the lower surface of the setting plate and the foundation surface shall be filled with a non-shrink grout capable of achieving a minimum compressive strength equal to or greater than the strength of the foundation concrete. The cost of the leveling, shimming, and non-shrink grout shall be the responsibility of the Contractor.

12.0 FOUNDATIONS

12.1 Foundation System

Foundation system shall utilize abutments designed by the Engineer in conjunction with the bridge bearing requirements and dimensions provided by the Bridge Manufacturer and the site-specific geotechnical information provided by the Engineer. All abutment dimensions and materials shall be shown on the final contract plans.

12.2 Anchor Bolts

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Bridge Manufacturer shall design the diameter and grade of anchor bolts, based on the shear and tensile strength of the anchor bolt material only. All design considerations regarding concrete breakout strength in shear and tension, pullout strength, concrete side-face blowout strength, concrete pry out strength, embedment depth, type of anchorage or any other concrete failure modes are the responsibility of the Engineer and shall be shown on the final contract plans. All anchor bolts shall be galvanized. The Engineer shall determine if the anchor bolts shall be cast-in-place, drilled/epoxy, or expansion anchors. Anchor bolts shall be provided and installed by the Contractor.

13.0 FABRICATION

13.1 Welding

Welding procedures and weld qualification test procedures shall conform to the provisions of *AWS D1.1*. Filler metal shall be in accordance with the applicable AWS Filler Metal Specification and shall match the corrosion properties of the base metal.

13.2 Welders

Welders shall be qualified for each process and position used while fabricating the bridge. Qualification tests shall be in accordance with AWS D1.1. All weld qualifications and records shall be kept in accordance with the Fabricator's Quality Assurance Manual which has been approved and audited by AISC as the basis for certification.

13.3 Shop Splices

Shop splices for main truss members shall be full penetration welds all around the perimeter of the member. These shop splices shall be performed using a full perimeter backing plate. After welding of the shop splices, the weld shall be ground smooth to match the perimeter of the member. Grinding these welds smooth is required and will be grounds for rejection of the bridge upon delivery if not completed.

Shop splices for all horizontal rail components to be located at the centerline of the truss verticals, each end welded to the truss vertical and seal welded together. Exposed surface of the seal welds as seen from the deck shall be ground smooth.

Shop spliced for all horizontal stringers to be located at the centerline of the floor beams, each end welded to the floor beam and seal welded together.

13.4 Bolted Splices

For shipping purposes, the bridge may be fabricated in sections. Sections shall be field assembled using bolted connections. No field welding of members shall be allowed.

The chord members of the bridge shall be bolted such that at least two faces of

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the member are bolted. This is to provide reasonable force distribution around the perimeter of the member. Bolted splices shall be designed and fabricated such that the head of the bolt and washer are the only item exposed. No through-bolting of the member is allowed. The nuts of the fastener cannot be welded to the internal splice plate and shall be held in plate with a nut capture system per Patent US 10,267,345 B2 or equal.

The diagonals and brace diagonals shall be bolted utilizing a through-bolt system with plates on the exterior faces of the members. An internal stiffening plate is required to keep the member from crushing during the bolt tightening process.

All bolted connections are considered to be pretensioned or slip-critical connections. All bolts are to be pretensioned per the requirements of section 8.2 of the Specification for Structural Joints Using High-Strength Bolts. Recommended tightening method of all structural bolts shall be Turn-of-the-Nut Pretensioning.

14.0 QUALITY CONTROL

14.1 AISC Certification

The bridge shall be fabricated in a shop owned by the Bridge Manufacturer. This facility shall have up to date quality certification by AISC as Certified Bridge Fabricator - Advanced (Major) with Fracture Critical Endorsement and Complex Coating Endorsement (P1-Enclosed or P2-Covered).

14.2 Certified Weld Inspector

The Bridge Manufacturer shall employ at least two Certified Weld Inspectors (CWI), with endorsement by AWS QC1. At least one CWI shall be present during the complete fabrication of the bridge. The CWI shall provide written documentation that the bridge has been fabricated in accordance with these specifications and the approved design drawings.

14.3 Documentation

Material Certifications shall be available for review for all materials within the bridge. Traceability of heat numbers is required for all structural steel.

Documentation showing the performance of all critical quality checks shall also be made available for review by the Engineer or Owner.

14.4 Non-Destructive Testing

All welds within the structure, shall be visually inspected for conformance to size, under cut, profile and finish.

All shop splices of main truss members shall be magnetic particle tested.

15.0 DELIVERY AND ERECTION

15.1 Delivery

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Delivery shall be made via truck to a location nearest the site which is accessible to normal over-the-road equipment. All trucks delivering bridge materials will need to be unloaded at the time of arrival. If the erection Contractor needs special delivery or delivery is restricted, they shall notify the Bridge Manufacturer prior to bid date. This includes site issues which may prevent over-the-road equipment from accessing the site. Steerable dollies are not used in the cost provided by the Bridge Manufacturer. Determining the length of bridge section which can be delivered is the responsibility of the Contractor and shall be communicated to the Bridge Manufacturer prior to the bid date.

15.2 Installation & Lifting Procedures.

The Bridge Manufacturer will provide standard typical written procedures for lifting and splicing the bridge. All actual means, methods, equipment and sequence of erection used are the responsibility of the Contractor.

16.0 WARRANTY

The Bridge Manufacturer shall warrant, at the time of delivery, that it has conveyed good title to its steel structure, free of liens and encumbrances created by the Bridge Manufacturer, and that its steel structure is free of defects in design, material and workmanship. This warranty shall be valid for a period of one (1) year from the earlier date of delivery or 60 days after final fabrication is complete. Durable tropical hardwood decking and hardwood attachments shall carry a one (1) year warranty against rot, termite damage, or fungal decay. This warranty shall specifically exclude all softwood and decking material such as Treated Southern Yellow Pine, Douglas Fir and Wood thermoplastic composite lumber (e.g. Trex). Paint, galvanizing and other special coatings, if warranted, shall be warranted by the coating manufacturer in accordance with their warranty provisions and are not covered under the Bridge Manufacturer's warranty.

This warranty shall not cover defects in the steel structure caused by abuse, misuse, overloading, accident, improper installation, maintenance, alteration, or any other cause not expressly warranted. This warranty shall not cover damage resulting from or relating to the use of any kind of de-icing material. This warranty shall be void unless owner's records are supplied that show compliance with the minimum guidelines specified in the in the Bridge Manufacturer's inspection and maintenance procedures.

Repair, replacement, or adjustment shall be the exclusive remedy for any defects under this warranty. This warranty shall exclude liability for any indirect, consequential, or incidental damages.

END OF SECTION

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SECTION 32 92 10
SEEDING AND PLANTING

PART 1 GENERAL

1.01 SUMMARY

A. The work covered by this section consists of all items related to the installation and establishment of a variety of vegetation types using various installation methods.

B. Vegetation types include:
   1. Seeding – Native Plants, Turf Grass;
   2. Containerized / Ball & Burlap – Shrubs, Trees; and
   3. Live Staking - Dormant Woody Cuttings/ Live Stakes

C. Locations and Corresponding Methods are:
   1. Planting Zone A (Stream Bank) – Native Plants and Live Stakes
   2. Planting Zone B (Floodplain) – Native Plants, Containerized / B&B – Shrubs, Trees
   3. Planting Zone C (Terrace Slopes) – Native Plants, Containerized / B&B – Shrubs, Trees
   4. Planting Zone D (Upland) – Turf Grass

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00

1.03 RELATED SECTIONS

A. 01 57 13 Temporary Erosion, Sediment, and Water Control
B. 31 23 00 Earthwork

1.04 SUBMITTALS

A. Provide submittals consistent with Section 01 33 00.

B. Plant and seed materials

   1. Name, address and contact information of tree, and seed suppliers.

   2. Certification that plant material meets specified requirements.

   3. The Contractor shall provide a certificate of inspection, which indicates the plants are free from injurious insects, plant diseases, and other plant pests and the certificate shall accompany each shipment or delivery of plant material. The certificate shall bear the name and address of the source of the stock.

   4. The Contractor shall provide written documentation verifying compliance of mixture of seed furnished. Include percentage of various seed species, year of production, germination rate, seed bag tags, and weed seed content.

C. Topsoil

   1. Name, address and contact information of supplier

   2. Photos of proposed supplier stockpile location

   3. Laboratory certification stating that the material(s) meet the requirements of this Specification for:

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i. Percentage organic matter
ii. Percentage clay
iii. Percentage sand
iv. pH

D. Fertilizer
1. Certification that fertilizer meets specified requirements.

PART 2 PRODUCTS

2.01 SEED, WOODY CUTTINGS, SHRUB, AND TREE SPECIES

A. Contractor shall refer to the surface restoration planting tables shown on the Drawings.

2.02 HANDLING OF MATERIALS

A. All material shall be handled with care to limit stress and damage. Damaged seed, shrubs, trees, and/or live stakes shall not be used.
B. Labels shall be attached securely to all planting materials (seed, dormant cuttings, fertilizer, etc.). Labels shall be durable, legible, use weather-resistant ink or other resilient lettering, so the owner may determine that all materials conform to the specifications (size, species, origin, etc.)
C. Seed
1. Seed shall be stored in a cool, shaded, and dry location; in the bag provided by the supplier.
2. Seed tags should remain on bags.
D. Containerized / B&B -Trees and Shrubs
1. Tree and shrub delivery should be the same day as planting. No plants shall be stored at the site without permission of the OWNER for more than two (2) days. Plants shall be carefully loaded and unloaded so as not to damage branching or root mass. Dropping of material will not be allowed. Plants in full leaf shall be thoroughly wetted down and completely covered with a wet tarp during transportation. All plant roots must be kept in a moist condition.
2. Outside storage locations shall be continually shaded and protected from wind. Do not allow plants to dry out. Store plants in a cool wet place with roots under wet mulch, wet straw, or wet soil. Tops should remain dry, however do not allow whole plant to dry out. Plants in full leaf shall be thoroughly wetted down and completely covered with a wet tarp during transportation. All plant roots must be kept in a moist condition.
3. Protect from freezing. Temperature shall be maintained between 34-38 degrees F, relative humidity shall be kept above 85%, and there shall be good air circulation around the plants. If the plants have broken dormancy during transit they shall not be stored for more than 2 days. from freezing.
E. Dormant Woody Cuttings
1. Materials shall be installed the same day as prepared or stored in a refrigerated area and kept moist for no longer than two (2) weeks. Bundles of harvested live material should be kept with cut ends submerged in water to keep cut ends moist at all times.
2. Protect cuttings at all times from sun, drying winds, and frost. Cuttings that cannot be planted immediately on delivery shall be kept well protected from winds and frost. Bundles of harvested live material should be kept with cut ends submerged in water to keep cut ends moist at all times. Care shall be taken to keep bundles moist during transportation from the harvest site to the planting site. Live cuttings that

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appear to be dried out or damaged during transportation will not be accepted. Rejected live cuttings may be marked by the OWNER.

2.03 TIMING

A. Some trees and shrubs may survive planting any time during the year, but the preferred time is in the fall after leaf drop. Fall planting should take place soon after leaf drop, providing time for new water absorbing roots to develop before winter. Since evergreens are especially prone to winter browning if planting is delayed, they should be installed in early fall (late September through October). Fall planting success may be increased by planting hardy plants into sites with good soil moisture and wind protection.

B. The CONTRACTOR will install plants when the soil is moist and when the plant is not under moisture stress. Water all woody plants two to three days before installing if the soil is dry.

2.04 TOPSOIL

A. Imported Topsoil

1. Natural, fertile, clean, friable soil, screened, representative of local productive soil, and free of clay lumps, subsoil, or other foreign matter larger than 1-inch diameter, not frozen or muddy. It shall be a loamy mixture having at least 95 percent passing No. 10 sieve. In addition, imported topsoil shall comply with the following requirements:
    i. Organic Matter: Contain no less than 7 percent nor more than 15 percent organic matter, as determined by the test for organic matter in accordance with ASTM D2974.
    ii. Clay: Contain no less than 10 percent or more than 25 percent clay, as determined in accordance with ASTM D422.
    iii. Sand: Sand content shall not exceed 50 percent, as determined in accordance with ASTM D422.
    iv. pH: The pH shall not be lower than 5.5 or higher than 7.5.
2. Free from noxious or invasive vegetation or seeds.

B. Salvaged Topsoil

1. Topsoil salvaged from the site shall meet the requirements of organic matter as defined above. Topsoil not meeting these requirements shall be amended, using methods approved by the Engineer, to meet the requirements.

2.05 SOIL SUITABILITY, TESTING, AND AMENDMENTS

A. The Contractor shall bear the responsibility of determining the suitability of on-site soils for planting applications specified on the plans.
B. The Contractor shall consult with the OWNER prior to the application of soil amendments.
C. Fertilizer (including root dips) and other soil additives (e.g. - topsoil, compost, mycorrhizal, etc.) shall be applied by the Contractor, as necessary, to ensure the success of the plantings in certain soil types through the maintenance period. The Contractor shall determine the type and application rate of fertilizer and/or other soil additives that are best suited for the plant species, planting applications, and existing soil conditions. Care shall be taken to minimize nutrient and pollutant loading to aquatic ecosystems through the addition of fertilizer or other additives.

2.06 FERTILIZER

A. Shall be Type B per WisDOT Standard Specification Section 629

2.07 EROSION MAT

A. Conform to Section 35 42 10 Watercourse Channel Banks.

2.08 MULCH

A. Conform to WisDOT Standard Specification Section 627

PART 3 EXECUTION

3.1 GENERAL

A. Finish grades are to be inspected and approved by the Engineer prior to start of permanent seeding and/or planting. The Contractor shall verify subgrade elevations with the OWNER's representative prior of placement.

B. The Contractor shall test site soils to evaluate the nutrient status of the soil prior to planting. Soils shall be sampled and tested. The "Soil Test Report" shall be submitted to the OWNER within ten (10) business days of receipt by the Contractor.

3.2 TOPSOIL

A. Install topsoil at thicknesses indicated on the Drawings

B. Place topsoil on subgrades that are free of mud, frost, snow, or ice: and during dry weather.

C. Scarify to a minimum depth of 3 inches, bench or break up sloped surfaces prior to placing topsoil so that topsoil will bond to existing materials. Ensure that previously compacted staging areas, haul routes, or other traffic areas are scarified and broken up before placing imported topsoil. Topsoil shall be placed within 3% of optimum moisture content as determined by ASTM D1557.

D. Compact each layer with tracked equipment, by hand, or with bucket. Maximum compaction of topsoil is 80% density (ASTM D1557).

3.3 NATIVE SEEDING (ZONE A, B, AND C)

A. The Contractor shall prepare the seedbed for the permanent establishment of native seed mix by ripping, tilling, disking, raking or otherwise scarifying the soil surface to a depth appropriate for the type(s) of seed being planted. Remove any non-topsoil materials and large clods.
B. The Contractor shall broadcast the specified seed mix in locations and rates conforming to the Drawings.
C. The specified seed mix shall be broadcasted by hand or by using a hand-held broadcast spreader at a rate identified on the Drawings. All seed shall be applied twice in two opposite directions to ensure even application.
D. Lightly rake seed into soil.
E. Zone A and B seed mix shall be applied during the installation of the bank protection. Refer to the channel sequence note on the Drawings.
F. Zone C seed mix shall be installed concurrently with the installation of erosion matting.
G. Cover Crop seed mix shall be installed in conjunction with zone A, B, and C seed mixes.
H. Do not sow seed immediately following rain, when ground is too dry, or during windy periods.

3.4 TURF SEEDING (ZONE D)

A. Conform to WisDOT Standard Specification Section 630.3

3.5 FERTILIZER

A. Conform to WisDOT Standard Specification Section 627

3.6 EROSION MAT

A. All slopes 4H:1V or steeper, located above bankfull limits, shall be covered with erosion control matting conforming to Section 35 42 10 Watercourse Channel Banks.

3.7 MULCH

A. All slopes flatter than 4H:1V, located above bankfull limits, shall be covered with mulch.

B. Conform to WisDOT Standard Specification Section 627

3.8 CONTAINERIZED / BALL & BURLAP TREE AND SHRUB PLANTING

A. Install conforming to WisDOT Standard Specification Section 632 with the addition of the following:
   1. Dig a hole large enough that any roots can hang downward and not be curled and the top of the plant, including any horizontal growth, is above the ground. Heel in soil at base of plant to ensure root to soil contact. Leave the plant in a vertical position.
   2. If plants are installed in late fall and winter the plant shall be installed slightly deeper than they were planted at the nursery.
   3. Shrubs & trees should be thoroughly watered immediately after planting. Thereafter, the soil must be regularly monitored to prevent drying out. If rainfall is less than 0.25 inch a week, the soil around the roots should be deeply watered approximately every 10-14 days.

3.9 DORMANT WOODY CUTTINGS

A. All lateral branches shall be carefully removed to avoid damage to the bark ridge and branch collar. All live stakes shall be scarred along the inserted end of the stake to promote root growth. A minimum of two buds shall be above grade.
B. Cuttings shall be driven into the ground using a “dead blow” plastic hammer with BB’s or by creating a hole and slipping the stake into it. The stakes shall be tamped in at a right angle to the slope with at least six inches (6”) of the stake installed below the ground surface. Soil shall be firmly packed around the hole after installation. Split stakes shall not be installed. Stakes that split during installation shall be replaced.
C. Cuttings may be installed by hydraulic injection methods developed by NRCS. (Stinger)

3.10 SUBSTANTIAL COMPLETION

A. Substantial Completion of vegetated areas is defined as the finished installation of plant materials per the Drawings and Specifications, and the establishment of these materials such that evidence of vegetation health and coverage can be assessed by the Engineer. Contractor shall provide an industry approved quantitative methodology to demonstrate vegetation establishment for approval by Owner. The Owner will consider 90% coverage by species in the seed mix, including cover crop, for approval of Substantial Completion. If evidence of vegetation health and coverage cannot be assessed before November 1st to establish Substantial Completion, the inspection for Substantial Completion will occur the following spring. Contractor shall maintain all vegetation until the following spring. Spring inspection to assess vegetation heath and coverage will not occur before May 1st.

3.11 VEGETATION MAINTENANCE

A. The Contractor is responsible for providing site conditions, materials, and work to maintain the vegetation shown on the Drawings at all times. The Three-Year Vegetation Maintenance Period begins immediately following Substantial Completion of vegetated

areas and continues until the end of the subsequent three-year period. Maintenance shall consist of the following items:

1. Development of Maintenance Plan
    i. Contractor is responsible for choosing and documenting in a Maintenance Plan the means and methods of maintaining vegetation including (but not limited to) tasks described below such as controlling invasive or weedy species in planted and limestone block areas, irrigation, mowing, herbicide application, removing debris or trash from vegetated areas, pruning woody species, repairing surficial erosion, reseeding or overseeding, and other tasks needed for plant health and performance.
    ii. The Contractor shall submit a Maintenance Plan for all areas vegetated with Containerized Plants, Seed, and Ball and Burlap Plants for the Engineer's and Owner's approval at least 60 days prior to the anticipated date of Substantial Completion.
    iii. Maintenance Plan shall include site observations, proposed techniques for plant establishment and invasive species management approach, tools, and anticipated schedule.
2. Maintenance logs of the required areas
    i. Following the installation of Seed, Container Plants, Ball and Burlap Plants, Shrubs, and Woody Cuttings the Contractor shall keep Maintenance Logs of site activity. These Logs shall be supplied to the Engineer within seven days of a maintenance visit, or immediately upon request. The logs shall document the condition of the required seeding and planting areas monthly for the first growing season after installation and no less than quarterly increments every growing season after for the remainder of the Three-Year Vegetation Maintenance Period.
    ii. The condition of the following minimum elements shall be documented: quantitative vegetation cover and condition, undesirable invasive species growth, methods utilized to control invasive growth, herbicide type and quantities used to control undesirable species growth, size and location of erosion and bare areas, general condition of earthwork and finished slopes, and damage by others.
3. After Storm Inspection and Reporting
    i. Within three days of being notified by the Village following significant storm events resulting in erosion of vegetated areas, the Vegetation Maintenance Contractor shall inspect the required contract areas for damage, foreign materials, and flow impeding blockages. These items will be documented as to location, priority or repair, and estimated cost of repair or removal. The documentation for this task shall be in the form of a written report to the Engineer. The Engineer will determine the extent of the repairs to be performed under the maintenance contract.
4. Mowing
    i. Contractor shall utilize mowing as a means to meet vegetation objectives throughout the Three-Year Vegetation Maintenance Period.
    ii. Mowing frequency and timing shall be proposed in the Maintenance Plan, and approved by the Engineer.

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iii. At a minimum, areas of Zone C Seed shall be mowed three times per year during Year 1, twice per year during Year 2, and once per year for the remainder of the Three-Year Vegetation Maintenance Period. Areas of Zone D Seed Mix shall be mowed three times per year during the Three-Year Vegetation Maintenance Period.

iv. Mowing equipment or operations shall not cause surficial damage.

5. Annual Maintenance and Site Condition Report

   i. The Annual Maintenance and Site Condition Report shall include an assessment of the site conditions on the previous year's condition as follows:

      a. A summary of Maintenance Logs.

      b. Copies of the Maintenance Logs as an appendix.

      c. Summary of storm events and assessed conditions.

      d. Copies of storm event reports as an appendix.

      e. Summary of vegetation control measures with schedule of operations for the Contract.

      f. Summary of location, area, and treatment of undesirable plant species.

      g. Summary of correspondence for the reporting period.

      h. Summary of Contract changes.

      i. A detailed discussion of proposed work required for the next reporting period.

      j. Site photos.

6. Vegetative Control of Injuries, Disease, Dead Materials, Removal Of Undesirable Plant Species

   i. Vegetation control of undesirable plant species shall be performed throughout all planting and seeding zones, and in all quarry stone areas, immediately following placement of materials and continuing until the end of Vegetation Maintenance Year 3

   ii. Contractor shall annually remove any woody vegetation in quarry stone and rip-rap areas to ground level and provide chemical treatment for stumps.

   iii. Noxious weeds and other invasive plant species as identified in Chapter NR 40, Wisconsin Administrative Code - Invasive Species Identification, Classification and Control, including but not limited to, Canada thistle, teasel, garlic mustard, purple loosestrife, reed canary grass, giant reed grass, common buckthorn and glossy buckthorn shall be controlled by appropriate means, including application of herbicides, mechanical and hand mowing, and hand pulling.

   iv. Not more than 5 percent cover of any invasive species shall be present in the seeded and planted areas at the termination of the Three-Year Vegetation Maintenance Period.

   v. All undesirable plant material shall be removed from quarry stone areas at least twice per year during the Three-Year Vegetation Maintenance Period.

7. Erosion and Surface Repairs

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i. Minor washed out areas shall be filled with topsoil, seeded, and original surface restoration and replacement vegetation reinstalled.

ii. Repairs due to damage because of insufficient vegetation coverage or in appropriate or inadequate maintenance shall be repaired by the Vegetation Maintenance Contractor. Minor shall mean single areas of 10 square feet or less or aggregate areas of 50 square feet or less following a storm event. Areas exceeding this shall be considered major and be addressed through contract adjustments.

8. Maintenance of Vigorous Growth of the Required Seeded and Planted Areas

i. The Vegetation Maintenance Contractor shall, at all times following installation of plant materials, maintain a vigorous growth of vegetation. All means necessary and appropriate under the permits for the project shall be utilized by the Vegetation Maintenance Contractor to establish complete, self-sustaining vegetation.

ii. The Vegetation Maintenance Contractor shall be responsible for any necessary permit modifications, additional permits, or specialized licenses or training for employing the management program.

iii. The Contractor shall make accommodations for temporary irrigation as needed to meet vegetation performance criteria.

iv. The Contractor shall remove flood and other debris, deposited sediment material, and trash from the vegetated and quarry stone areas at least four times (and prior to any mowing activity) per year during the Three-Year Vegetation Maintenance Period.

END OF SECTION

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SECTION 33 05 05

TRENCH EXCAVATION AND BACKFILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Trenching requirements for underground piping including requirements for excavation, backfill, and compaction.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. No separate bid item has been included for the work of this Section. All Work and costs associated with this Section including excavation, bedding, backfilling and compaction shall be included in the cost of pipe installation.

1.03 RELATED SECTIONS

A. Section 33 40 00 – Storm Drainage Utilities

B. Section 33 12 12 – Water Services

C. Section 31 23 00 - Earthwork

1.04 REFERENCES

A. Standard Specifications for Sewer and Water Construction in Wisconsin, 6th Ed. (Standard Specifications).

B. State of Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction, Current Edition (WisDOT Spec.).
   1. 209 - Granular Backfill.
   2. 608 – Storm Sewers

1.05 SUBMITTALS

A. Provide the following submittals consistent with Section 01 33 00 – Submittal Procedures:
   1. Product Data for each Borrow Material:
      a. Name and location of source.
      b. Results of gradation tests.

1.06 QUALITY ASSURANCE

A. Contractor shall hire an independent testing firm and analytical laboratory to conduct the required soil classification and compaction testing.
   1. The Contractor's technician performing soil classifications tests and soil compaction tests shall have a minimum of 3 years of experience performing similar tests.

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B. Contractor shall assist the testing laboratory with obtaining material samples and necessary surface preparation for density tests.

1.07 DEFINITIONS

A. Bedding: The soil material adjacent to the pipe which makes contact with the pipe foundation, walls of the trench, and upper level of backfill. The purpose of bedding is to secure the pipe to true line and grade, and to provide structural support to the pipe barrel.

B. Foundation: Soil material beneath the pipe bedding.

C. Improved Pipe Foundation: Foundation provided by importing material from sources outside the Site. Required when foundation is soft or unstable.

D. Pipe Zone: That part of the trench below a distance of one foot above the top of the pipe.

E. Sand Cushion: Aggregate bedding material used around pipe in areas where rock excavation is encountered, where pipe insulation is used, and when crossing existing utilities.

1.08 SEQUENCING AND SCHEDULING

A. Known existing underground utilities are shown on the Drawings in a general way. Owner does not guarantee the locations as shown on the Drawings. Contractor shall anticipate variations in both the vertical and horizontal locations of underground utility lines from those shown on the Drawings.

B. Uncover utilities and verify both horizontal and vertical alignments sufficiently in advance of construction to permit adjustments in the Work. Determine location of existing utilities and identify conflicts before excavating trench for pipe installation.

C. Notify Digger's Hotline before starting construction in a given area, requesting utility locations in the field.

D. Provide continuance of flow of existing sewer and other facilities.

E. Backfill and compact all trench excavations promptly after the pipe is laid.

1.09 WARRANTY

A. Trench settlements that occur during the correction period and are greater than 1 inch as measured by a 10-foot straight edge will be repaired in a manner acceptable to the Owner at the Contractor's expense.

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PART 2 PRODUCTS

2.01 PIPE BEDDING MATERIAL

A. ¾-inch Crushed Stone Chips to pipe springline, as shown on the Drawings.

B. Gradation shall conform to Chapter 8.43.2 of the Standard Specifications.

2.02 PIPE COVER

A. Gradation shall conform to Chapter 8.43.3 of the Standard Specifications.

2.03 BACKFILL MATERIAL

A. General Fill, as shown on the Drawings.
   1. Conform to Section 31 23 00 Earthwork.

2.04 IMPROVED PIPE FOUNDATION MATERIAL

A. Comply with WisDOT Section 209, Grade 1.
   1. Crushing Requirements: At least 50 percent of the material by weight retained on the No. 4 sieve shall have 1 or more crushed faces.

2.05 SAND CUSHION MATERIAL

A. Material shall conform to WisDOT Section 209, Grade 1:
   1. No onsite granular material encountered during construction may be used.
   2. 1-inch maximum aggregate size.

PART 3 EXECUTION

3.01 EXAMINATION

A. Use construction methods conforming to WisDOT Spec. 608.3.

B. Prior to construction, inspect existing utility structures and surface features, and document condition.

C. Re-inspect foundation soils if rain fall or snow has occurred after initial inspection but prior to placing pipe and bedding.

3.02 PREPARATION

A. Notify Diggers Hotline to field mark individual utility locations.

B. Protect as necessary surface features, such as utility poles, trees, structures, pavement, etc., that are not designated on the Drawings to be removed.

C. Notify utility companies of progress schedule so they can accomplish any necessary relocations and removals that they have agreed to relocate, remove, or support.

D. Implement traffic control.

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E. Complete temporary removal or relocation of surface features, such as fences, shrubs, signs, and mailboxes.

F. Crossing Under Existing Utility Lines
   1. Use extreme care when excavating in the vicinity of underground utility lines to avoid damage to protective coatings or surfaces.
   2. Where possible and as authorized by the utility, temporarily remove the utility line, install the new pipe, and reinstall the utility line.
   3. Where existing line cannot be removed or is not feasible to remove, securely support, excavate under, backfill under and around the utility line to 100 Percent Standard Proctor Density.
   4. Report and repair damaged lines prior to backfilling trench.

3.03 CONSTRUCTION

A. Trench Excavation:
   1. Excavate trench to alignment and grade shown on the Drawings.
   2. Trench width shall be minimized to avoid excess disturbance to surrounding vegetation. However, it shall be of ample width to permit the pipe to be laid and jointed properly and the backfill to be placed and compacted properly.
   3. Correct any part of the trench that is inadvertently excavated below grade with approved material compacted to 100 Percent Standard Proctor Density.
   4. Brace, shore, or sheet trench and provide drainage. Comply with applicable State Regulations relating to industrial safety to a safe angle of repose. Angle of repose may be no less than that required by the Accident Prevention Division of the State Industrial Commission or the requirements of the Occupational Safety and Health Act (OSHA), whichever is most restrictive.
   5. Pile all excavated material in a manner that will not endanger the Work or obstruct sidewalks, driveways, gutters, etc.
   6. Segregate soils in the excavated material that are not suitable for trench backfill and dispose of according to Section 31 23 00 Earthwork.
   7. Dispose of excess excavated materials according to Section 31 23 00 Earthwork.

B. Water Control:
   1. Dewater the ground as necessary to excavate the trench and install the pipe. All pipe and structures shall be laid in a dry condition prior to backfill. Maintain groundwater level a minimum of 1 foot below the pipe invert.
   2. Dewater according to Section 01 57 13 Temporary Erosion, Sediment, and Water Control.

C. Trench Bottom:
   1. Excavate to a sufficient depth to ensure adequate foundation when the bottom of the trench is soft or where in the opinion of the Engineer unsatisfactory foundation conditions exist. Bring excavation up to pipe grade with thoroughly compacted granular materials meeting the requirements of Improved Pipe Foundation Material.
   2. Provide temporary support, remove, relocate, or reconstruct existing utilities located within the trench excavation. Utility shall designate method employed. Use particular care and provide compacted fill or other stable support for utility crossings to prevent detrimental displacement, rupture, or failure.
   3. Excavate to expose existing utilities that cross in close proximity to the planned pipeline to determine the utilities' exact location sufficiently ahead of pipe installation to plan for the avoidance of grade conflict. Measure to determine the utilities' location

relative to the planned pipeline location. A deviation from the alignment, grade, and location to avoid conflict may be ordered by the Engineer.

4. In locations where rock affects the pipe foundation, excavate the trench 6 to 12 inches below the pipe and place sand cushion material up to the proposed invert elevation.
5. Improved Pipe Foundation: When unsatisfactory foundation conditions exist, as identified by the Engineer, excavate to a depth consisting of solid materials. Fill to pipe grade with thoroughly compacted granular materials meeting the requirements of Improved Pipe Foundation Material.

3.04 PIPE BEDDING

A. Use only selected materials free from boulders, debris, or other high void content substances at thicknesses stated on the Drawings. Remove debris, boulders, and large stones to provide at least 6-inch clearance from pipe.

B. Dig bell holes of ample dimension at each joint such that the pipe barrel rests continuously on the bedding.

3.05 COVER MATERIAL

A. Backfill immediately after pipe is laid. Restrain pipe as necessary to prevent their movement during backfill operations.

B. Place material completely under pipe haunches in uniform layers not exceeding 4 inches in depth.

C. Place and compact cover material in one or more lifts after compacting bedding material. Place a minimum of 12 inches of cover material over the pipe.

3.06 BACKFILL ABOVE PIPE ZONE

A. Use suitable materials meeting the requirements of Backfill Material and according to the appropriate trench section identified in the Drawings.

B. Place in uniform depth layers not to exceed 12 inches before compaction. Complete the compaction of each layer before placing material for the succeeding layer.

C. Compact each layer by mechanical means, conforming to the requirements of Chapter 2.6.14(b) of the Standard Specifications.

D. The means and method of placement and type of compaction equipment used is at the discretion of the Contractor. However, all portions of the trench backfill must meet the minimum specified compaction requirements.

3.07 RESTRICTED TRENCH WIDTH

A. Restrict width of trench to prevent damage to adjacent structures and limit unnecessary disturbance.

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3.08 DISPOSAL OF MATERIALS

A. Dispose of all trench spoil materials not suitable for trench backfill or other onsite filling operations at locations chosen by the Contractor.

B. The Contractor shall comply with all federal, state and local laws and regulations controlling pollution of the environment, including obtaining and executing all permits required. If contaminated soil is encountered, the Contractor shall obtain a landfill waste profile and dispose of the soil appropriately. Modifications to the unit price for the utility associated with the trench spoils requiring landfill disposal may be made in accordance with Article 11 of the General Conditions.

3.09 FIELD QUALITY CONTROL

A. Material testing and compaction testing requirements shall conform to Section 31 23 00 - Earthwork.

B. Failed density test areas shall be excavated and re-compacted until the density requirements are met.

END OF SECTION

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SECTION 33 12 12

WATER SERVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Alteration of existing 2-inch diameter water service at Wall Street.

B. Related Sections
   1. Section 33 05 05 – Trenching and Backfilling.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00.

1.03 REFERENCES

A. Standard Specifications for Sewer and Water Construction in Wisconsin, Latest Edition (Standard Specifications), and all current supplements.

B. American Society of Testing and Materials (ASTM)
   1. A674 - Standard Practice for Polyethylene Encasement for Ductile Iron Pipe for Water or Other Liquids.
   2. B88 - Class K Copper Water Service Pipe.
   3. D3035 - Standard Specification for Polyethylene (PE) Plastics Pipe (DR-Pr) Based on Controlled Outside Diameter.
   4. F1290 - Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings.

C. American Water Works Association (AWWA)
   1. C105 - American National Standard for Polyethylene Encasement for Ductile Iron Pipe Systems.
   2. C900 - AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 through 12 Inches, for Water Distribution.
   3. C901 - AWWA Standard for Polyethylene (PE) Pressure Pipe and Tubing, 1/2 (13 mm) Through 3 Inches (76 mm), for Water Service.

1.04 SUBMITTALS

A. Submit the Product Data for the following items consistent with Section 01 33 00:
   1. Pipe and fittings.

B. The Contractor shall submit a Workplan for the water service alteration at Wall Street to the Village for approval a minimum of 30 days prior to start of work. Workplan shall include at a minimum:
   1. Plan view with lengths labeled.
   2. Profile view with elevations and slopes labeled, and including clearance between proposed water service and the proposed box culvert.

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3. Installation method.
4. Proposed joining method, materials and fittings.
5. Schedule of operations.

1.05 SEQUENCING AND SCHEDULING

A. Alteration of the water service along Wall Street shall be performed prior to installation of the Wall Street Crossing or placement of any channel materials in this location.

PART 2 PRODUCTS

2.01 SERVICE PIPE

A. High Density Polyethylene (HDPE) Pipe: Conform to AWWA C901 and ASTM D3035, designation code PE 3408, C-901/DR 9.

2.02 TRANSITION FITTINGS

A. Polycam®, or equal steel transition fittings or Polycam® Flared Nut Aeries 912 shall conform to AWWA C901 for connections to PE Service Pipe.

2.03 TRACER WIRE

A. Wire shall be a minimum of 10-gauge solid wire with a solid PVC insulation coating suitable for underground installation and rated for wet conditions

B. Tracer wire insulation color shall be blue.

2.04 INSULATION

A. Insulation shall conform to Section 850.1 of the Standard Specifications for Sewer and Water Construction in Wisconsin.

PART 3 EXECUTION

3.01 INSTALLATION

A. Governing Code: Wisconsin Plumbing Code and any local ordinances that may apply.

B. Preparation: Conform to Section 33 05 05 – Trench Excavation and Backfill.

C. Water Service Line
1. Water Service shall be altered to allow for the construction of the proposed box culvert and channel features.
2. Alteration shall conform to the Water Service Alteration Notes on the Drawings.

D. Tracer Wire
1. Place wire along entire length of pipe. Wire shall be taped to the pipe at 10-foot intervals.

E. Insulation
1. Insulation shall be placed according to the Water Service Alteration Notes on the Drawings.

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F. Connection to Existing Service
   1. Connections to the existing water service shall be made per the Standard Specifications for Sewer & Water Construction in Wisconsin.

3.02 HIGH DENSITY POLYETHYLENE (HDPE) JOINING METHOD

A. Electrofusion joining processes conforming to ASTM F1290 shall be used to connect HDPE water service line to all transition fittings or joining pipe.

3.03 FIELD QUALITY CONTROL

A. Do not backfill trench until the service has been inspected and approved by the Engineer.

B. Hydrostatic Pressure Test
   1. Minimum Test Pressure: 150 psi.
   2. Test Duration: 2 hours.
   3. Criteria: No drop in pressure allowed.
   4. Testing Gauge: Liquid filled, 4-1/2 inches diameter, labeled in 1-psi increments, such as Ashcroft Model 1082, or approved equal.

C. Tracer Wire Testing: Demonstrate the electrical continuity of tracer wire.

END OF SECTION

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SECTION 33 31 00

SANITARY UTILITY SEWER PIPING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Sanitary sewer gravity pipe, fittings, and miscellaneous appurtenances.
   2. Sanitary Manholes

B. Related Sections
   1. Section 31 23 13 – Subgrade Preparation.
   2. Section 32 11 23 - Aggregate Base.
   3. Section 33 05 05 – Trench Excavation and Backfill.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00.

1.03 REFERENCES

A. Standard Specifications for Sewer and Water Construction in Wisconsin, Latest Edition (Standard Specifications), and all current supplements.

B. American Society of Testing and Materials (ASTM)
   1. D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (PVC) Compounds.
   2. D3034 - Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   3. D3212 - Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
   4. F477 - Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
   5. F679 - Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
   6. F794 - Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based On Controlled Inside Diameter.

1.04 SUBMITTALS

A. Submit Shop Drawings for sanitary sewer structures per Section 01 33 00.

B. Submit Product Data for the following items consistent with Section 01 33 00:
   1. Pipe and fittings.
   2. Castings and seals
   3. Bedding, cover, and backfill.

1.05 SEQUENCING AND SCHEDULING

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A. Do not pursue Work causing shut off of utility services (gas, water, electric, telephone, TV, etc.) to consumers until the utility owner is contacted and all consumers are notified of the shut-off schedule.

B. Verify vertical and horizontal location of sanitary sewers sufficiently in advance of installing new pipe to determine the extent of conflict, if any.

C. Successfully complete required inspections and testing before restoration of surface.

PART 2 PRODUCTS

2.01 SOLID WALL PVC PIPE

A. Polyvinyl Chloride (PVC) Pipe and Fittings.
   1. General: Pipe and fittings shall be made of compounds conforming to ASTM D1784 in accordance with the material requirements of ASTM F679.
   2. Design: Integral bell gasketed joint and a minimum wall thickness conforming to SDR 26.
   3. Joints: Elastomeric gasket joints providing a water-tight seal conforming to ASTM F477.

2.02 TRANSITION COUPLING

A. Coupling consisting of an elastomeric sleeve with incorporating stainless steel tension bands, tightening mechanism, and less than 0.01 inch thick shear ring conforming to ASTM C1173, Type A.

B. Separate bushings are not allowed without approval from the Engineer.

2.03 MANHOLES

A. Precast concrete sections conforming to ASTM C478 and details on the Drawings.
   1. All sections shall be cured by an approved method and shall not be shipped nor subjected to loading until the concrete compressive strength has attained 3,000 psi and not before 5 days after fabrication and/or repair, whichever is longer.
   2. The date of manufacture and the name and trademark of the manufacture shall be clearly marked on the inside of each precast section.

B. Joints: Rubber gasketed joint forming a watertight seal conforming to ASTM C443.

C. Watertight Pipe Connections
   1. Conform to ASTM C923 for connections between maintenance hole structures and pipes.
      a. Positive Mechanical Seal.
         1) Kor-N-Seal, A-Lok X-Cel, PSX, or equal.

D. Manhole Steps:
   1. Reinforced polypropylene plastic steps with No. 2 deformed grade steel rod.
   2. Manhole steps shall be OSHA approved and fabricated using 3/8" minimum diameter steel reinforcing rod with molded plastic covering.
   3. Manhole steps shall be integrated with the precast manhole structure.

E. Structures and bases shall be of precast concrete.

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F. Internal Seals Approved Manufacturer: Cretex Type Chimney Seal, or approved equal
   1. Sleeves and Extensions: Minimum thickness 3/16-inch, extruded or molded high grade rubber compound conforming to ASTM C923; 1,500-psi tensile strength, maximum 18-percent compression set and hardness.
   2. Bands: Used for compressing the sleeve and extension against the manhole: 16-gauge stainless steel conforming to ASTM A240, Type 304, screws, bolts, and nuts of stainless-steel conforming to ASTM F593 and F594, Type 304.

2.04 FRAMES AND COVERS

A. As shown on the Drawings.

B. Manufacture shall be Neenah Foundry or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Excavation and Preparation of Trench: Conform to Section 33 05 05.

B. By-Pass Pumping: Contractor shall be responsible for all items required to maintain sewer flows during construction of the new sanitary sewer line. All Work and costs for this are considered incidental to the Project, unless otherwise specified.

C. Erosion control and dewatering in conformance with Section 01 57 13.

3.02 PIPE INSTALLATION

A. Trench Excavation and Backfill: Conform to Section 33 05 05.

B. Install pipe to the alignment, grade, and location as shown on the Drawings and/or staked in the field. No deviation from the Drawings and/or staked alignment, grade, or location is allowed. Tolerances measured along pipe centerlines or invert as follows:
   1. Horizontal: Within 0.50 feet of alignment shown.
   2. Vertical: Zero plus and 0.08 feet minus elevation shown with no intermediate high points, level sections, or reverse invert slope.
   3. Joint Deflection: No more than 75 percent of the maximum allowable, as recommended by manufacturers of pipe and joint material.

C. Maintain reference line and grade with laser equipment or other equipment approved by the Engineer. Periodically check equipment for adjustment and accuracy. Correct deficiencies in equipment, reference line, and reference grade. Take precautions to prevent deflections in reference line and grade.

D. Non-Conforming Pipe Installation: Remove and reinstall.

E. Inspect pipe for defects and cracks while suspended immediately prior to installation.

F. Install pipe from lower to higher invert elevation with uniform and smooth invert line.

G. Install pipe length spigot ends pointing in the direction of flow.

H. No pipe is to be laid in water or when trench conditions are unsuitable for such Work.

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I. Jointing
   1. In conformance with recommendations of manufacturers of pipe and joint material.
   2. All joints must be watertight.
   3. Hand fill and compact all bell depressions with granular bedding materials to prevent joints from sagging or movement.

J. Cleaning and Protection
   1. Remove all dirt and debris from the interior of each pipe length as the Work progresses.
   2. Protect the exposed end of the pipe with temporary covers or plugs.
   3. Protect in place pipe from damage and dislocation.

K. Flexible Pipe Installation: Conform to ASTM D2321.

3.03 CONNECT TO EXISTING SYSTEM

A. Connect to Existing Manhole
   1. Connect to existing structure at location shown on the Drawings.
   2. If rubber boot exists at manhole opening, connect new pipe to the boot and secure.
   3. If manhole opening does not contain rubber boot or the existing boot is damaged, core drill opening in the structure, and install a rubber boot in manhole opening prior to connection of pipe.
   4. Make repairs to the structure required due to the Work performed, including installation of doghouse.
   5. If necessary, the invert shall be reconstructed to accommodate new flow location. Reconstruction of invert will also be necessary if pipe sizes increase.

B. Connect to Existing PVC
   1. Expose existing sanitary sewer main at location of proposed manhole
   2. Saw cut existing main to provide a straight joint at connection.
   3. Connect to proposed manhole.

3.04 MANHOLE INSTALLATION

A. Furnish and install structures in accordance with the Drawings.

B. Excavate to depth and size as shown in the Drawings.

C. Preformed inverts are required.

D. All concrete pipes entering manholes must be cut with a concrete saw.

E. Steps
   1. Locate on the downstream side, except for pipe 24 inches in diameter or greater. Install in the most appropriate place, to provide suitable access.

F. Position vertical wall of the eccentric cone on the downstream side.

G. Lift holes neatly mortared up.

H. Place casting at the center of the cone

I. Install concrete adjustment rings as needed to raise the casting to grade.

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J. Butyl sealant shall be used between adjustment ring and to join each ring to cone or casting frame.
   1. Seal joint at the casting frame seat with 2 rows of butyl sealant.
   2. Acceptable manufacturers shall be Kent Seal, Ramnek, or approved equal.

3.05 FIELD QUALITY CONTROL

A. Gravity Pipe Leak Testing
   1. General
      a. Test all systems (pipe and structures) for leakage before being put in service. Notify Engineer of the date and time for each test 1 day prior to actual testing. Test in section length increments deemed necessary by the Engineer.
   2. Low Pressure Air Test
      a. Diameter: Less than or equal to 24-inches.
      b. Must meet criteria set forth in ASTM F1417.
      c. Groundwater level shall be no higher than 2-feet above the top of pipe at upstream end.
      d. Acceptable time for loss of 0.5 psig of air pressure shall be the larger of the 2 times below:

Pipe Size	Min. Time (Min's)	Time (s/ft of pipe)
8	3:50	0.760
10	4:40	1.187
12	5:40	1.709
15	7:05	2.671
18	8:30	3.846
21	9:55	5.235
24	11:20	6.837

      e. Requirement may be waved for reconstruction projects where reconnection of active sewer services prevents testing with permission from Owner.

B. Gravity Pipe Deflection Testing
   1. Required for all flexible pipe (FRP, PVC, and HDPE).
   2. Deflection Testing Methods
      a. Pipe Diameters Through 24 Inches: Pull mandrel through the pipe by hand (without aid of mechanical pulling devices).
      b. Pipe Diameters Greater Than 24-Inches Through 36-Inches: Deflections shall be determined by use of a mandrel or a method submitted to and approved by the Engineer. If mandrel is used, it shall be pulled through the pipe by hand (without aid of mechanical pulling devices).
      c. Pipe Diameters Greater Than 36-Inches: Deflection measurements shall be determined using a mandrel, rigid bar, a circular rigid template, or by a method approved by the Engineer. If mandrel is used, it shall be pulled through the pipe by hand (without aid of mechanical pulling devices).
   3. Deflection testing shall be conducted at least 30 days after the pipe has been backfilled to the desired finish grade on all direct bury flexible pipe.
   4. 5-percent deflection allowance.
   5. Mandrel Diameter Requirements:

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a. Diameter equal to 95-percent of the base inside diameter noted in Appendix XI of ASTM D3034 for PSM PVC pipe (SDR pipe) and calculated from Appendix X2 of ASTM F679 for PS 46 or 115 pipe.
b. Mandrel shall be constructed of rigid steel, be non-adjustable, and have an odd number of legs (9 legs minimum). Its effective length shall not be less than its nominal diameter.

6. Deflection Template/Bar Requirements
   a. The circular template diameter (or rigid bar length) shall be equal to the mandrel diameter requirements as determined above.
   b. Circular templates shall be constructed of rigid materials and be non-adjustable.
   c. Rigid bars shall have a 1-inch diameter circular section, be constructed of steel, and be non-adjustable.

C. Manhole Leak Testing
   1. Testing shall be performed on all manholes.
   2. Leak test manholes in accordance with 1 of the following test methods:
      a. Standard test method for concrete sewer manholes by negative air pressure according to criteria set forth in ASTM C1244.
      b. Standard practice for infiltration and exfiltration testing of pre-cast concrete pipe sewer lines according to criteria set forth in ASTM C969.

D. Re-test after corrective measures are completed.

E. Cleanup
   1. Cleaning Pipe and Structures
      a. If newly installed mains and structures are kept clean during construction, cleaning will not be required.
      b. If newly installed mains and/or structures become dirty due to negligence of the Contractor, cleaning will be performed at the sole expense of the Contractor.
   2. The bailing or flushing method of cleaning pipe is acceptable only if adequate provisions, acceptable to the Engineer, for keeping dirt and debris out of the existing sewer system. Jetting may be required.
   3. Complete prior to final inspection for acceptance.

END OF SECTION

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SECTION 33 40 00

STORM DRAINAGE UTILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Storm sewer pipe, manholes, catch basins, castings, Wall Street culvert crossing, and miscellaneous appurtenances.

B. Related Sections
   1. Section 31 23 13 – Subgrade Preparation.
   2. Section 32 11 23 - Aggregate Base.
   3. Section 33 05 05 – Trench Excavation and Backfill.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Refer to Section 01 20 00.

1.03 REFERENCES

A. American Society of Testing and Materials (ASTM)
   1. A153 - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   2. A615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   3. B864 – Specification for Corrugated Aluminum Box Culverts
   4. C76 - Specification for Reinforced Concrete Culvert, Drain, and Sewer Pipe.
   5. C150 - Specification for Portland Cement.
   6. C206 - Specification for Finishing Hydrated Lime.
   7. C361 - Specification for Reinforced Concrete Low Head Pressure Pipe.
   8. C478 - Specification for Precast Reinforced Concrete Manhole Sections.
   9. D2837 - Specification for Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

B. Wisconsin Department of Transportation "Standard Specifications for Construction," most current edition (WisDOT Spec.)
   1. 519 – Brick Masonry and Concrete Brick or Block Masonry
   2. 520 – Pipe Culverts
   3. 606 - Rip Rap.
   4. 608 – Storm Sewer
   5. 645 - Geotextiles.

C. American Association of State Highway and Transportation Officials "Standard Specifications for Highway Bridges," 2002 Edition (AASHTO).

1.04 SEQUENCING AND SCHEDULING

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A. Do not conduct work causing shut off of utility service to consumers until the utility owner is contacted and all consumers are notified of the shut-off schedule.

B. Successfully complete required inspections and tests before commencement of work.

1.05 SUBMITTALS

A. Submit Shop Drawings for storm sewer structures per Section 01 33 00.

B. Shop drawings shall indicate complete information for fabrication and installation of units. Include the following:
   1. Plans and elevations locating and defining all material furnished by manufacturers.
   2. Sections and details showing connections, cast-in-place items, field installed lifting devices, capacities, all openings, and their relation to the structure.

C. Submit Manufacturer's Certificate of Compliance for the following items:
   1. Castings.
   2. Precast manhole and pipe sections.
   3. Precast box sections for Wall Street culvert crossing.
   4. Bedding, cover, backfill, riprap.
   5. Appurtenances.

D. Submit design calculations for Wall Street culvert crossing headwall, wingwalls, and foundations demonstrating adequacy for anticipated loading.

E. Manhole/Catch Basin Elevation Report
   1. The Contractor shall complete the report attached to the end of this Section for each structure as it is constructed. Completed reports shall be submitted on a weekly basis to the Engineer or the Engineer's designated representative.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mortar Materials
   a) Conform to WisDOT Standard Specification Section 519.2.3

2.02 FRAMES AND COVERS

A. As shown on the Drawings.

B. Manufacture shall be Neenah Foundry or approved equal.

2.03 STORM MANHOLES AND CATCH BASINS

A. General Requirements: ASTM C478 and details on the Drawings.

B. Structures and bases shall be of precast concrete.

C. Manhole Joints: Shall be butyl rubber gasket or butyl rubber rope. Acceptable manufactures shall be:
   1. Kent Seal

2. Ramnek
3. Approved Equal

D. Manhole Steps:
1. Reinforced polypropylene plastic steps with No. 2 deformed grade steel rod.
2. Manhole steps shall be OSHA approved and fabricated using 3/8" minimum diameter steel reinforcing rod with molded plastic covering.
3. Manhole steps shall be integrated with the precast manhole structure.

2.04 PIPE MATERIALS

A. Reinforced Concrete (RCP) Pipe and Fittings
1. General Requirement: ASTM C76, Wall B with circular reinforcing.
2. Materials: Conform to the requirements of ASTM C76, Wall B with circular reinforcing. O-ring gaskets shall be synthetic rubber, circular reinforcing in cross-section, and shall conform to ASTM C361.
3. Pipe Joints: Bell and spigot ASTM C361.
4. Pipe Class: As shown on the Drawings.
5. Marking: Each pipe shall be identified with the name of the manufacturer trade name or trademark and code, identification of plant, date of manufacture, and the pipe class and specification design.

B. Reinforced Concrete Box Sewer for Wall Street Culvert Crossing
1. General Requirements: Conform to ASTM C1577
2. Pipe Joints: A butyl rubber sealant shall be used to join pipes. Materials shall conform to ASTM C990.
3. Exterior Wrap: Concrete joints shall consist of a plastic or rubber compound that conforms to ASTM C877. Approved manufactures are Press-Seal Co., ConSeal Inc., or approved equal.

2.05 APRON ENDWALL

A. General Requirements: ASTM C76

B. Materials: Conform to the requirements of ASTM C760. O-ring gaskets shall be synthetic rubber

C. Attach to pipe string using joint ties.

2.06 JOINT TIES

A. Conform to WisDOT Spec Section 608.3.3 and WisDOT Standard Detail Drawing SDD 8f4.

2.07 RIPRAP

A. General Requirement: Conform to WisDOT Spec. 606
1. Riprap Materials: Conform to WisDOT Spec. 606.2
a) Gradation shall conform to “Heavy Riprap”
2. Geotextile Filter: Conform to WisDOT 645.2.2.7 Geotextile, Type HR

PART 3 EXECUTION

3.01 PREPARATION

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A. Trench Excavation and Backfill shall conform to Section 33 05 05.

B. Control of water: Contractor responsible for all work required to maintain flows during construction of the new storm sewer. All dewatering operations shall conform to Section 01 57 13 Temporary Erosion, Sediment, and Water Control.

3.02 INSTALLATION

A. Pipe Installation
   1. Lay and maintain pipe appurtenances to the alignment, grade, and location shown on the Drawings and/or staked in the field.
   2. General Pipe Installation Procedures
      a) Wipe joints clean; apply the manufacturer's recommended lubricant compound over the entire joint surface; center spigot in bell and push spigot home; take care to prevent dirt from entering the joint space; bring pipe to proper line and grade, and secure pipe in place by properly bedding.
   3. Lay pipe upgrade with spigot ends pointing in the direction of flow.
   4. All joints must be watertight.
   5. Remove all foreign matter or dirt from inside the pipe. Keep the bell and spigot clean during and after installation. Take care to prevent dirt from entering the joint space. Remove any superfluous material from inside the pipe after pipe installation by means of an approved follower or scraper.
   6. Where cut-ins make it impossible to construct bell and spigot joints or when dissimilar pipe materials are joined, a reinforced concrete collar shall be placed completely surrounding the joint or the connection shall be made by using an approved adapter.
   7. Any pipe which has been disturbed after being laid must be taken up, the joint cleaned and properly re-laid as directed by the Engineer.
   8. Where a sewer line outlets to grade or where the line terminates with a flared end section:
      a) Fasten at least the last 2 joints together using joint ties.

B. Wall Street Culvert Crossing Box Sewer Installation
   1. Box Sewers shall be installed according to PIPE INSTALLATION in this section with the addition of requires below:
      a) Butyl rubber sealant shall be placed within both the bell and the spigot end of each section of pipe. Butyl rubber sealant shall fill the entire annular space. Pipes shall be pushed "home" to compress and seal the butyl rubber sealant.
      b) Once pipe has been laid to line and grade and properly backfilled to springline, exterior wrap shall be placed over the top of the pipe and down to each springline. Exterior wrap shall be completely bonded to the concrete surface without dust or debris preventing adhesion.
      c) Backfill between box culvert sections shall be Low Density Concrete conforming to Section 03 34 00.
      d) Box sewers shall be visually inspected by the Engineer prior to acceptance.
   2. Headwalls and wingwalls shall be installed according to manufacturer's requirements and the details shown on the Drawings.

C. Structures and Appurtenances Installation
   1. Furnish and install structures in accordance with the Drawings.
   2. Excavate to depth and size as shown in the Drawings.
   3. Preformed inverts are not allowed.

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4. Pour inverts shaped to the half section of equivalent size pipe conforming to the inlet and outlet pipe so as to allow for a free, uninterrupted flow with all surfaces sloping to the flow line.
5. All concrete pipes entering manholes must be cut with a concrete saw.
6. Steps
    a) Locate on the downstream side, except for pipe 24 inches in diameter or greater. Install in the most appropriate place, to provide suitable access.
7. Position vertical wall of the eccentric cone on the downstream side.
8. Lift holes neatly mortared up.
9. Place casting at the center of the cone
10. Install concrete adjustment rings as needed to raise the casting to grade.
11. Butyl sealant shall be used between adjustment ring and to join each ring to cone or casting frame.
    a) Seal joint at the casting frame seat with 2 rows of butyl sealant.
    b) Acceptable manufacturers shall be Kent Seal, Ramnek, or approved equal.

D. Apron Endwall
    1. General: Conform to WisDOT Spec Section 520.

E. Joint Ties
    1. Tie the endwall and the last two sections of pipe.

F. Rip Rap
    1. General: Conform to WisDOT Spec Section 606.

3.03 RECONNECTING EXISTING STORM SEWER PIPES/LATERALS

A. Identify all laterals in existing structures or pipes before removal of that structure or pipe. Remove existing lateral pipes to the next engineer accepted joint and replace in-kind with reinforced concrete pipe. Verify that positive drainage is achieved when connecting lateral. Connect the existing pipes to the new pipes with the appropriate coupling, concrete collar or by means approved by the Engineer. Use concrete masonry for concrete collar conforming to WisDOT Spec Section 501.

3.04 CONNECTING TO EXISTING MANHOLE OR PIPE

A. Core or cut into existing structure at locations shown on the plans. Opening in existing structure shall be minimized to extent possible.

B. Mortar all openings between the new storm sewer and existing structure.

C. Pour a concrete collar, minimum of 6" thick, around the entire connection point.

3.05 FIELD QUALITY CONTROL

A. Scope
    1. All pipeline testing is considered incidental to the Bid cost of the pipe.
    2. Engineer to observe and verify that all tests and inspections have been completed prior to final acceptance.

B. Cleaning
    1. Consists of Cleaning the Pipe and Structures

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a) If newly installed mains and structures are kept clean during construction, cleaning will not be required.
b) If newly installed mains and/or structures become dirty due to negligence of the Contractor, cleaning will be performed at the sole expense of the Contractor.

2. The bailing or flushing method of cleaning pipe is acceptable only if adequate provisions acceptable to the Engineer for keeping dirt and debris out of the existing sewer system or ponds are employed. Jetting may be required.
3. Complete prior to final inspection for acceptance.

C. Required Tests and Inspections
1. Lamping
a) Verify installation is to true line and grade.
b) Verify installed pipe is structurally sound.
c) Verify there are no broken or deflective pipes.
d) Verify that joints are all home.
e) Verify structures conform to specified requirements.
2. Infiltration
a) Engineer may waive test if no visible infiltration is observed during the lamping inspection.
b) Measurements taken at the points where in the Engineer's opinion the flow of water in the sewer is greater than the maximum allowable leakage.
c) Measurement made by means of 90 degree v-notch weirs placed in the lines as directed by the Engineer.
d) Maximum Allowable Rate of Leakage: Not more than 100 gallons per mile per inch diameter per day.
e) Tests may be taken between individual manholes and the infiltration in any given line must not exceed the specified maximum allowable rate.
3. Televising
a) If it is deemed necessary by the Engineer, sewers shall be televised to ensure that all joints are seated and no damage to the pipe has occurred.

3.06 PROTECTION

A. Plug all entrances and openings to the system promptly and before suspension of operations at the end of working day.

B. Secure manholes and structures immediately after completion or before suspension of operations at the end of working day with castings or suitable alternative device.

C. Mark all structures to avoid being hit by construction or vehicular traffic.

D. Mark each plug location with 4 inches by 4 inches timbers to above grade to aid in marking the future connection.

E. Establish erosion control measures as per Section 01 57 13.

END OF SECTION

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Manhole/Catch Basin Field Elevation Report

Stantec

Project:	Date:
Owner:	Contractor:
Stantec Resident Project Representative :	Contractor's Representative:
Stantec Project No:	Owner Project No:

Contractor is required to complete this form before payment of structure is approved.

Structure Location				Structure Type (circle one)	Design Invert (from Plan)	As-Constructed Invert Elevation *	Difference (+ / -)	Comments / Quality Assurance
Structure No.	Structure Station	Direction of invert/flow	Street Name or Easement Location					
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				
				MH CB Apron				

*** - As-Constructed Invert Elevation provided by Contractor from measurements taken in the field to nearest 0.01 feet.**

SECTION 35 42 10

WATERCOURSE CHANNEL BANKS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This Section covers work necessary for the following:

1. Furnishing quarry stone on the east and west channel banks, including streambank grading and shaping, subgrade preparation, placement of stone bedding, filter stone and quarry stone.
2. Vegetated Riprap adjacent to the quarry stone banks.
3. Bank protection adjacent to quarry stone and vegetated banks.
4. Erosion matting along bank slopes.

B. Related Sections

1. 32 92 10 Seeding and Planting

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment

1. Refer to Section 01 20 00.

1.03 REFERENCES

A. State of Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" most current edition and all current Supplements (WisDOT Specification):

1. 305 – Dense Graded Base.
2. 606 – Riprap
3. 645 – Geosynthetics

1.04 SUBMITTALS

A. The Contractor shall submit certifications that the following materials conform to the material specifications.

i. Quarry stone blocks
ii. Bedding stone
iii. Filter gravel
iv. Non-Woven geotextile fabric
v. Riprap
vi. Footer boulders
vii. Coir matting

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viii. Erosioin control fabric

B. In addition, the following specific information shall be provided:

1. SCHEDULE

The Contractor shall submit as part of the construction schedule, the anticipated production rates for the various types of stone materials. If production rates change such that delays are caused at the job site, the Engineer shall be notified in writing with the reason for the delay.

2. QUARRY STONE TESTING RESULTS

a. The Contractor shall submit testing results demonstrating that quarry stone block meets the following requirements:

1) Absorption: Corps of Engineers CRD-C 107-89: 5% maximum water

2) Freeze-Thaw cycles: ASTM D 5312 or Corps of Engineers CRD 144: 10% maximum loss at 25 cycles

3. STONE SUPPLIERS AND MATERIAL CERTIFICATIONS

a. The Contractor shall submit the following information to the Engineer for approval:

1) Name, address, and phone number of all quarry stone and bedding stone suppliers, including location of quarry.

2) Name, address, and phone number of filter gravel supplier, including location of pit.

3) Certified analysis of all materials to be used that show compliance with these specifications (including gradation analysis).

4. SAMPLES

a. Submit samples or arrange for a visit to the quarry stone block quarry by the Engineer for approval prior to construction start and delivery of materials.

5. SURVEY RESULTS

a. The Contractor shall submit to the Engineer on a weekly basis during bank construction final survey elevations of the quarry stone bank at minimum intervals of 50 feet.

6. WEIGHT TICKETS

a. The Contractor shall submit weight tickets for quarry stone, bedding stone, and filter gravel to the Engineer on a daily basis.

PART 2 PRODUCTS

2.01 QUARRY STONE BANK

A. QUARRY STONE

1. Quarry stone shall be durable angular stone and shall be sound, hard, dense and free of seams, blast fractures, cracks or undesirable weathering. Argillaceous stone, chert stone, or stone with high shale contents are more susceptible to weathering, abrasion, thin bedding, close fracturing and other undesirable stone properties and will not be

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accepted. Stone shall be such character that it will not disintegrate from the action of air, water, freezing or handling and placing. The density of the stone shall be between 162 and 172 pounds per cubic foot.

2. Quarry stone bank revetment blocks shall be rectangular in shape, saw cut on a maximum of two parallel faces to meet size criteria, with the following dimensions:
   a. Vertical height: 16-inch minimum to 24-inch maximum, with a maximum variation of 2 inches between blocks.
   b. Width (parallel to the stream flow): 3-feet minimum and 5-feet maximum.
   c. Length (perpendicular to the stream flow): 4-feet minimum and 5-feet maximum.
3. The top and bottom planes of the block shall be nearly parallel with each other and at nearly 90 degrees to each vertical side. The vertical sides shall be at nearly 90 degrees to one another at each corner of the block. The maximum aspect ratio (greatest dimension: least dimension) of any piece of quarry stone shall not be greater than 3:1 when measured on mutually perpendicular axes. Not more than 25 percent of the stone shall have an aspect ratio greater than 2.5:1.
4. It has been found that some freshly quarried stone exhibits unloading type fracturing caused by the release of stored energy. Therefore, all stone shall be stockpiled (cured) at the quarry for a minimum of 48 hours prior to inspection. After November 15 (and until April 15), stone shall cure a minimum of 30 days before inspection.
5. Stone shall be buff colored.

B. BEDDING STONE

1. Bedding stone shall be hard and durable quarry stone with less than 35 percent wear when tested for resistance to abrasion in conformance to ASTM C535. Bulk density shall not be less than 160 pounds per dry cubic foot. The least dimension of any one piece shall not be less than 1/3 the greatest dimension. Broken concrete or recycled construction products will not be allowed unless specifically indicated in the Plans or approved in writing by the Engineer.
2. Each load of bedding stone shall be reasonably well graded from the smallest to the maximum size specified. Stone size gradation for bedding stone shall be as follows:

Average Diameter (inches)	In-Place Volume of Stone (percent)
7-9	10-14
5-7	15-21
2-5	20-28
<2	5-7
<1	2 or less

3. Stone shall be of a size and shape approved by the Engineer. The stone shall be well graded between the minimum and maximum sizes so as to provide a strong interlocked section with a minimum of voids.

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C. FILTER GRAVEL

1. Natural gravel, crushed gravel, or crushed rock, 1-3/4-inch maximum, free from dirt, clay balls, roots, and organic material, and meeting the following gradation requirements.

Sieve Size	Percent Passing By Weight
1-3/4-inch	100
1-1/4-inch	75-90
1/2-inch	40 - 60
No. 4	10 - 25
No. 10	0 – 5

D. NON-WOVEN GEOTEXTILE

1. Geotextile for quarry stone bank work shall consist of polyester, polyethylene, polypropylene, or polyamide filaments, nonwoven and formed into a multi-directional stable fabric network. The geotextile shall have the following typical properties, as a minimum:

Weight, ASTM D3776	6.4 oz/sy
Grab Strength, ASTM D1682	160 lbs.
Trapezoidal Tear, ASTM D4533	60 lbs.
Mullen Burst Strength, ASTM D3786	305 psi
Water Flow Rate, ASTM D4491	110 gal/m/sf

2. Nonwoven geotextile be manufactured by Mirafi, Inc., Phillips Fibers Corp., Hoechst Fibers Industries, or equal.

E. CHOKE STONE MATERIAL

1. Mixture of gravel and stone, sized and placed to fill voids between the bedding stone and the riprap. Choke Stone Material shall consist of equal parts BEDDING STONE and FILTER GRAVEL.

F. MATERIAL APPROVAL

1. All tests necessary for the Contractor to locate an approved source of Quarry Stone, Bedding Stone and Filter Gravel shall be made by the Contractor. Certification that the material conforms to the Specification requirements along with copies of the test results from an approved commercial testing laboratory shall be submitted to the Engineer for approval at least 30 days before the material is required for use. Sampling of the material source shall be done by the Contractor under the review by the Engineer in accordance with ASTM D75. Tentative approval of the material source shall be based on an inspection of the source by the Engineer and the certified test results submitted by the Contractor to the Engineer. No imported materials shall be delivered

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to the site until the proposed source and tests on the materials have been tentatively approved in writing by the Engineer.

2.02 RIPRAP ADJACENT TO QUARRY STONE BANK

A. Geotextile Fabric shall be type HR conforming to WisDOT Standard Specification Section 645.

B. Heavy riprap conforming to WisDOT Standard Specification Section 606

C. Topsoil conforming to Section 32 92 10 Seeding and Planting.

D. Seed shall be Zone A or Zone C Seed Mix conforming to Section 32 92 10 Seeding and Planting and the Drawings.

2.03 VEGETATED RIPRAP BANK AT CONFLUENCE

A. Geotextile Fabric shall be type HR conforming to WisDOT Standard Specification Section 645.

B. Footer Boulder shall be granite fieldstone boulders 3 feet in diameter or larger and may be either on-site salvaged boulders in good condition or imported from off site. Imported boulders shall be Wisconsin Granite Fieldstone Boulders provided by Halquist Stone or approved equal.

C. Riprap be heavy riprap conform to WisDOT Standard Specification Section 606.

D. Topsoil shall conform to Section 32 92 10 Seeding and Planting.

E. Seed shall be Zone C Seed Mix conforming to Section 32 92 10 Seeding and Planting and the Drawings.

2.04 ENERGY DISSIPATOR

A. Riprap be heavy riprap conform to WisDOT Standard Specification Section 606.

B. 3-inch base aggregate shall conform to WisDOT Standard Specification Section 305.

2.05 BANK PROTECTION

A. Topsoil conforming to Section 32 92 10 Seeding and Planting.

B. Seed shall be Zone A Seed Mix conforming to Section 32 92 10 Seeding and Planting and the Drawings.

C. Straw shall be small-grain straw free of weeds, disease, and rot. Straw mulch obtained from regular farming operations is not free of weeds and will be rejected. Straw shall be oat, wheat, rye, barley, or rice stalk. Straw stock shall be in air-dry condition and of a suitable consistency to be broadcast by commercial mulch-blowing equipment.

D. Coir matting shall be C700 BN as manufactured by North American Green or approved equal. It shall be 100% biodegradable coir net with 100% coconut fiber matrix.

E. Hardwood stakes used to secure the matting along the toe of the channel and the top of the bank shall be made of dense hardwood and nominal dimensions of 2" by 2" by 18" in length. One end shall be beveled to a point to facilitate driving through the coir mat and into the underlying soil.

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F. Anchors shall be made of wood or other biodegradable material, a minimum length of 6", and have a notch at the end to secure the matting.

2.06 EROSION CONTROL FABRIC ALONG SLOPES

A. All slopes 4H:1V or steeper, located above bankfull limits, shall be covered with erosion control matting.

1. Erosion control fabric shall be C125 BN as manufactured by North American Green or approved equal. It shall be 100% biodegradable double net erosion blanket of 100% coconut fiber. Stakes shall be 4 to 6 inches in length and biodegradable. No metal pins or staples allowed.

B. All slopes flatter than 4H:1V, located above bankfull limits, shall be covered with Mulch Conforming to Section 32 92 10 Seeding and Planting.

PART 3 EXECUTION

3.01 RESPONSIBILITY

A. It is the Contractor's responsibility to review the Plans, Specifications, Geotechnical Borings and existing site conditions prior to bidding to ascertain the extent of the work requiring ground support systems.

3.02 GENERAL EXCAVATION

A. Perform all excavation of every description, regardless of the type, nature, or condition of material encountered, as specified, shown, and required to accomplish the construction in accordance with Section 31 23 00 Earthwork.

B. Perform all earthwork to the lines, grades and cross-sections as shown on the Plans or established by the Engineer, with the proper allowance for all materials shown on the Plans. Place the excavated material only within the approved working area. Do not place excavated material in flowing or standing water. Do not obstruct private or public roadways or streets. Conform to all Federal, State, and local codes governing safe loading of excavations with excavated material. Excavated material which is not used for backfill shall be stockpiled on site for reuse. Material not suitable for reuse and all excess material shall be disposed of conforming to Section 31 23 00 Earthwork.

C. The method of excavation is at the Contractors option; however, no explosives shall be used. Excavation that cannot be accomplished without endangering existing or new structures shall be done with hand tools.

3.03 LIMITS OF EXCAVATION

A. Excavate to the depth and limits, as necessary to install the quarry stone bank revetment as shown in the Plans. Do not carry excavation for subgrade and at structures deeper than necessary to complete construction as shown on the Plans. Excavation carried below the grade lines shown or established by the Engineer shall be replaced with approved compacted material. The Contractor shall bear all costs for correcting over-excavated areas. The subgrade for the bank revetment shall be free of all protruding roots, branches, rocks or other sharp objects. The Contractor shall bear all costs associated with the

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removal and disposal of sediment that accumulates on the stream bed during the construction of the bank revetment.

3.04 QUARRY STONE BANK

A. NON WOVEN GEOTEXTILE

1. Place nonwoven geotextile fabric at locations shown on the Plans. Fabric shall be cut to the proper width prior to installation. Provide 12-inch minimum overlap. Anchor the fabric at the excavation bottom with Filter Gravel. Anchor fabric to the excavation wall before placing Filter Gravel. Care shall be taken to prevent wrinkles, folding, and tearing of the fabric during placement of the materials.

B. FILTER GRAVEL

1. Install filter gravel to the line, grade, and minimum layer thickness shown on the Plans. Compact the graded crushed aggregate to 90 percent of maximum density as determined by AASHTO T 180. Accomplish supplementary compaction where required with mechanical vibrating or impact tampers

C. BEDDING STONE

1. Bedding stone shall be placed as shown on the Plans. Minimum thickness of the stone materials or layer shall not be less than shown on the Plans. The stone pieces shall be placed to minimize voids in the bedding layer and to avoid disturbing the filter gravel. The bedding layer shall provide a stable and level surface upon which to place the quarry stone.

D. QUARRY STONE

1. The rectangular quarry stone slabs shall be placed to the line and grade as shown on the Plans. The stones shall be carefully placed to minimize movement of the bedding material and to maintain a level surface. The stones shall be placed in a manner as to ensure that no drill/core holes are visible on any vertical stone faces, without gaps in excess of 3-inches. Joints between stones from one course to the next shall be staggered.

2. Quarry Stone Revetment shall consist of one, two or more stones with the vertical dimensions necessary to achieve the top elevation shown on the Plans. Stones shall be overlapped perpendicular to the direction of stream flow as shown.

3. Quarry Stone Revetment shall be terminated with Heavy Riprap with Imported Topsoil in locations as shown on the Plans. After excavating to the extent and grades indicated on the plans and placing Non-woven Geotextile and Filter Gravel, Heavy Riprap may be machine placed with suitable equipment that will not disturb the under layer, or damage surrounding elements. Heavy Riprap shall be placed in two lifts, and filled with Imported Topsoil, as described in Section 32 92 10 Seeding and Planting. Choke Stone Material shall be placed to fill all voids, as shown on the plans.

4. Quarry Stone Steps shall be placed in the location and grades as shown on the Plans. The stones shall be carefully placed and embedded as necessary to minimize movement of the adjacent surface and to maintain a level top surface. The stones shall be placed in a manner as to ensure that no drill/core holes are visible on any vertical stone faces. Top of adjacent stone units shall not exceed 1-inch in height

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variation. Stone shall appear naturally weathered; cut faces shall not be visible; and sharp edges shall not be exposed. Contractor shall field verify locations of stone with Engineer prior to construction.

E. TOLERANCES

1. Construct all components of the channel to the lines and grade shown on the Plans. Tolerance in the horizontal plane shall be +/- 0.5 ft. Final elevations shall be +/-0.1 ft. of those shown on the Plans. Surface elevations of stone materials shall be measured at the average surface height, which is defined as the elevation midway between the lowest and highest points of the exposed stone the surface. No stone shall deviate more than 0.5 ft. from the average surface elevation.
2. Spaces between quarry stones shall be a maximum of 3-inches. Stones shall be saw cut to the appropriate width and angle to meet these requirements.
3. The Contractor shall keep written survey notes of final surveyed elevations of the quarry stone bank revetment at minimum 50-foot intervals along the channel. These records shall be available to the Engineer at all times upon his request, and the Contractor shall submit copies of the survey notes to the Engineer on a weekly basis.

3.05 RIPRAP ADJACENT TO QUARRY STONE BANK

A. Excavate to the line and grades shown in the Drawings and in accordance with Section 31 23 00 Earthwork.

B. Place geotextile fabric in accordance with WisDOT Standard Specifications Section 645.3

C. Heavy riprap shall be machine placed in accordance with WisDOT Standard Specifications Section 606.3. Place riprap and topsoil in lifts to ensure all voids between riprap stones are filled with topsoil. Mechanically mix each lift to ensure all voids are filled.

D. Place final lift of topsoil at a minimum depth of 4 inches and seed according to Section 32 92 10 Seeding and Planting and the Drawings.

3.06 VEGETATED RIPRAP BANK AT CONFLUENCE

A. Excavate to the line and grades shown in the Drawings and in accordance with Section 31 23 00 Earthwork.

B. Place geotextile fabric in accordance with WisDOT Standard Specifications Section 645.3

C. Place footer boulders along the toe of the proposed bank. Footer boulders shall be trenched into the channel bed a minimum of 1 foot. Void space between footer boulders shall not exceed 2 inches.

D. Heavy riprap shall be machine placed in accordance with WisDOT Standard Specifications Section 606.3. Place riprap and topsoil in lifts to ensure all voids between riprap stones are filled with topsoil. Mechanically mix each lift to ensure all voids are filled.

E. Place final lift of topsoil at a minimum depth of 4 inches and seed according to Section 32 92 10 Seeding and Planting and the Drawings.

3.07 ENERGY DISSIPATOR

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A. Place 3-inch base aggregate on the channel bed at a minimum thickness of 12 inches. Compact base aggregate to 90 percent maximum density as determined by AASHTO T 180

B. Heavy riprap shall be machine placed in accordance with WisDOT Standard Specifications Section 606.3. Shape slopes according to the details and grading plan within the Drawings.

3.08 BANK PROTECTION

A. Following excavation and grading of the channel banks and channel bed, topsoil material shall be placed on the channel banks at a minimum depth of 12 inches. Topsoil material shall be lightly compress with the excavator bucket to for slopes conforming to the typical sections.

B. Seed shall be applied according to Section 32 92 10 Seeding and Planting and the Drawings. Straw shall be hand broadcasted, covering the ground to secure seed.

C. Place coir matting by unrolling the matting parallel to the channel alignment. Care shall be taken to preserve the required line, grade, and cross section area. Prior to installing the coir matting, remove stones, soil clods, and debris that will prevent direct contact with the topsoil.

D. Coir matting edges shall be overlapped a minimum of 6 inches and in the downstream direction to prevent uplift from flow of water.

E. Installation of coir matting shall be done prior to installation of glide, riffle, or riprap materials to allow for the coir matting to be anchored.

3.09 EROSION CONTROL FABRIC ALONG SLOPES

A. Install per manufacturers recommended and according to WisDOT Standard Specifications Section 628.3.2.

END OF SECTION

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SECTION 35 43 60

CONSTRUCTED CHANNEL MATERIALS

PART 1 GENERAL

1.01 SUMMARY

A. The work covered by this section consists of all items related to the construction of glides, riffles, and boulder brush runs including but not limited to the placement of boulders, small boulder/cobble, and gravels, finish grading of bed slopes and the stream channel.

B. Constructed Glides, Riffles, and Runs are designed to provide grade control for existing and newly constructed channel sections.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Refer to Section 01 20 00.

1.03 REFERENCE STANDARDS

A. 35 01 55 Channel Grading
B. 35 42 10 Watercourse Channel Banks

1.04 Submittals

A. The Contractor shall submit certifications that the following materials conform to the material specifications.
    i. Glide material
    ii. Boulders and gravels associated with Riffle and Boulder Brush Runs.

PART 2 PRODUCTS

2.01 MATERIALS

A. The mixture of materials for Glides, Riffles, and Runs are described in the notes and table on the Drawings.

B. Glide

1. 3/8" to 3/4" rounded washed stone free of fines conforming to AASHTO No. 67

C. Riffle and Run

1. Boulders shall be granite fieldstone boulders and may be either on-site salvaged boulders in good condition or imported from off site. Imported boulders shall be 24"+ Wisconsin Granite Fieldstone Boulders provided by Halquist Stone or approved equal.

2. Small boulders/cobble shall be imported Field Stone shall be 6"-12" Wisconsin Granite Fieldstone Boulders provided by Halquist Stone or approved equal.

3. Coarse and Fine Gravels shall conform to WisDOT Standard Specification 305 Dense Graded Base.

4. Brush shall consist of a combination of hardwood and conifer branches, limbs, and tops meeting ranging from 1 to 6 inches. Brush should be hard, dense, and free of rot.

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D. Bank Protection

1. Refer to Section 35 42 10 Watercourse Channel Bank.

E. Channel Foundation Stabilization

1. Material shall conform to Foundation Stabilization material as specified in Section 31 23 00 Earthwork.

F. Toe Wood

1. Refer to Section 35 43 70 Toe Wood.

PART 3 EXECUTION

3.01 General

A. The grades, slopes, and lengths of the constructed bed features will be in accordance with the Plan and Profile sheets. All excavation shall conform to Section 31 23 00 Earthwork.

B. Structure installation and channel grading sequences may vary based on structure location and the Contractor's means and methods. Bank protection must be installed prior to installation of Glide or Riffle materials.

C. Typical Construction Sequence:

1. Refer to the channel sequence notes on the Drawings

3.02 Channel Foundation Stabilization

A. In locations where channel foundation is unsuitable to support the channel materials, Foundation Stabilization material shall be installed in accordance with Section 31 23 00 Earthwork.

3.03 Glide

A. Install glide materials conforming to WisDOT Standard Specification 310.3

3.03 Riffle

A. Mix small boulders, coarse gravel, and fine gravel conforming to the channel structure notes on the Drawings. Materials shall be mixed on-site, not at the quarry.

B. Excavate channel according to Section 35 01 55 Channel Grading.

C. Place and grade riffle materials in a manner that creates a variability including, small pools, turbulent areas, and/or "high spots" randomly across the entire channel bed area. Transitions will have variability, as previously described, with no abrupt "Jump" (transition) between bed features.

D. Bucket, rake and/or otherwise adjust placed rock material, as needed, to create a thalweg within the riffle width in order that the finished cross section will match the shape and dimensions shown on the typical section.

E. Boulders shall be placed at locations along the channel corridor approved by the Engineer. They shall be placed in a stable orientation with approximately one-third of their diameter buried. They shall be placed in locations that will not result in flow-induced scour.

F. The riffle structure shall have positive slope from upstream to downstream according to elevations and slopes shown on the Drawings.

3.04 Boulder Brush Run

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A. Mix boulder, small boulders, and coarse gravels conforming to the channel structure notes on the Drawings. Materials shall be mixed on-site, not at the quarry.

B. Excavate channel according to Section 35 01 55 Channel Grading.

C. Place brush and rock mixture in layers within the excavation to create a well-blended mixture. Utilize the excavator bucket to mix rock into the brush layer and compact to eliminate all voids. Layer thickness may vary depending on size of brush but a lift thickness of one foot is recommended.

3.05 Bank Protection

A. Refer to Section 35 42 10 Watercourse Channel Bank.

3.06 Toe Wood

A. Refer to Section 35 43 70 Toe Wood.

3.07 Tolerances

A. Finish ground surface shall be within the tolerances stated in the typical cross section notes on the Drawings.

END OF SECTION

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SECTION 35 43 70
TOE WOOD

PART 1 GENERAL

1.01 SUMMARY

A. The work covered by this section consists of all items related placement of footer logs, woody debris, soil, and coir lifts in order to construct toe wood. All work will conform to the locations, lines, grades, and details shown on the Drawings.

B. Toe wood is a stream bank stabilization structure comprised of woody debris (tree trunks, limbs, root mat, debris, etc.), rocks, vegetation, and soil. Toe wood is constructed in a series of lifts and installed continuously along the outside of meander bends below the inner berm. The structure is used to direct stream flow away from the outside of the meander bend and improve aquatic habitat.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Refer to Section 01 20 00.

1.03 REFERENCE STANDARDS

A. 31 23 00 Earthwork
B. 35 42 10 Watercourse Channel Banks

1.04 SUBMITTALS

A. The Contractor shall submit certifications that the following materials conform to the material specifications.

i. Coir matting
ii. Hardwood stakes

PART 2 PRODUCTS

2.01 MATERIALS

A. Toe wood

1. The Owner has procured and stockpiled adequate quantities of wood materials on site for the proposed Toe Wood structures. The Contractor will not be required to provide off-site woody material.

2. The size and mixture of materials for Toe Wood are described in the notes and table on the Drawings.

3. Brush and footer logs

a. Brush and footer logs shall consist of a combination of hardwood and conifer branches, limbs, and tops meeting size requirements shown on the Drawings. All wood material should be hard, dense, and free of rot.

4. Fill

a. Onsite General Fill material from adjacent excavation complying with Section 31 23 00 Earthwork.

b. Free of clumps greater than 2 inches.

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B. COIR LIFTS

1. Coir matting shall be C700 BN as manufactured by North American Green or approved equal. It shall be 100% biodegradable coir net with 100% coconut fiber matrix.

2. Hardwood stakes used to secure the coir lifts shall be made of dense hardwood and nominal dimensions of 2" by 2" by 18" in length. One end shall be beveled to a point to facilitate driving through the coir mat and into the underlying materials.

3. Anchors used to maintain matting and ground contact shall be of a wood or biodegradable material, a minimum of 6" long and, and have notch or nail on the end to secure the matting.

4. Fill material shall be General Fill complying with Section 31 23 00 Earthwork.

2.02 EQUIPMENT

A. The Contractor shall use standard heavy construction equipment to perform the work as shown on the Drawings. Toe Wood construction typically requires that a hydraulic thumb be fitted to the bucket of an excavator for easier placement of logs and woody debris.

PART 3 EXECUTION

3.01 TOE WOOD

A. The lengths of the structure will be in accordance with the Plan sheets.

B. Structure installation and channel grading sequences may vary based on structure location and the Contractor's means and methods.

C. Typical Toe Wood construction sequence:

1. Excavate outside bank of the proposed channel to install toe wood structure in locations shown of the drawings. Excavation shall extend 10 feet beyond the toe of the outside bank or as necessary to install footer logs.
2. The contractor shall install footer logs at a sufficient depth such that the woody material (trunks, limbs, roots, etc.) will lay on-top of and across to the footer log in accordance with the Detail shown on the Drawings. The footer log shall be pressed into subgrade using the bucket of the excavator.
3. After installation of the footer log, install woody debris in between and across the footer logs. Woody debris shall be installed in layers with on-site soils to minimize voids and create a consistency conforming to the notes for the toewood detail on the Drawings.
4. The contractor shall use the excavator and hydraulic thumb to achieve this consistency.
5. It is anticipated that the on-site soils will come from adjacent excavations and not imported materials.
6. Smooth final lift of woody debris and on-site soils to create a level surface to install the coir lifts.

D. The Contractor shall finish grade the adjacent streambed, channel banks, and/or floodplain to provide a smooth even grade transition between structure components and the proposed ground surface.

3.02 COIR LIFTS

A. Unroll coir matting perpendicular to the channel alignment. Coir lift shall extend a

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minimum of 8 feet, or to the excavation limits, and staked using a hardwood stake. Provide enough loose matting to be rolled back on top of the fill material.

B. Place 6 inches of fill material on top of coir matting and compact with the excavator bucket or by other mechanical methods.

C. Pull loose coir matting over top of the fill material, extending to match the limits of the bottom mat. Coir matting shall be pulled tight to prevent sloughing of the fill material and match channel typical section dimensions.

D. Stake edge of matting using a hardwood stake at 3 feet centers.

E. Stake center of matting using anchors at a minimum of 12" centers perpendicular to the channel and 3' centers parallel to the channel.

F. Place additional coir lifts as shown on the Drawings. Stagger each coir lift so there is a minimum of 2 feet between edges of coir matting.

3.03 TOLERANCES

A. The finished structures will be within plus or minus 0.2 feet of the proposed elevations and plus or minus 0.5 feet horizontally as shown on the Drawings.

END OF SECTION

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APPENDIX A
GEOTECHNICAL BORING LOGS

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SUBSURFACE LOG

Project Number	193806812	Location	N 385969.07, E 2481912.98
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	G-1
County	Elm Grove, Wisconsin	Surface Elevation	742.9 ft
Project Type	Community Development	Date Started	9/18/24
Supervisor	R. Klein	Driller	GESTRA
Logged By	W. Cull		

Total Depth: 40.0 ft | Completed: 9/18/24 | Depth to Water: Dry | Date/Time: 9/18/24 | Depth to Water: N/A | Date/Time: N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
742.9'	0.0'	Top of Hole							
742.4'	0.5'	Asphalt							
741.9'	1.0'	FILL - SAND and GRAVEL: brown		SPT-1	1.0' - 2.5'	1.0	7-4-3	9	
741.6'	1.3'	FILL - SAND and GRAVEL (SW): beige, subrounded, moist							
		FILL - CLAYEY SAND with Gravel (SC): brown, moist		SPT-2	6.0' - 7.5'	0.3	3-5-10	15	
735.4'	7.5'	GRAVELLY SAND (SW): brown and beige, fine to medium, subrounded, moist		SPT-3	8.5' - 10.0'	1.0	6-14-14	10	
731.9'	11.0'	SILTY CLAY (CL-ML): gray and brown, moist		SPT-4	11.0' - 12.5'	1.5	4-6-8	17	
729.4'	13.5'	SILTY SAND (SM): gray and brown, fine, wet 14.5' - 14.8': clay seam		SPT-5	13.5' - 15.0'	1.0	5-5-6	25	G: 1.6%, S: 80.7%, Fines: 17.7%
726.9'	16.0'	SAND (SW): gray and brown, fine to coarse, rounded, wet, some silt		SPT-6	16.0' - 17.5'	1.0	3-5-6	--	
723.9'	19.0'	SAND (SP): gray, fine to medium, wet, some gravels		SPT-7	18.5' - 20.0'	1.5	3-5-7	--	
				SPT-8	23.5' - 25.0'	0.8	4-4-5	--	

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ, FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385969.07, E 2481912.98
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	G-1
Total Depth	40.0 ft		

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		SAND (SP): gray, fine to medium, wet, some gravels *(Continued)*		SPT-9	28.5' - 30.0'	1.0	8-7-8	--	
				SPT-10	33.5' - 35.0'	0.8	6-6-7	--	
704.4'	38.5'								
702.9'	40.0'	SILTY CLAY (CL): gray, wet		SPT-11	38.5' - 40.0'	1.5	6-6-7	19	

No Refusal /
Bottom of Hole

Cave Depth: 12 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ, FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385900.78, E 2481925.56
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-2**
County	Elm Grove, Wisconsin	Surface Elevation	742.4 ft
Project Type	Community Development	Date Started	9/17/24
Supervisor	R. Klein	Driller	GESTRA
Logged By	W. Cull		

Total Depth: 40.0 ft | Completed: 9/17/24 | Depth to Water: Dry | Date/Time: 9/17/24 | Depth to Water: N/A | Date/Time: N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
742.4'	0.0'	Top of Hole							
742.1'	0.3'	Asphalt							
741.8'	0.6'	FILL - SAND and GRAVEL: brown		SPT-1	1.0' - 2.5'	0.8	2-3-7	16	
738.9'	3.5'	FILL - SILTY CLAY (CL): dark brown, moist, some gravels		SPT-2	3.5' - 5.0'	0.8	3-5-17	15	
736.4'	6.0'	FILL - GRAVELLY SAND (SW): dark brown, fine to medium, subrounded, moist, some clay		SPT-3	6.0' - 7.5'	1.5	2-3-4	28	LL: 45, PL: 19, PI: 26
733.4'	9.0'	FILL - SILTY CLAY (CL): dark brown to black, moist, some silt, some organics		SPT-4	8.5' - 10.0'	1.3	12-20-27	38	
731.4'	11.0'	GRAVELLY SAND (SW): orange and brown, fine to medium, subrounded, moist		SPT-5	11.0' - 12.5'	1.5	4-7-9	16	
728.9'	13.5'	CLAYEY SILT (CL-ML): gray and brown, moist		SPT-6	16.0' - 17.5'	1.0	6-5-6	--	
		SAND (SP): gray and brown, fine, wet, trace gravel		SPT-7	18.5' - 20.0'	1.5	5-7-8	--	
				SPT-8	23.5' - 25.0'	1.0	12-14-15	--	

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ, FMSM-GRAPHIC LOG.GDT 12/12/24

12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385900.78, E 2481925.56
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	G-2
Total Depth	40.0 ft		

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		SAND (SP): gray and brown, fine, wet, trace gravel *(Continued)*		SPT-9	28.5' - 30.0'	1.5	13-14-22	--	
709.4'	33.0'								
		SAND (SW): gray, fine to coarse, subrounded, wet, some gravel		SPT-10	33.5' - 35.0'	1.5	25-19-17	--	
703.6'	38.8'								
702.4'	40.0'	CLAY (CH): gray and brown, wet, silt seam from 39.4' to 39.6'		SPT-11	38.5' - 40.0'	1.0	13-8-7	17	

No Refusal /
Bottom of Hole

Cave Depth: 12 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ_FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385903.18, E 2481990.12
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-4**
County	Elm Grove, Wisconsin	Surface Elevation	741.8 ft
Project Type	Community Development	Date Started	9/17/24
Supervisor	R. Klein	Driller	GESTRA
Logged By	W. Cull		

Total Depth: 30.0 ft | Completed: 9/17/24 | Depth to Water: Dry | Date/Time: 9/17/24 | Depth to Water: N/A | Date/Time: N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
741.8'	0.0'	Top of Hole							
741.4'	0.4'	Asphalt							
740.8'	1.0'	FILL - SAND and GRAVEL: brown		SPT-1	1.0' - 2.5'	1.3	21-17-5	--	
		FILL - GRAVELLY SAND (SW): brown and beige, fine to medium, subrounded, moist		SPT-2	3.5' - 5.0'	0.5	4-3-2	--	
735.8'	6.0'								
		FILL - SILTY CLAY (CL): red and brown, moist, some sand		SPT-3	6.0' - 7.5'	1.5	3-2-3	16	
733.3'	8.5'								
		CLAYEY SAND with Gravel (SC): dark brown, fine to medium, moist		SPT-4	8.5' - 10.0'	1.0	7-4-6	19	G: 20%, S: 59.8%, Fines: 20.2%
730.8'	11.0'								
		SILTY CLAY (CL): brown, wet		SPT-5	11.0' - 12.5'	1.0	4-1-3	21	LL: 25, PL: 14, PI: 11
728.3'	13.5'								
		SAND (SP): brown and gray, fine to medium, wet,		SPT-6	13.5' - 15.0'	1.0	4-4-6	--	
				SPT-7	16.0' - 17.5'	1.5	4-6-10	--	
				SPT-8	18.5' - 20.0'	1.5	2-2-3	--	
				SPT-9	23.5' - 25.0'	0.5	15-12-7	--	

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ, FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number 193806812 Location N 385903.18, E 2481990.12

Project Name Elm Grove Underwood Creek Daylight Boring No. **G-4** Total Depth 30.0 ft

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
713.8'	28.0'	SAND (SP): brown and gray, fine to medium, wet, *(Continued)*							
711.8'	30.0'	SAND (SW): gray, medium to coarse, rounded, wet, some gravels		SPT-10	28.5' - 30.0'	0.8	9-8-7	--	
		No Refusal / Bottom of Hole							

Cave Depth: 11 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY ELM-GROVE_DAYLIGHTING.GPJ FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385908.81, E 2482047.48
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-5** Total Depth 30.0 ft
County	Elm Grove, Wisconsin	Surface Elevation	742.0 ft
Project Type	Community Development	Date Started	9/16/24 Completed 9/16/24
Supervisor	R. Klein Driller GESTRA	Depth to Water	11.0 ft Date/Time 9/16/24
Logged By	W. Cull	Depth to Water	N/A Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
742.0'	0.0'	Top of Hole							
741.7'	0.3'	Asphalt							
741.0'	1.0'	FILL - COBBLES: gray							
		FILL - GRAVELLY SAND (SW): orange brown and beige, fine to medium, subrounded, moist		SPT-1	1.0' - 2.5'	1.0	5-6-7	10	
738.5'	3.5'	FILL - FOUNDRY SAND (SW): black with red, fine to coarse, cinders and coal pieces, trace gravel, moist		SPT-2	3.5' - 5.0'	1.3	4-7-5	15	
737.0'	5.0'	FILL - CLAYEY SAND with Gravel (SC): dark brown and black, fine to medium, moist		SPT-3	6.0' - 7.5'	1.5	2-2-4	35	
733.0'	9.0'	GRAVELLY SAND (SW): orange brown and beige, fine to coarse, rounded, moist, some clay		SPT-4	8.5' - 10.0'	1.5	7-10-13	23	
				SPT-5	11.0' - 12.5'	1.0	16-23-21	10	
728.5'	13.5'	CLAYEY SILT (CL-ML): gray and brown, wet		SPT-6	13.5' - 15.0'	1.0	2-4-4	19	
727.0'	15.0'	SAND (SP): gray, medium, subrounded, wet		SPT-7	16.0' - 17.5'	1.0	8-7-8	--	
				SPT-8	18.5' - 20.0'	1.0	5-6-6	--	
719.0'	23.0'	SAND (SW): gray, fine to coarse, subrounded, wet, some gravel		SPT-9	23.5' - 25.0'	0.5	5-6-6	--	

STANTEC\FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number 193806812 Location N 385908.81, E 2482047.48

Project Name Elm Grove Underwood Creek Daylight Boring No. **G-5** Total Depth 30.0 ft

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
		SAND (SW): gray, fine to coarse, subrounded, wet, some gravel *(Continued)*							
712.0'	30.0'			SPT-10	28.5' - 30.0'	0.8	13-9-10	--	

No Refusal /
Bottom of Hole

Cave Depth: 11 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY ELM-GROVE_DAYLIGHTING.GPJ FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385847.23, E 2482133.51
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-6** Total Depth 20.0 ft
County	Elm Grove, Wisconsin	Surface Elevation	741.4 ft
Project Type	Community Development	Date Started	9/16/24 Completed 9/16/24
Supervisor	R. Klein Driller GESTRA	Depth to Water	Dry Date/Time 9/16/24
Logged By	W. Cull	Depth to Water	N/A Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
741.4'	0.0'	Top of Hole							
741.1'	0.3'	Asphalt							
740.4'	1.0'	FILL - SAND and GRAVEL: brown and dark brown		SPT-1	1.0' - 2.5'	1.3	9-9-9	8	
738.4'	3.0'	FILL - SAND and GRAVEL (SW): beige and brown, fine to coarse, subrounded, moist, some clay		SPT-2	3.5' - 5.0'	1.0	13-11-4	70	
736.9'	4.5'	FILL - GRAVELLY SAND (SW): orange brown and beige, fine to coarse, subrounded, moist		SPT-3	6.0' - 7.5'	1.0	4-5-9	14	Non Plastic
734.9'	6.5'	FILL - SILT (ML): black, moist, some organics		SPT-4	8.5' - 10.0'	1.5	9-10-11	8	
732.9'	8.5'	FILL - GRAVELLY SILT (ML): brown and beige, moist, some sand, some roots		SPT-5	11.0' - 12.5'	1.0	4-5-5	--	
730.4'	11.0'	GRAVELLY SAND (SW): dark gray and beige, fine to medium, rounded, moist, some clay		SPT-6	13.5' - 15.0'	1.5	4-5-5	--	
725.4'	16.0'	SAND (SP): brown and beige, fine to medium, subrounded, moist to wet, trace gravel		SPT-7	16.0' - 17.5'	1.5	2-3-4	--	
721.4'	20.0'	SAND (SW): gray, fine to coarse, subrounded, wet		SPT-8	18.5' - 20.0'	1.5	3-3-5	--	
		No Refusal / Bottom of Hole							

Case Depth: 11 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ, FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385805.53, E 2482229.62
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-7** Total Depth 20.0 ft
County	Elm Grove, Wisconsin	Surface Elevation	741.6 ft
Project Type	Community Development	Date Started	9/16/24 Completed 9/16/24
Supervisor	R. Klein Driller GESTRA	Depth to Water	Dry Date/Time 9/16/24
Logged By	W. Cull	Depth to Water	N/A Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
741.6'	0.0'	Top of Hole							
741.1'	0.5'	Asphalt							
740.6'	1.0'	FILL - SAND and GRAVEL: brown and dark brown		SPT-1	1.0' - 2.5'	0.8	9-9-6	10	
738.1'	3.5'	FILL - SAND and GRAVEL (SW): beige and brown, fine to coarse, subrounded, moist, some clay		SPT-2	3.5' - 5.0'	0.8	14-13-8	43	
737.1'	4.5'	FILL - GRAVEL (GW): beige, fine to coarse, subrounded, some sand		SPT-3	6.0' - 7.5'	0.8	16-29-23	8	
735.6'	6.0'	FILL - ORGANIC CLAY (OL): black, some sand		SPT-4	8.5' - 10.0'	1.0	9-10-10	--	
733.6'	8.0'	FILL - GRAVELLY CLAY (CL): yellow brown and beige		SPT-5	11.0' - 12.5'	0.8	15-19-11	--	
728.1'	13.5'	GRAVELLY SAND (SW): gray and orange brown, fine to medium, subrounded, moist		SPT-6	13.5' - 15.0'	1.0	5-5-4	--	
		SAND (SW): orange brown, fine to coarse, subrounded, wet, trace gravel		SPT-7	16.0' - 17.5'	1.3	3-4-5	--	
721.6'	20.0'			SPT-8	18.5' - 20.0'	1.0	6-5-6	--	

No Refusal /
Bottom of Hole

Cave Depth: 10 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ, FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385746.23, E 2482294.14
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	G-8
County	Elm Grove, Wisconsin	Surface Elevation	740.7 ft
Project Type	Community Development	Date Started	9/18/24
Supervisor	R. Klein	Driller	GESTRA
Logged By	W. Cull		

Total Depth: 40.0 ft
Completed: 9/18/24
Depth to Water: 13.0 ft
Date/Time: 9/18/24
Depth to Water: N/A
Date/Time: N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
740.7'	0.0'	Top of Hole							
740.4'	0.3'	Asphalt							
739.7'	1.0'	FILL - SAND and GRAVEL: dark brown		SPT-1	1.0' - 2.5'	1.0	5-4-3	--	
737.2'	3.5'	FILL - GRAVELLY SAND (SW): dark brown and beige, fine to medium, subrounded, moist, some wood and black coal pieces		SPT-2	3.5' - 5.0'	0.5	4-2-4	43	Organic Content: 16.3%
735.7'	5.0'	FILL - ORGANIC CLAY (OL): black, moist		SPT-3	6.0' - 7.5'	1.0	5-8-9	--	
		GRAVELLY SAND (SW): orange brown and beige, fine to medium, subrounded, moist, some clay		SPT-4	8.5' - 10.0'	1.0	8-11-9	--	
729.7'	11.0'	SAND (SW): orange brown to gray, fine to coarse, subrounded, moist to wet		SPT-5	11.0' - 12.5'	1.0	4-5-6	--	
				SPT-6	13.5' - 15.0'	1.0	4-4-5	--	
				SPT-7	16.0' - 17.5'	1.5	6-6-6	--	
720.7'	20.0'			SPT-8	18.5' - 20.0'	1.0	6-7-6	--	
		SAND (SP): gray, fine to medium, rounded, wet							
715.7'	25.0'			SPT-9	23.5' - 25.0'	1.0	5-6-6	--	

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number 193806812 Location N 385746.23, E 2482294.14

Project Name Elm Grove Underwood Creek Daylight Boring No. **G-8** Total Depth 40.0 ft

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
		GRAVELLY SAND (SW): gray, fine to medium, rounded, wet, some clay							
				SPT-10	28.5' - 30.0'	1.0	4-5-7	--	
				SPT-11	33.5' - 35.0'	1.0	7-8-20	--	
				SPT-12	38.5' - 40.0'	0.5	14-10-6	16	
700.7'	40.0'	No Refusal / Bottom of Hole							

Cave Depth: 14 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385713.89, E 2482278.97
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-9**
County	Elm Grove, Wisconsin	Surface Elevation	740.1 ft
Project Type	Community Development	Date Started	9/17/24
Supervisor	R. Klein	Driller	GESTRA
Logged By	W. Cull		

Total Depth: 40.0 ft | Completed: 9/17/24 | Depth to Water: 8.0 ft | Date/Time: 9/17/24 | Depth to Water: N/A | Date/Time: N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
740.1'	0.0'	Top of Hole							
739.6'	0.5'	Asphalt							
739.1'	1.0'	FILL - SAND and GRAVEL: brown		SPT-1	1.0' - 2.5'	1.0	14-12-9	--	
738.6'	1.5'	FILL - GRAVELLY SAND (SW): black and gray, fine to medium, subrounded, moist, some coal pieces		SPT-2	3.5' - 5.0'	0.5	7-8-9	47	
736.6'	3.5'	FILL - GRAVELL SAND (SW): light brown, fine to medium, rounded, moist		SPT-3	6.0' - 7.5'	1.0	8-6-10	14	
735.1'	5.0'	FILL - ORGANIC CLAY (OL): black, moist		SPT-4	8.5' - 10.0'	1.0	10-11-9	--	
727.1'	13.0'	GRAVELLY SAND (SW): brown and beige, fine to medium, rounded, moist 11' - 11.5': cobbles		SPT-5	11.0' - 12.5'	0.8	28-35-30	--	
724.1'	16.0'	GRAVELLY SAND (SW): orange brown, fine to coarse, rounded, wet		SPT-6	13.5' - 15.0'	0.5	10-14-14	--	
721.6'	18.5'	SAND (SP): gray, coarse, rounded, wet, trace gravel		SPT-7	16.0' - 17.5'	0.8	6-7-7	--	
716.6'	23.5'	GRAVELLY SAND (SW): gray, medium to coarse, rounded, wet		SPT-8	18.5' - 20.0'	0.5	12-11-10	--	
				SPT-9	23.5' - 25.0'	1.0	8-9-10	--	

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number 193806812 Location N 385713.89, E 2482278.97

Project Name Elm Grove Underwood Creek Daylight Boring No. **G-9** Total Depth 40.0 ft

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
		SAND (SP): gray, fine to medium, rounded, wet, trace clay and gravel *(Continued)*							
				SPT-10	28.5' - 30.0'	1.0	4-7-9	18	
				SPT-11	33.5' - 35.0'	0.8	5-6-7	--	
700.1'	40.0'			SPT-12	38.5' - 40.0'	1.5	13-14-13	--	

No Refusal /
Bottom of Hole

Cave Depth: 8 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ_FMSM-GRAPHIC LOG.GDT 12/12/24

12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385652.27, E 2482378.13
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-10**
County	Elm Grove, Wisconsin	Surface Elevation	740.3 ft
Project Type	Community Development	Date Started	9/16/24
Supervisor	R. Klein	Driller	GESTRA
Logged By	W. Cull		

Total Depth: 25.0 ft | Completed: 9/16/24 | Depth to Water: Dry | Date/Time: 9/16/24 | Depth to Water: N/A | Date/Time: N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
740.3'	0.0'	Top of Hole							
739.7'	0.6'	Asphalt							
		FILL - SILTY CLAY (CL): dark brown to brown, moist, some cinder and coal pieces, trace gravel		SPT-1	1.0' - 2.5'	1.3	3-3-4	17	
				SPT-2	3.5' - 5.0'	1.3	4-2-4	20	LL: 46, PL: 22, PI: 24
733.8'	6.5'								
		GRAVELLY SAND (SW): orange brown and beige, fine to soarse, subrounded, moist to wet		SPT-3	6.0' - 7.5'	1.3	11-13-15	19	
				SPT-4	8.5' - 10.0'	1.0	13-18-24	--	
				SPT-5	11.0' - 12.5'	1.0	15-13-10	--	
				SPT-6	13.5' - 15.0'	1.3	4-10-13	--	
724.3'	16.0'								
		SILTY CLAY (CL): gray, wet		SPT-7	16.0' - 17.5'	1.5	3-3-5	16	LL: 26, PL: 13, PI: 13
				SPT-8	18.5' - 20.0'	0.8	12-8-7	18	

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number 193806812 Location N 385652.27, E 2482378.13

Project Name Elm Grove Underwood Creek Daylight Boring No. **G-10** Total Depth 25.0 ft

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
719.3'	21.0'								
		SAND (SW): gray, fine to medium, subrounded, wet							
				SPT-9	23.5' - 25.0'	1.5	4-8-7	--	
715.3'	25.0'								
		No Refusal / Bottom of Hole							

Cave Depth: 10 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY ELM-GROVE_DAYLIGHTING.GPJ FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	N 385592.17, E 2482430.41
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-11**
County	Elm Grove, Wisconsin	Surface Elevation	739.1 ft
Project Type	Community Development	Date Started	9/16/24
Supervisor	R. Klein	Driller	GESTRA
Logged By	W. Cull		

Total Depth: 20.0 ft | Completed: 9/16/24 | Depth to Water: 13.0 ft | Date/Time: 9/16/24 | Depth to Water: N/A | Date/Time: N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
739.1'	0.0'	Top of Hole							
738.1'	1.0'	FILL - GRAVEL							
736.6'	2.5'	FILL - ORGANIC CLAY (OH): black, moist, trace silt		SPT-1	1.0' - 2.5'	1.3	7-5-3	31	Organic Content: 9.4%
732.6'	6.5'	FILL - SILT (ML): light gray, moist, trace fine sand and clay		SPT-2	3.5' - 5.0'	1.3	3-5-10	20	
724.3'	14.8'	SILTY GRAVEL and SAND (GM): orange brown and beige, subrounded, moist to wet		SPT-3	6.0' - 7.5'	1.3	6-12-20	15	
				SPT-4	8.5' - 10.0'	1.0	7-14-18	--	G: 44.2%, S: 43.2%, Fines: 12.6%
				SPT-5	11.0' - 12.5'	0.5	12-23-24	--	
				SPT-6	13.5' - 15.0'	1.0	7-16-8	--	
722.1'	17.0'	CLAY (CH): gray, wet, some silt		SPT-7	16.0' - 17.5'	1.3	2-3-4	24	
720.6'	18.5'	SILT (ML): gray, wet							
719.1'	20.0'	SAND (SW): gray, fine to medium, subrounded, wet		SPT-8	18.5' - 20.0'	1.5	2-4-4	--	
		No Refusal / Bottom of Hole							

Cave Depth: 16 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

STANTEC/FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ_FMSM-GRAPHIC LOG.GDT 12/12/24

SUBSURFACE LOG

Project Number	193806812	Location	(See Boring Layout)
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-12**
County	Elm Grove, Wisconsin	Surface Elevation	
Project Type	Community Development	Date Started	2/28/25
Supervisor	R. Klein	Driller	GESTRA
Logged By	W. Cull		

Total Depth: 21.0 ft
Completed: 2/28/25
Depth to Water: Dry
Date/Time: 2/28/25
Depth to Water: N/A
Date/Time: N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
'	0.0'	Top of Hole							
		TOPSOIL and GRAVELLY CLAY: dark brown, moist, some sand							ground surface at about El. 738 ft
				SPT-1	1.0 - 2.5	0.4	6-6-5	--	
'	3.5'								
		SILT (ML): light gray to brown, moist, trace fine sand		SPT-2	3.5 - 5.0	1.0	9-11-12	8	
'	6.1'								
		GRAVELLY SAND (SW): dark brown to beige, subrounded, moist		SPT-3	6.0 - 7.5	0.8	11-18-25	--	
				SPT-4	8.5 - 10.0	1.3	7-15-18	--	
				SPT-5	11.0 - 12.5	1.0	5-16-17	--	
'	13.5'								footing embedment below channel bottom about 5 ft
		SAND (SP): orange to brown, rounded, wet, some gravel		SPT-6	13.5 - 15.0	0.3	3-9-8	--	
'	16.0'								bridge footing at El. 723 ft
		CLAY (CH): gray, wet, some silt		SPT-7	16.0 - 17.5	1.0	0-0-3	16	
'	18.0'								
		GRAVEL (GP): gray, subrounded to rounded, wet		SPT-8	18.5 - 20.0	1.3	7-7-7	--	

FMSM_LEGACY_ELM-GROVE_DAYLIGHTING.GPJ FMSM.GDT 3/21/25

SUBSURFACE LOG

Project Number	193806812	Location	(See Boring Layout)
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-12**
Total Depth	21.0 ft		

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
'	21.0'								

No Refusal /
Bottom of Hole

Auger tooling sheared off in borehole, abandoned borehole with tooling in place (10-20 feet below grade).
Unable to measure cave and water depth.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

SUBSURFACE LOG

Project Number	193806812	Location	(See Boring Layout)		
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-13**	Total Depth	40.0 ft
County	Elm Grove, Wisconsin	Surface Elevation			
Project Type	Community Development	Date Started	2/28/25	Completed	2/28/25
Supervisor	R. Klein	Driller GESTRA	Depth to Water	16.0 ft	Date/Time 2/28/25
Logged By	W. Cull		Depth to Water	N/A	Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
'	0.0'	Top of Hole							
		SANDY TOPSOIL and FILL: dark brown to black, moist, trace gravel			ground surface at about El. 740 ft				
'	1.5'								
		SANDY CLAY with GRAVEL (CL): light orange to brown, subrounded, moist		SPT-1	1.0 - 2.5	1.0	4-5-9	--	
'	3.5'								
		SILTY CLAY (CL): brown to dark brown, moist		SPT-2	3.5 - 5.0	1.0	5-5-6	14	
'	6.0'								
		CLAYEY SAND (SC): dark brown, fine, trace rounded gravel, moist		SPT-3	6.0 - 7.5	1.0	4-8-10	--	
'	9.0'								
		GRAVELLY SAND (SW): orange brown to beige, subrounded, moist		SPT-4	8.5 - 10.0	1.3	6-24-22	--	
				SPT-5	11.0 - 12.5	0.8	3-16-14	--	
'	13.5'								
		SANDY CLAY (CL): brown and gray, moist		SPT-6	13.5 - 15.0	0.3	6-9-11	10	
					footing embedment below channel bottom about 5 ft				
				SPT-7	16.0 - 17.5	0.0	7-13-16	--	
'	17.5'								
		SAND (SP): gray, fine, uniform, wet			bridge footing at El. 723 ft				
'	19.0'								
				SPT-8	18.5 - 20.0	1.3	4-8-10	--	

FMSM_LEGACY ELM-GROVE_DAYLIGHTING.GPJ FMSM.GDT 3/21/25

Project Number 193806812 Location (See Boring Layout)

Project Name Elm Grove Underwood Creek Daylight Boring No. **G-13** Total Depth 40.0 ft

Lithology		Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
Elevation	Depth								
'	23.0'	GRAVEL (GP): gray, subrounded to rounded, wet *(Continued)*							
'	24.0'	SAND (SP): gray, fine, wet							
'	27.0'	GRAVEL (GW): gray, subrounded to rounded, wet		SPT-9	23.5 - 25.0	0.8	5-6-9	--	
'	29.5'	SAND (SW): gray, fine to coarse, subrounded, wet		SPT-10	28.5 - 30.0	0.8	1-3-5	--	
'	33.0'	GRAVEL (GP): gray, subrounded to rounded, wet							
'	34.5'	SAND (SP): gray, fine to medium, wet		SPT-11	33.5 - 35.0	1.3	7-11-18	--	
'	38.0'	SANDY GRAVEL (GW): gray, rounded, wet							
'	40.0'	SAND (SP): gray, fine to medium, wet		SPT-12	38.5 - 40.0	1.5	12-16-18	--	
		No Refusal / Bottom of Hole							

FMSM_LEGACY ELM-GROVE_DAYLIGHTING.GPJ FMSM.GDT 3/21/25

SUBSURFACE LOG

Project Number	193806812	Location	(See Boring Layout)
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-13**
		Total Depth	40.0 ft

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	

Cave Depth: 19 ft.
Backfilled with bentonite chips.

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

FMSM_LEGACY ELM-GROVE_DAYLIGHTING.GPJ FMSM.GDT 3/21/25

SUBSURFACE LOG

Project Number	193806812	Location	(See Boring Layout)		
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-14**	Total Depth	15.0 ft
County	Elm Grove, Wisconsin	Surface Elevation			
Project Type	Community Development	Date Started	2/28/25	Completed	2/28/25
Supervisor	R. Klein	Driller GESTRA	Depth to Water	Dry	Date/Time 2/28/25
Logged By	W. Cull		Depth to Water	N/A	Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
'	0.0'	Top of Hole							
		FILL - SANDY CLAY: brown to black, moist, some gravel		SPT-1	1.0 - 2.5	0.4	4-3-4	--	
'	3.5'								
		SILTY CLAY (CL): yellow to brown, moist		SPT-2	3.5 - 5.0	0.8	2-3-4	17	
'	6.0'								
		ORGANIC CLAY (OH): dark gray, moist, some silt		SPT-3	6.0 - 7.5	1.0	2-2-3	42	
'	7.5'								
		SAND (SP): yellow to brown, fine to medium, subrounded, moist							
'	9.0'								
		CLAYEY SILT (CL-ML): gray, some gravel		SPT-4	8.5 - 10.0	1.0	2-5-7	14	
'	11.5'								
		GRAVELLY SAND (SW): orange brown to beige, subrounded, moist		SPT-5	11.0 - 12.5	1.0	3-9-14	--	
'	13.5'								
		SANDY GRAVEL (GW): orange brown to beige, subrounded, moist		SPT-6	13.5 - 15.0	0.8	14-17-21	--	
'	15.0'								
		No Refusal / Bottom of Hole							

Cave Depth not measured.
Groundwater not encountered.
Backfilled with bentonite chips.

FMSM_LEGACY ELM-GROVE_DAYLIGHTING.GPJ FMSM.GDT 3/21/25

SUBSURFACE LOG

Project Number	193806812	Location	(See Boring Layout)
Project Name	Elm Grove Underwood Creek Daylight	Boring No.	**G-14**
		Total Depth	15.0 ft

Lithology			Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	
Elevation	Depth	Description	Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	Remarks

Boring location referencing to Wisconsin State Plane Coordinate System South Zone (NAD83).
Ground surface elevation referencing to National Geodetic Vertical Datum of 1929 (NGVD29).

FMSM_LEGACY ELM-GROVE_DAYLIGHTING.GPJ FMSM.GDT 3/21/25

APPENDIX B

PERMITS

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USACE NWP 27: Aquatic Habitat Restoration, Enhancement, and Establishment Activities

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, ST. PAUL DISTRICT
ST. PAUL DISTRICT OFFICE
332 MINNESOTA STREET SUITE E1500
ST. PAUL MINNESOTA 55101

November 5, 2024

Regulatory File No. MVP-2024-01148-ALH

Tom Harrigan
Village of Elm Grove
13600 Juneau Blvd
Elm Grove, WI 53122
tharrigan@elmgrovewi.org

Dear Tom Harrigan,

We are responding to your request for authorization to permanently and temporarily discharge dredged/fill material into aquatic resources for creek realignment. The proposed work is located in Section 25, Township 07N, Range 20E, Waukesha County, Wisconsin.

Project Authorization:

The regulated activities associated with this project are detailed on the attached drawings and include:

- Permanent discharge of dredged/fill material into 850 square feet of wetland and 19,382 square feet of the existing waterway channel for creek restoration and realignment.
- Temporary discharge of dredged/fill material into 1,360 square feet of wetlands and 3,930 square feet of the existing creek for temporary access.

We have determined that these activities are authorized by a Nationwide Permit (NWP), specifically, NWP 27, Aquatic Habitat Restoration, Enhancement, and Establishment Activities. Your project requires verification prior to starting work. This work is shown on the enclosed figures, labeled MVP-2024-01148-ALH Figure 1 through 5 of 5.

Conditions of Your Permit:

You must ensure the authorized work is performed in accordance with the enclosed applicable terms and conditions.

You are also required to complete and return the enclosed Compliance Certification form within 30 days of completing your project. Please email the completed form to the contact identified in the last paragraph.

A change in location or project plans may require re-evaluation of your project. Proposed changes should be coordinated with this office prior to construction. Failure to comply with all terms and conditions of this permit invalidates this authorization and could result in a violation of Section 301 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. You must also obtain all local, State, and other Federal permits that apply to this project.

Water Quality Certification:

You must also comply with the enclosed Water Quality Certification conditions associated with this General Permit.

Permit Expiration:

The 2021 NWP is valid until March 14, 2026 unless modified, suspended, or revoked. If the work has not been completed by that time, you should contact this office to verify that the permit is still valid. Furthermore, if you commence or are under contract to commence this activity before the date of General Permit expiration, modification, or revocation, you have 12 months to complete the activity under the present terms and conditions of the General Permit.

Jurisdictional Determination:

No jurisdictional determination was requested or prepared for this permit decision. While not required for this project, you may contact the Corps representative listed below with any questions concerning jurisdictional determinations.

Contact Information:

If you have any questions, please contact Amy Heffernan of the Brookfield office at 262-359-0251 or by email at Amy.Heffernan@usace.army.mil.

Sincerely,

FOR

Amy Heffernan
Regulatory Specialist

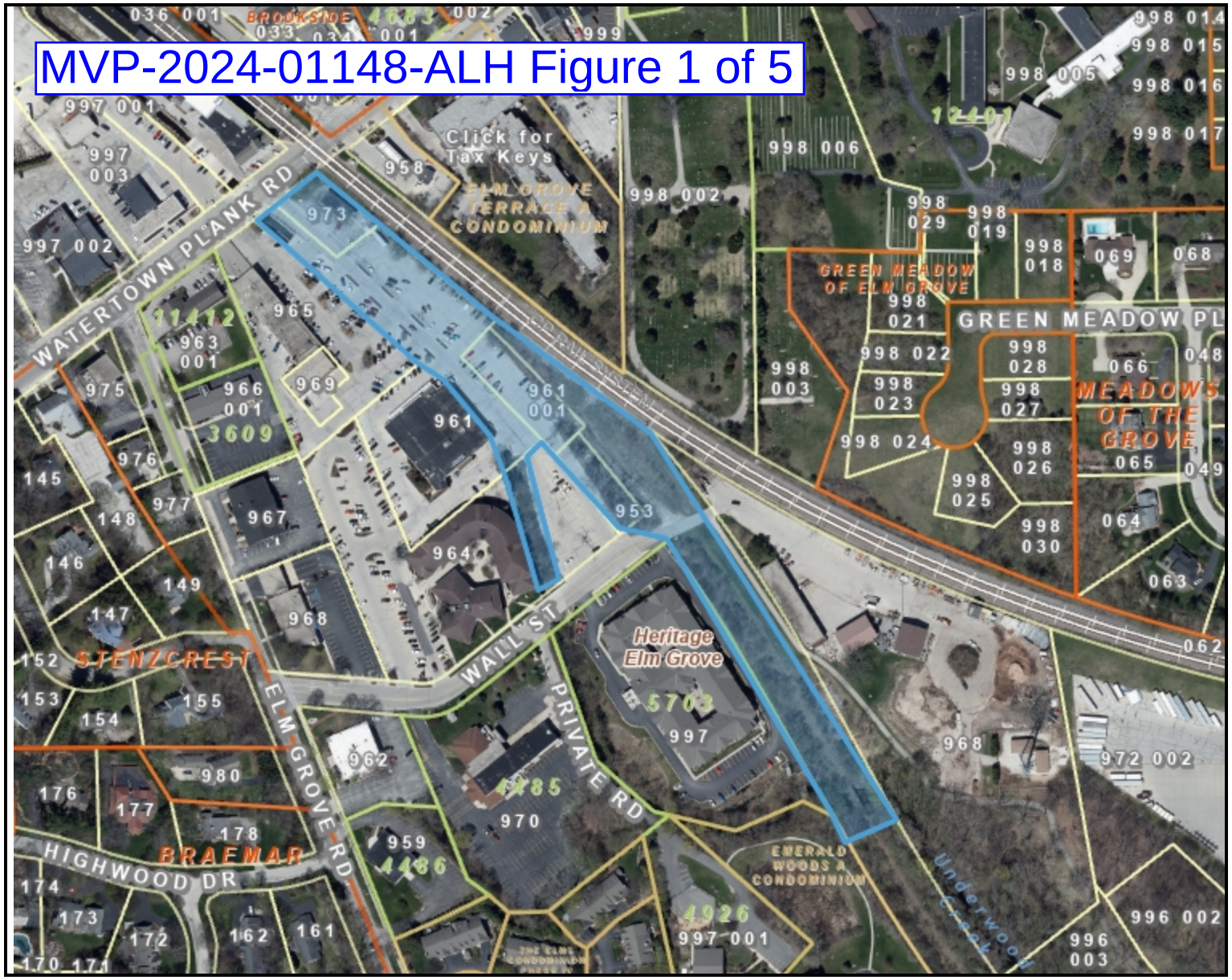
Enclosures
GP Conditions, Project Drawings, WQC, Compliance Certification Form

CC:
Richard Klein, Stantec Consulting Services, Inc.
richard.klein@stantec.com

Alison Masek, WDNR (docket # IP-SE-2024-68-03428 and GP-SE-2024-68-03425)
Alison.masek@wisconsin.gov

MAP WAUKESHA county

Underwood Creek Daylighting Project



Legend

- Municipal Boundary_2K
- Parcel_Dimension_2K
- Note_Text_2K
- Lots_2K
  - Lot
  - Unit
  - General Common Element
  - Outlot
- SimultaneousConveyance
  - Assessor Plat
  - CSM
  - Condominium
  - Subdivision
- Cartoline_2K
  - EA-Easement_Line
  - PL-DA
  - PL-Extended_Tie_line
  - PL-Meander_Line
  - PL-Note
  - PL-Tie
  - PL-Tie_Line
  - <all other values>
- Railroad_2K

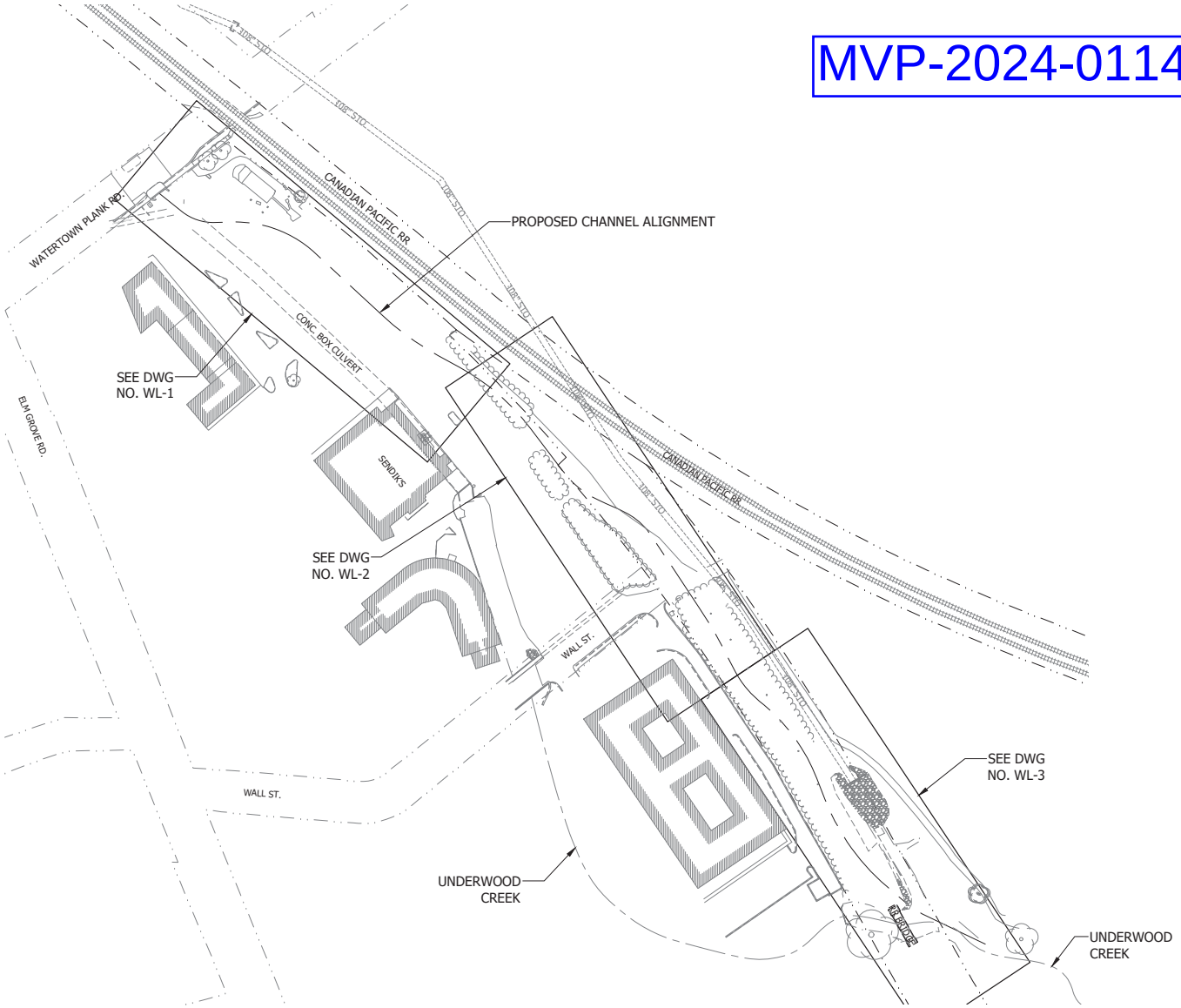
0 285.64 Feet

The information and depictions herein are for informational purposes and Waukesha County specifically disclaims accuracy in this reproduction and specifically admonishes and advises that if specific and precise accuracy is required, the same should be determined by procurement of certified maps, surveys, plats, Flood Insurance Studies, or other official means. Waukesha County will not be responsible for any damages which result from third party use of the information and depictions herein, or for use which ignores this warning.

Notes: PARCEL MAP

Printed: 8/15/2024

MVP-2024-01148-ALH Figure 2 of 5



Underwood Creek Impacts Table

DISPLAY	ITEM	Area (SF)	Area (Acres)	Length (LF)
	Wetlands			
	Temporary Impacts	1360	0.031	185
	Permanent Impacts	4495	0.103	382
	Creation	4292	0.099	1583
	Stream			
	Temporary Impacts	3930	0.09	190
	Permenant Impacts	15,737	0.36	863
	Creation	32,058	0.74	1583

N

0 80' 160'

PRELIMINARY PLAN

DESIGNER M. SIERACKI
DRAWN BY A. ROCK
CHEKCER D. AMUNDSEN
APPROVED R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

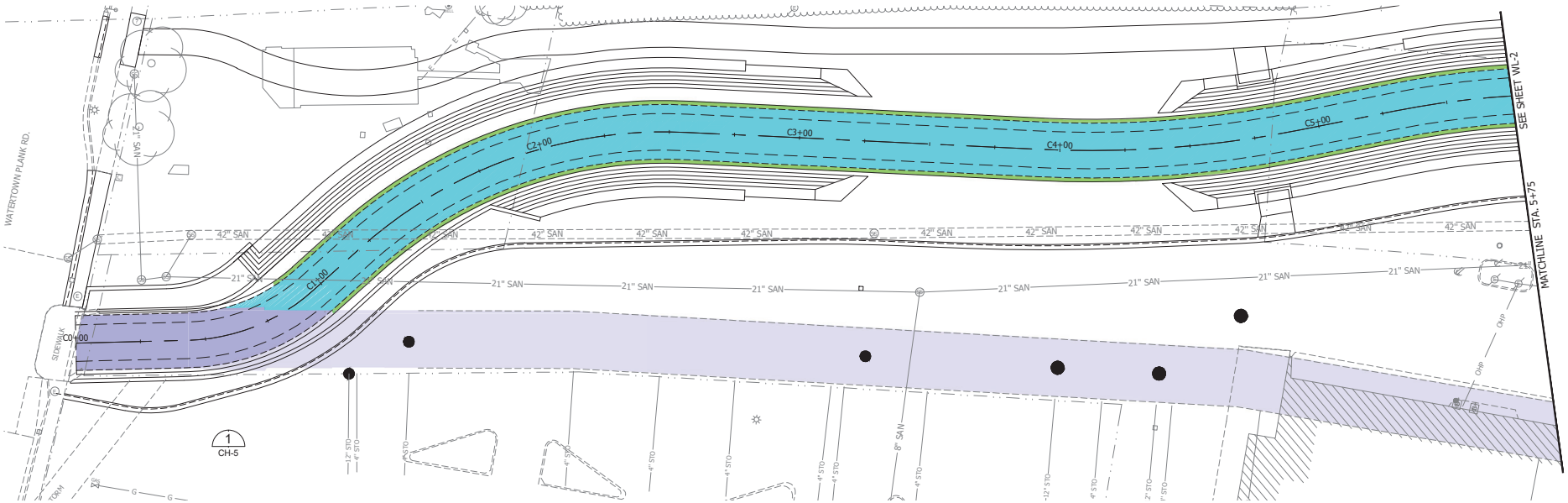
VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WETLAND AND STREAM IMPACT PLAN

DRAWING NO.	WL-1
SHEET NO.	23
DATE	August 15, 2024
PROJ NO.	193806812
FILE	193806812_WL.dwg

MVP-2024-01148-ALH Figure 3 of 5



IMPACT SUMMARY

- EXISTING STREAM (NO IMPACTS)
- STREAM PERMANENT IMPACT
- STREAM TEMPORARY IMPACT
- NEW STREAM
- EXISTING WETLAND (NO IMPACTS)
- WETLAND TEMPORARY IMPACT
- WETLAND PERMANENT IMPACT
- NEW WETLAND

NOTE:
WETLAND/STREAM BOUNDARY WAS DETERMINED BASED ON OHWM ELEVATION DETERMINED ON DECEMBER 2017 BY DNR.

0 20' 40'
HORIZONTAL

PRELIMINARY PLAN

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHEKCER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

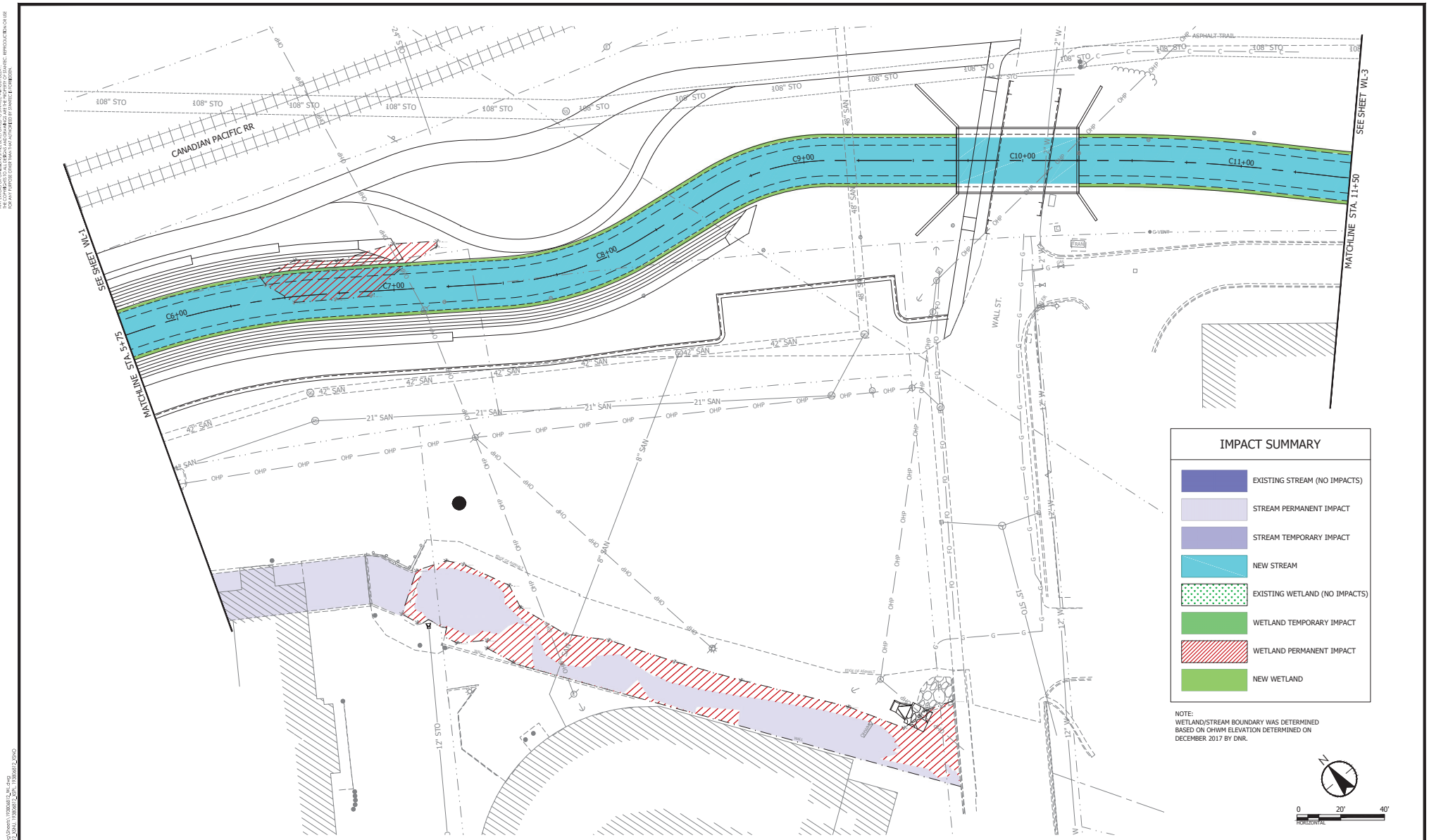
VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WETLAND AND STREAM IMPACT PLAN

DRAWING NO.	WL-2
SHEET NO.	2
DATE	August 15, 2024
PROJ NO.	193806812
FILE	193806812_WL.dwg

MVP-2024-01148-ALH Figure 4 of 5



PRELIMINARY PLAN

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHEKCER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

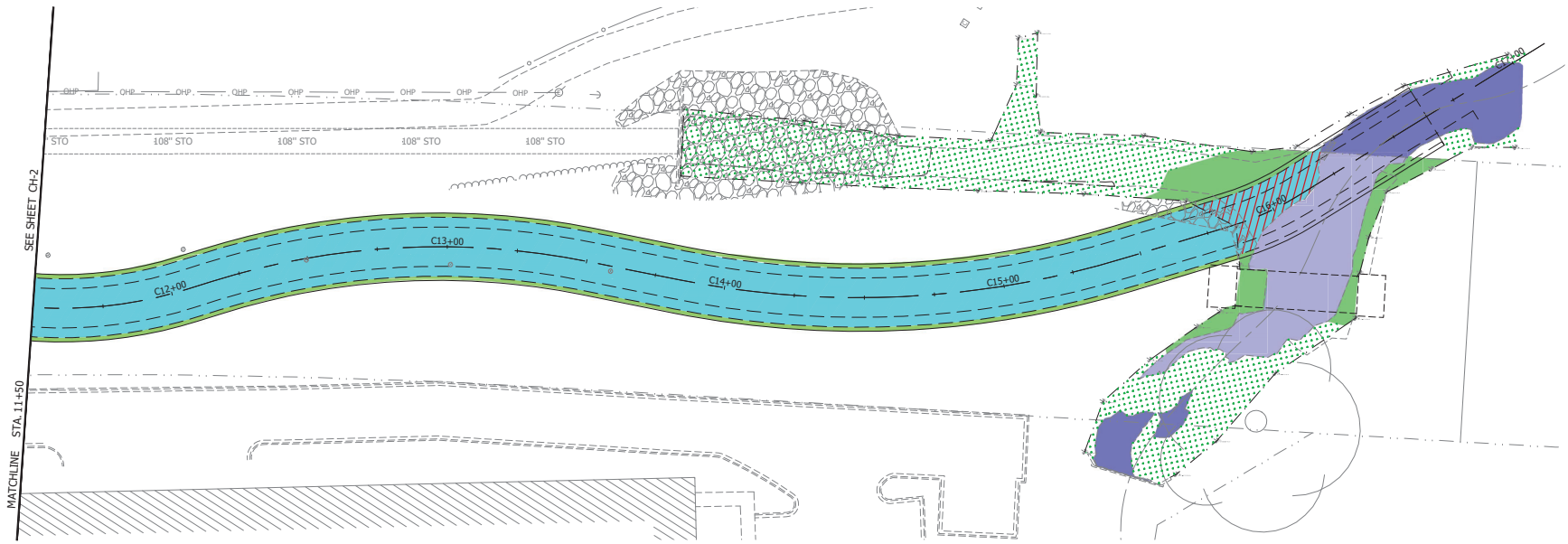
VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WETLAND AND STREAM IMPACT PLAN

DRAWING NO.	WL-2
SHEET NO.	3
DATE	August 15, 2024
PROJ NO.	193806812
FILE	193806812_WL.dwg

MVP-2024-01148-ALH Figure 5 of 5



IMPACT SUMMARY

- EXISTING STREAM (NO IMPACTS)
- STREAM PERMANENT IMPACT
- STREAM TEMPORARY IMPACT
- NEW STREAM
- EXISTING WETLAND (NO IMPACTS)
- WETLAND TEMPORARY IMPACT
- WETLAND PERMANENT IMPACT
- NEW WETLAND

NOTE:
WETLAND/STREAM BOUNDARY WAS DETERMINED BASED ON OHWM ELEVATION DETERMINED ON DECEMBER 2017 BY DNR.

N

0 20' 40'
HORIZONTAL

PRELIMINARY PLAN

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHEKCER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

193806812_WL - CH-3

DRAWING NO.	CH-3
SHEET NO.	26
DATE	August 15, 2024
PROJ NO.	193806812
FILE	193806812_WL.dwg

27. Aquatic Habitat Restoration, Enhancement, and Establishment Activities. Activities in waters of the United States associated with the restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas, the restoration and enhancement of non-tidal streams and other non-tidal open waters, and the rehabilitation or enhancement of tidal streams, tidal wetlands, and tidal open waters, provided those activities result in net increases in aquatic resource functions and services.

To be authorized by this NWP, the aquatic habitat restoration, enhancement, or establishment activity must be planned, designed, and implemented so that it results in aquatic habitat that resembles an ecological reference. An ecological reference may be based on the characteristics of one or more intact aquatic habitats or riparian areas of the same type that exist in the region. An ecological reference may be based on a conceptual model developed from regional ecological knowledge of the target aquatic habitat type or riparian area.

To the extent that a Corps permit is required, activities authorized by this NWP include, but are not limited to the removal of accumulated sediments; releases of sediment from reservoirs to maintain sediment transport continuity to restore downstream habitats; the installation, removal, and maintenance of small water control structures, dikes, and berms, as well as discharges of dredged or fill material to restore appropriate stream channel configurations after small water control structures, dikes, and berms are removed; the installation of current deflectors; the enhancement, rehabilitation, or re-establishment of riffle and pool stream structure; the placement of in-stream habitat structures; modifications of the stream bed and/or banks to enhance, rehabilitate, or re-establish stream meanders; the removal of stream barriers, such as undersized culverts, fords, and grade control structures; the backfilling of artificial channels; the removal of existing drainage structures, such as drain tiles, and the filling, blocking, or reshaping of drainage ditches to restore wetland hydrology; the installation of structures or fills necessary to restore or enhance wetland or stream hydrology; the construction of small nesting islands; the construction of open water areas; the construction of oyster habitat over unvegetated bottom in tidal waters; coral restoration or relocation activities; shellfish seeding; activities needed to reestablish vegetation, including plowing or discing for seed bed preparation and the planting of appropriate wetland species; re-establishment of submerged aquatic vegetation in areas where those plant communities previously existed; re-establishment of tidal wetlands in tidal waters where those wetlands previously existed; mechanized land clearing to remove non-native invasive, exotic, or nuisance vegetation; and other related activities. Only native plant species should be planted at the site.

This NWP authorizes the relocation of non-tidal waters, including non-tidal wetlands and streams, on the project site provided there are net increases in aquatic resource functions and services.

Except for the relocation of non-tidal waters on the project site, this NWP does not authorize the conversion of a stream or natural wetlands to another aquatic habitat type (e.g., the conversion of a stream to wetland or vice versa) or uplands. Changes in wetland plant communities that occur when wetland hydrology is more fully restored during wetland rehabilitation activities are not considered a conversion to another aquatic habitat type. This NWP does not authorize stream channelization. This NWP does not authorize the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments.

Compensatory mitigation is not required for activities authorized by this NWP since these activities must result in net increases in aquatic resource functions and services.

Reversion. For enhancement, restoration, and establishment activities conducted: (1) In accordance with the terms and conditions of a binding stream or wetland enhancement or restoration agreement, or a wetland establishment agreement, between the landowner and the U.S. Fish and Wildlife Service (FWS), the Natural Resources Conservation Service (NRCS), the Farm Service Agency (FSA), the National Marine Fisheries Service (NMFS), the National Ocean Service (NOS), U.S. Forest Service (USFS), or their designated state cooperating agencies; (2) as voluntary wetland restoration, enhancement, and establishment actions documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or (3) on reclaimed surface coal mine lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the Office of Surface Mining Reclamation and Enforcement (OSMRE) or the applicable state agency, this NWP also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or establishment activities). The reversion must occur within five years after expiration of a limited term wetland restoration or establishment agreement or permit, and is authorized in these circumstances even if the discharge of dredged or fill material occurs after this NWP expires. The five-year reversion limit does not apply to agreements without time limits reached between the landowner and the FWS, NRCS, FSA, NMFS, NOS, USFS, or an appropriate state cooperating agency. This NWP also authorizes discharges of dredged or fill material in waters of the United States for the reversion of wetlands that were restored, enhanced, or established on prior-converted cropland or on uplands, in accordance with a binding agreement between the landowner and NRCS, FSA, FWS, or their designated state cooperating agencies (even though the restoration, enhancement, or establishment activity did not require a section 404 permit). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate state agency executing the agreement or permit. Before conducting any reversion activity, the permittee or the appropriate Federal or state agency must notify the district engineer and include the documentation of the prior condition. Once an area has reverted to its prior physical condition, it will be subject to whatever the Corps Regulatory requirements are applicable to that type of land at the time. The requirement that the activity results in a net increase in aquatic resource functions and services does

not apply to reversion activities meeting the above conditions. Except for the activities described above, this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit would be required for any reversion.

Reporting. For those activities that do not require pre-construction notification, the permittee must submit to the district engineer a copy of: (1) the binding stream enhancement or restoration agreement or wetland enhancement, restoration, or establishment agreement, or a project description, including project plans and location map; (2) the NRCS or USDA Technical Service Provider documentation for the voluntary stream enhancement or restoration action or wetland restoration, enhancement, or establishment action; or (3) the SMCRA permit issued by OSMRE or the applicable state agency. The report must also include information on baseline ecological conditions on the project site, such as a delineation of wetlands, streams, and/or other aquatic habitats. These documents must be submitted to the district engineer at least 30 days prior to commencing activities in waters of the United States authorized by this NWP.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing any activity (see general condition 32), except for the following activities:

(1) Activities conducted on non-Federal public lands and private lands, in accordance with the terms and conditions of a binding stream enhancement or restoration agreement or wetland enhancement, restoration, or establishment agreement between the landowner and the FWS, NRCS, FSA, NMFS, NOS, USFS or their designated state cooperating agencies;

(2) Activities conducted in accordance with the terms and conditions of a binding coral restoration or relocation agreement between the project proponent and the NMFS or any of its designated state cooperating agencies;

(3) Voluntary stream or wetland restoration or enhancement action, or wetland establishment action, documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or

(4) The reclamation of surface coal mine lands, in accordance with an SMCRA permit issued by the OSMRE or the applicable state agency.

However, the permittee must submit a copy of the appropriate documentation to the district engineer to fulfill the reporting requirement. (Authorities: Sections 10 and 404)

Note: This NWP can be used to authorize compensatory mitigation projects, including mitigation banks and in-lieu fee projects. However, this NWP does not authorize the reversion of an area used for a compensatory mitigation project to its prior condition, since compensatory mitigation is generally intended to be permanent.

2021 Nationwide Permits (NWP)

St. Paul District Regional Conditions for Minnesota and Wisconsin

To qualify for NWP authorization, the prospective permittee must comply with the following regional conditions, as applicable, in addition to any case specific conditions imposed by the division engineer. The St. Paul District Regulatory website will provide current information regarding NWPs and the necessary 401 Water Quality Certifications at https://www.mvp.usace.army.mil/missions/regulatory/nwp/. Every person who wishes to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

The following NWPs have been revoked and are not available for use in St. Paul District: NWPs 8, 12, 14, 15, 21, 23, 24, 34, 48, 49, 50, 55, 56, 57, and 58.

Information on other permits available for use in St. Paul District can be found at: https://www.mvp.usace.army.mil/Missions/Regulatory/Permitting-Process-Procedures/.

Any regulated activity eligible for authorization under a St. Paul District Special Area Management Plan (SAMP) general permit is not eligible for authorization by NWPs.

The following regional conditions are applicable to all NWPs:

A. **Linear Projects:** No linear utility or linear transportation projects are eligible for authorization by NWPs. These projects will be reviewed for authorization under the St. Paul District's regional general permits or an individual permit.

B. **Temporary Impacts:** All regulated temporary impacts to waters of the U.S. must comply with the following criteria:

(1) If the temporary impacts in waters of the U.S., including wetlands, that occur as a result of the regulated activity would remain in place for longer than 90 days between May 15 and November 15, a PCN is required.

(2) Any PCN with temporary impacts must specify how long the temporary impact will remain and include a restoration and re-vegetation plan showing how all temporary fills and structures will be removed and the area restored to preconstruction contours and elevations. Native, non-invasive vegetation must be used unless otherwise authorized by a Corps NWP verification.

C. **PCNs for Apostle Islands National Lakeshore and Madeline Island**: A project proponent must notify the District by submitting a PCN if the regulated activity would result in excavation, fill, or the placement of a new structure within the boundaries of Apostle Islands National Lakeshore and Madeline Island in Wisconsin. Regulated activities authorized under NWP 3 (Maintenance) are not subject to this condition unless they include bank shaping or excavation.

D. **Calcareous fens:**

WISCONSIN: No work in a calcareous fen is authorized by a NWP unless the Wisconsin Department of Natural Resources (WI DNR) has approved a permit for the proposed regulated activity. Project proponents must provide evidence of an approved permit to the District.

MINNESOTA: No work in a calcareous fen is authorized by a NWP unless the Minnesota Department of Natural Resources (MN DNR) has approved a calcareous fen management plan specific to a project that otherwise qualifies for authorization by a NWP. Project proponents must provide evidence of an approved fen management plan to the District. A list of known Minnesota calcareous fens can be found at: http://files.dnr.state.mn.us/eco/wetlands/calcareous_fen_list.pdf.

E. **Special Aquatic Resources:** A project proponent must notify the District by submitting a PCN if a regulated activity would occur in any of the following aquatic resources:

(1) State-designated wild rice waters[1,2];

(2) Bog wetland plant communities[1,3];

(3) Fens[1,3];

(4) Coastal plain marshes[1,4];

(5) Interdunal wetlands[1,4];

(6) Great Lakes ridge and swale complexes[1,4];

(7) Aquatic resources within Lake Superior National Estuarine Research Reserve;

(8) Ramsar wetland sites, including: the Horicon Marsh, Upper Mississippi River Floodplain Wetland, Kakagon and Bad River Slough, Door Peninsula Coastal Wetlands, Chiwaukee Illinois Beach Lake Plain, and Lower Wisconsin Riverway. The complete up to date Ramsar list is available at https://rsis.ramsar.org.

The following regional conditions are applicable to a specific NWP:

F. **NWP 52. Water-Based Renewable Energy Generation Pilot Projects:** NWP 52 does not authorize structures or work in Lake Michigan and Lake Superior within the geographic regulatory boundaries of the St. Paul District.

G. **NWP 3, 33, and 41. Aquatic Resource Impacts:** A project proponent must notify the District by submitting a PCN if a regulated activity, including but not limited to, filling, flooding, excavating, or drainage of waters of the U.S., involves:

(1) A permanent loss of greater than 1/10 acre of waters of the U.S. for NWP 3 and 41; or
(2) over 1/2 acre of temporary impacts to waters of the U.S. for NWP 3, 33, and 41.

H. **NWP 27. Aquatic Habitat Restoration, Establishment and Enhancement Activities:** NWP 27 does not authorize the permanent conversion of forested, bog, fen, sedge meadow, or shrub-carr wetlands to other plant communities. A project proponent may request, in writing, a waiver from this condition from the District. The waiver will only be issued if it can be demonstrated that the conversion would restore wetland plant communities to the pre-settlement condition or a watershed approach and that the current landscape and hydrologic conditions would sustain the targeted community.

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[1] Information about Wisconsin plant community types for 1-6 above may be obtained from: http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=group&Type=Wetland

[2] Information regarding wild rice waters and their extent may be obtained from: https://www.dnr.state.mn.us/wildlife/shallowlakes/wildrice.html and https://gisdata.mn.gov/dataset/biota-wild-rice-lakes-dnr-wld in Minnesota, https://dnr.wisconsin.gov/topic/wildlifehabitat/rice.html in Wisconsin, and an interactive map is provided at: http://maps.glifwc.org/ (under Treaty Resources – Gathering).

[3] Additional information on bog and fen communities can be found at: http://www.mvp.usace.army.mil/missions/regulatory.aspx and in Minnesota at http://www.dnr.state.mn.us/npc/classification.html.

[4] Coastal plain marshes, interdunal wetlands, and Great Lakes ridge and swale complexes are specific to Wisconsin

2021 Nationwide Permit General Conditions

1. Navigation.

(a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Structures and Fills. Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers.

(a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. Permittees shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species.

(a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR 402.02 for the definition of "effects of the action" for the purposes of ESA section 7 consultation, as well as 50 CFR 402.17, which provides further explanation under ESA section 7 regarding "activities that are reasonably certain to occur" and "consequences caused by the proposed action."

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA (see 33 CFR 330.4(f)(1)). If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat or critical habitat proposed for such designation, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation), the pre-construction notification must include the name(s) of the endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or that utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. For activities where the non-Federal applicant has identified listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species (or species proposed for listing or designated critical habitat (or critical habitat proposed for such designation), or until ESA section 7 consultation or conference has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation or conference with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring that an action authorized by an NWP complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to determine what measures, if any, are necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties.

(a) No activity is authorized under any NWP which may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)(1)). If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts commensurate with potential impacts, which may include background research, consultation, oral history interviews, sample field investigation, and/or field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she

makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect.

(d) Where the non-Federal applicant has identified historic properties on which the proposed NWP activity might have the potential to cause effects and has so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed by permittees in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after she or he determines that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) Compensatory mitigation at a minimum one-for-one ratio will be required for all losses of stream bed that exceed 3/100-acre and require pre-construction notification, unless the district engineer determines in writing that either

some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. This compensatory mitigation requirement may be satisfied through the restoration or enhancement of riparian areas next to streams in accordance with paragraph (e) of this general condition. For losses of stream bed of 3/100-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. If restoring riparian areas involves planting vegetation, only native species should be planted. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f).)

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). If permittee-responsible mitigation is the proposed option, and the proposed compensatory mitigation site is located on land in which another federal agency holds an easement, the district engineer will coordinate with that federal agency to determine if proposed compensatory mitigation project is compatible with the terms of the easement.

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan needs to address only the baseline conditions at the impact site and the number of credits to be provided (see 33 CFR 332.4(c)(1)(ii)).

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary,

to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state or federal, dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality.

(a) Where the certifying authority (state, authorized tribe, or EPA, as appropriate) has not previously certified compliance of an NWP with CWA section 401, a CWA section 401 water quality certification for the proposed discharge must be obtained or waived (see 33 CFR 330.4(c)). If the permittee cannot comply with all of the conditions of a water quality certification previously issued by certifying authority for the issuance of the NWP, then the permittee must obtain a water quality certification or waiver for the proposed discharge in order for the activity to be authorized by an NWP.

(b) If the NWP activity requires pre-construction notification and the certifying authority has not previously certified compliance of an NWP with CWA section 401, the proposed discharge is not authorized by an NWP until water quality certification is obtained or waived. If the certifying authority issues a water quality certification for the proposed discharge, the permittee must submit a copy of the certification to the district engineer. The discharge is not authorized by an NWP until the district engineer has notified the permittee that the water quality certification requirement has been satisfied by the issuance of a water quality certification or a waiver.

(c) The district engineer or certifying authority may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). If the permittee cannot comply with all of the conditions of a coastal zone management consistency concurrence previously issued by the state, then the permittee must obtain an individual coastal zone management consistency concurrence or presumption of concurrence in order for the activity to be authorized by an NWP. The district engineer or a state may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its CWA section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is authorized, subject to the following restrictions:

(a) If only one of the NWPs used to authorize the single and complete project has a specified acreage limit, the acreage loss of waters of the United States cannot exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

(b) If one or more of the NWPs used to authorize the single and complete project has specified acreage limits, the acreage loss of waters of the United States authorized by those NWPs cannot exceed their respective specified acreage limits. For example, if a commercial development is constructed under NWP 39, and the single and complete project includes the filling of an upland ditch authorized by NWP 46, the maximum acreage loss of waters of the United States

for the commercial development under NWP 39 cannot exceed 1/2-acre, and the total acreage loss of waters of United States due to the NWP 39 and 46 activities cannot exceed 1 acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____

(Transferee)

_____

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires review by, or permission from, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission and/or review is not authorized by an NWP until the appropriate Corps office issues the section 408 permission or completes its review to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification.

(a) *Timing*. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to

cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Pre-Construction Notification*: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4)

(i) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures.

(ii) For linear projects where one or more single and complete crossings require pre-construction notification, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters (including those single and complete crossings authorized by an NWP but do not require PCNs). This information will be used by the district engineer to evaluate the cumulative adverse environmental effects of the proposed linear project, and does not change those non-PCN NWP activities into NWP PCNs.

(iii) Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial and intermittent streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45-day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-federal permittees, if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat (or critical habitat proposed for such designation), the PCN must include the name(s) of those endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the

proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an NWP activity that requires permission from, or review by, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from, or review by, the Corps office having jurisdiction over that USACE project.

(c) *Form of Pre-Construction Notification*: The nationwide permit pre-construction notification form (Form ENG 6082) should be used for NWP PCNs. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) *Agency Coordination*:

(1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iii) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure that the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

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BEFORE THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Application of the United States Department of the Army,)
Corps of Engineers, for Water Quality Certification for the)
Final Regulations Pertaining to the Issuance, Reissuance,)
and Modification of Nationwide Permits

On September 15, 2020, the United States Department of the Army, Corps of Engineers (COE), published its notice regarding the Issuance of Nationwide Permits (NWPs) in the Federal Register (agency docket number COE–2020–0002). The publication includes new, existing, and modified NWPs. Publication of these NWPs serves as the Corps' application to the State for water quality certification (WQC) under Section 401 of the Federal Clean Water Act (CWA).

The Wisconsin Department of Natural Resources (WDNR) has examined the regulations promulgated by the COE and United States Environmental Protection Agency pursuant to Section 401, CWA, and Chapters NR 102, 103, and 299, Wisconsin Administrative Code (Wis. Adm. Code).

The WDNR has determined the following conditions for the NWPs are required to ensure compliance with state water quality standards enumerated in s. 299.04, Wis. Adm. Code. Water quality in Wisconsin will be adequately protected so long as these conditions are met and the requirements of the final NWPs are consist with the public noticed drafts. This certification shall expire when the nationwide permits expire.

Section 401 Certification does not release the permittee from obtaining all other necessary federal, state, and local permits, licenses, certificates, approvals, registrations, charters, or similar forms of permission required by law. It does not limit any other state permit, license, certificate, approval, registration, charter, or similar form of permission required by law that imposes more restrictive requirements. It does not eliminate, waive, or vary the permittee's obligation to comply with all other laws and state statutes and rules throughout the construction, installation, and operation of the project. This Certification does not release the permittee from any liability, penalty, or duty imposed by Wisconsin or federal statutes, regulations, rules, or local ordinances, and it does not convey a property right or an exclusive privilege.

The conditions of this Certification cannot be used for other permit decisions, permit types or licenses that are not expressly listed in the agency docket number COE–2020–0002. Pursuant to 40 CFR 121.5, a certification request must be submitted to the state of Wisconsin for all individual license or permit requests. This includes projects undertaken by federal agencies including U.S. Army Corp of Engineer projects.

This Certification does not replace or satisfy any environmental review requirements, including those under the Wisconsin Environmental Policy Act (WEPA) or the National Environmental Policy Act (NEPA).

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STATE CONDITIONS AND LIMITATIONS OF CERTIFICATION

GENERAL CONDITIONS:

1. The permittee shall allow the WDNR reasonable entry and access to the discharge site to inspect the discharge for compliance with the certification and applicable laws.

   Justification: On-site inspection is a critical element to gather necessary information for water quality certification decisions and quality control and assurance of data provided by the applicant. This authorization is required pursuant to s. NR 299.05(3)(d)2.c, Wis. Adm. Code.

2. Water quality certification is denied without prejudice for activities involving the temporary stockpiling of dredged or fill material in waters of the state, including wetlands.

   Justification: Physical alterations can degrade surface waters through the filling, dredging or stockpiling of materials. Pursuant to ss. NR 102.05 and NR 103.03, Wis. Adm. Codes, no waters of the state including wetlands shall be lowered in quality unless it has been affirmatively demonstrated to the department that such a change is justifiable. To satisfy these antidegradation and water quality protection requirements, individual certification is warranted to properly demonstrate that temporary stockpiling of dredged or fill material is warranted.

3. Water quality certification is denied without prejudice for activities that have the potential to adversely impact Area of Special Natural Resource Interest (ASNRI) waters designated under to s. NR 1.05, Wis. Adm. Code.

   Justification: Pursuant to ch. NR 207, Wis. Adm. Code, Wisconsin's antidegradation standards prohibit degradation of outstanding resource waters and limits degradations to exceptional resource waters. Additionally, formal consultation with the Voigt Task Force is needed on projects which could have impacts on wild rice or wild rice habitat. For these reasons, all projects that have the potential to degrade ASNRI waters designated under s. 30.01(1am), Wis. Stat. are denied without prejudice. ASNRI waters are available on the DNR's surface water data viewer at https://dnr.wisconsin.gov/topic/SurfaceWater/swdv.

4. Water quality certification is denied without prejudice for activities that have the potential to adversely impact Public Rights Features (PRFs) designated under to s. NR 1.06, Wis. Adm. Code.

   Justification: Pursuant to s. NR 102.04(1)(a) and (b)**,** Wis. Adm. Code, objectionable deposits or debris shall not be present in such amounts as to interfere with public rights in waters of the state. Public Rights Features are most sensitive to these types of deposits and warrant individual water quality

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water quality certification

certification to ensure that wildlife, recreation, and fish and aquatic life standards under ch. NR 102, Wis. Adm. Code are satisfied.

PRFs are available on the DNR's surface water data viewer at https://dnr.wisconsin.gov/topic/SurfaceWater/swdv.

5. No discharges of dredged or fill material below the ordinary high water mark of a navigable stream as defined by s. 310.03(5), Wis. Adm. Code, may take place during fish spawning periods or times when nursery areas would be adversely impacted. These periods are:
   - September 15th through May 15th for all trout streams and upstream to the first dam or barrier on the Root River (Racine County), the Kewaunee River (Kewaunee County), and Strawberry Creek (Door County). To determine if a waterway is a trout stream, you may use the WDNR website trout maps at http://dnr.wi.gov/topic/fishing/trout/streammaps.html.
   - September 15th through June 15th on all Great Lakes tributaries upstream to the first dam or barrier.
   - November 1st through June 15th for Lake Michigan waters surrounding Door County including Green Bay and all harbors and bays.
   - September 15th through July 1st for Lake Superior waters surrounding Douglas County including St. Louis River and all harbors and bays.
   - March 1st through June 15th for ALL OTHER waters.

   Justification: Pursuant to s. NR 102.04(3), Wis. Adm. Code, aquatic life designations include spawning areas for cold water and warm water fish and aquatic life habitat. Water quality criteria are derived to ensure spawning activities in Wisconsin are protected.

6. The permittee must install in-water best management practices (BMPs) to minimize total suspended solids (TSS), sedimentation and nutrient loadings for any work conducted below the ordinary high water mark (OHWM). Any visual increase in turbidity outside of the approved impact area shall result in the project operations ceasing until BMPs have been modified to address the issue.

   Justification: Pursuant to ss. NR 102.04(1) and NR 102.06, Wis. Adm. Code, objectionable deposits and nutrients may not be present in amounts that interfere with public rights and interests or exceed state standards for surface water. In-water BMPs also help ensure excessive sedimentation, TSS, and nutrient loadings will not result in a violation of state wetland water quality standards under s. NR 103.03, Wis. Adm. Code.

7. The permittee may not use any materials that contains toxic substances in toxic amounts. This may include materials used for structure placement, beneficially reused materials, or fill.

   Justification: Pursuant to chs. NR 102, NR 103, NR 105 and s. NR 299.04(1)(b), Wis. Adm. Codes, water quality criteria and limitations must be satisfied to grant water quality certification.

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water quality certification

8. The permittee must ensure that any material used to construct a project is properly contained and stabilized in a manner that will prevent the material from being eroded.

   Justification: Pursuant to ss. NR 102.04(1)(a) and (b) and NR 103.03, Wis. Adm. Code, objectionable deposits or debris shall not be present in amounts that interfere with public rights and interests in waterways or the functions and values of wetlands in Wisconsin.

9. Projects permitted under any NWP must implement planning and pretreatment of equipment to minimize spread of invasive or noxious species, designated under to ch. 40, Wis. Adm. Code.

   Justification: Pursuant to s. NR 103.03(2)(f)3., Wis. Adm Code, water quality certification must prevent conditions conducive to the establishment or proliferation of nuisance organisms in order to protect existing wetland habitat and ecosystems. Invasive species threaten the "protection and propagation of a balanced fish and other aquatic life community" under the "Fish and other aquatic life" designated use in ch. NR 102.04(3), Wis. Adm. Code.

10. Whenever an applicant is completing sediment sampling and analysis, monitoring or disposal of materials from any dredging project, proper sampling and quality assurance methods shall be implemented in alignment with ch. NR 347, Wis. Adm. Code.

    Justification: In order to protect the public rights and interests in the waters of the state and to ensure that data quality is representative of site conditions to make informed water quality certification decisions, all data gathering, sampling, monitoring, data analysis and disposal shall be completed using proper sampling and quality assurance methods in alignment with ch. NR 347, Wis. Adm. Code.

Conditions Applicable to Specific Nationwide Permits Granted Water Quality Certification:

NWP 16 — Return Water From Upland Contained Disposal Areas:

The permittee must ensure that return water from dredging that is directly returned to the original source water meets the same water quality standards that apply to the original source water. If the return water is discharged into a receiving water that is not the original source water, then the permittee must ensure that the discharge water will meet the more stringent water quality standard of the receiving water and the original source water.

Justification: The return water shall not violate state water quality standards established under chs. NR 102, 103 and 105, Wis. Adm. Code.

NWP 18 — Minor Discharges:

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water quality certification

The permittee must ensure that direct and secondary impacts to wetlands do not exceed 400 sq. ft.

Justification: Pursuant to s. NR 103.03(2)(d), Wis. Adm. Code, wetlands shall be protected from cumulative impacts of discharges which may result in concentrations or combinations of substances which are toxic or harmful to human, animal, or plant life. Ensuring that the eligibility standard for wetland impacts encompasses primary and secondary impacts will ensure adequate protection from cumulative impacts.

The project scope shall not include installation of nonperforated drain tile which would have a hydrologic impact to a waterway or wetland.

Justification: Sections NR 103.03(1)(a) and (b), Wis. Adm. Code, require that wetland hydrology and storm and flood water storage be adequately protected.

NWP 42 — Recreational Facilities:

The permittee must remove temporary fill within 60 days of placing the material in a waterway or wetland unless mitigation is provided for the temporary loss of function.

Justification: This material can be a source of TSS and nutrients, particularly phosphorus to the receiving water (chs. NR 102 and 103, Wis. Adm. Code).

The permittee shall ensure that the project will not result in a conversion of navigable waters, pursuant to s. NR 310.03(5), Wis. Adm. Code, to uplands or an enclosure of navigable waters that would result in an interference with the public rights in those waters.

Justification: Pursuant to s. NR 102.04(1)(a) and (b)**,** Wis. Adm. Code, objectionable deposits or debris shall not be present in such amounts as to interfere with public rights in waters of the state.

NWP 43 — Stormwater Management Facilities:

The permittee may not convert navigable waterways pursuant to s. 310.03(5), Wis. Adm. Code, or wetlands to treat stormwater.

Justification: Pursuant to s. NR 103.03(1)(a), Wis. Adm. Code, state wetland water quality standards require that wetlands are maintained within natural variation from storm and flood water storage and retention and the moderation of water level fluctuation extremes. Pursuant to s. NR 102.04(1)(a) and (b)**,** Wis. Adm. Code, objectionable

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water quality certification

deposits or debris shall not be present in such amounts as to interfere with public rights in waters of the state.

NWP 46 — Discharges in Ditches:

The permittee must remove temporary fill within 60 days of placing the material in a waterway or wetland unless mitigation is provided for the temporary loss of function.

Justification: This material can be a source of TSS and nutrients, particularly phosphorus to the receiving water (chs. NR 102 and 103, Wis. Adm. Code).

NWP 51 – Land-Based Renewable Energy Generation Facilities

The permittee must remove temporary fill within 60 days of placing the material in a waterway or wetland unless mitigation is provided for the temporary loss of function.

Justification: This material can be a source of TSS and nutrients, particularly phosphorus, to the receiving water (chs. NR 102 and 103, Wis. Adm. Code).

The permittee may not convert wetlands to stormwater treatment facilities.

Justification: Pursuant to s. NR 103.03(1)(a), Wis. Adm. Code, state wetland water quality standards require that wetlands are maintained within natural variation from storm and flood water storage and retention and the moderation of water level fluctuation extremes.

The project shall not impact more than 300 linear feet.

Justification: Pursuant to s. NR 207.12, antibacksliding requirements must be satisfied before a relaxation of a standard could be applied. This analysis requires individual water quality certification.

NWP 53 - Removal of Low-Head Dams

The permittee shall ensure that accumulated sediment is adequately controlled to ensure that downstream water quality is protected once the dam is removed.

Justification: This material can be a source of TSS and nutrients, particularly phosphorus to the receiving water (chs. NR 102 and 103, Wis. Adm. Code).

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water quality certification

NWP E- Water Reclamation and Reuse Facilities

The permittee shall only use native plantings or, for the purposes of short-term stabilization, early successional non-invasive plantings for the purposes of short-term stabilization followed by native plantings.

Justification: Pursuant to s. NR 103.03(2)(f)3., Wis. Adm Code, water quality certification must prevent conditions conducive to the establishment or proliferation of nuisance organisms in order to protect existing wetland habitat and ecosystems. The invasive species rule, ch. NR 40, Wis. Adm. Code, makes it illegal to possess, transport, transfer or introduce certain invasive species in Wisconsin.

Nationwide Permits Granted Water Quality Certification:

- NWP 3 — Maintenance
- NWP 4 — Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities
- NWP 5 — Scientific Measurement Devices
- NWP 6 — Survey Activities
- NWP 7 — Outfall Structures and Associated Intake Structures
- NWP 13 — Bank Stabilization
- NWP 19 — Minor Dredging
- NWP 20 — Response Operations for Oil or Hazardous Substances
- NWP 22 — Removal of Vessels
- NWP 25 — Structural Discharges
- NWP 27 — Aquatic Habitat Restoration, Enhancement, and Establishment Activities
- NWP 30 — Moist Soil Management for Wildlife
- NWP 31 — Maintenance of Existing Flood Control Facilities
- NWP 32 — Completed Enforcement Actions
- NWP 36 — Boat Ramps
- NWP 37 — Emergency Watershed Protection and Rehabilitation
- NWP 38 — Cleanup of Hazardous and Toxic Waste
- NWP 41 — Reshaping Existing Drainage Ditches
- NWP 45 — Repair of Uplands Damaged by Discrete Events
- NWP 54 — Living Shorelines

Nationwide Permits Denied Water Quality Certification Without Prejudice At This Time:

- NWP 17 – Hydropower Projects

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water quality certification

Justification: The NWP is overly broad and can include a wide range of activities. The broad category of activities covered could significantly impact phosphorus and thermal impacts to waterways. Because Wisconsin has numeric standards for phosphorus and temperature pursuant to ch. NR 102, Wis Adm. Code, individual water quality certification is required to determine thermal and nutrient loadings from these areas. Individual water quality certification will also help ensure that state wetlands standards under ch. NR 103, Wis. Adm. Code are satisfied.

- NWP 29 — Residential Developments

Justification: The NWP is overly broad and can include a range of residential development density and can also include a wide array of other integral development pieces. The density of the development can significantly impact phosphorus and thermal impacts to waterways. Because Wisconsin has numeric standards for phosphorus and temperature pursuant to ch. NR 102, Wis. Adm. Code, individual water quality certification is required to determine thermal and nutrient loadings from these areas. Individual water quality certification will also help ensure that state wetlands standards under ch. NR 103, Wis. Adm. Code are satisfied.

- NWP 33 – Temporary Construction, Access, and Dewatering

Justification: Site-specific WQC is appropriate to ensure that site-specific dewatering plans are developed and address sediment-laden materials, which may contain potentially contaminated materials, discharged from dewatering disposal. Oily sheens, odors or colors can be observed in some dewatering activities which may violate water quality standards under ch. NR 102, Wis. Adm. Code.

- NWP 39 — Commercial and Institutional Developments

Justification: The NWP is overly broad and can include a range of commercial and institutional development types and density. These can significantly impact phosphorus and thermal impacts to waterways. Because Wisconsin has numeric standards for phosphorus and temperature pursuant to ch. NR 102, Wis. Adm. Code, individual water quality certification is required to determine thermal and nutrient loadings from these areas. Individual water quality certification will also help ensure that state wetlands standards under ch. NR 103, Wis. Adm. Code are satisfied.

- NWP 40 — Agricultural Activities

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water quality certification

Justification: The NWP is overly broad and can include a wide range of agricultural activities. These can significantly impact phosphorus and thermal impacts to waterways. Because Wisconsin has numeric standards for phosphorus and temperature pursuant to ch. NR 102, Wis. Adm. Code, individual water quality certification is required to determine thermal and nutrient loadings from these areas. Individual water quality certification will also help ensure that state wetlands standards under ch. NR 103, Wis. Adm. Code are satisfied.

- NWP 44 — Mining Activities

Justification: The NWP is overly broad and can include a range of activities. Given the proximity of these activities to mining activities there is an increase risk that heavy metals or other toxic substances regulated in ch. NR 105 and 106, Wis. Adm. Code, may be discharged in surface waters at levels that may not comply with state standards.

- NWP 48 — Commercial Shellfish Mariculture Activities

Justification: Nutrient discharges from commercial shellfish activities can be significant depending on the size, placement, and treatment of waters from these areas. Given the range of concentration and placement, individual water quality certification is appropriate for these activities to ensure that state nutrient standards pursuant to s. NR 102.06, Wis. Adm. Code are satisfied. Individual water quality certification will also help ensure that state wetlands standards under ch. NR 103, Wis. Adm. Code are satisfied.

- NWP 52 — Water-Based Renewable Energy Generation Pilot Projects

Justification: Impacts to fish and aquatic life uses and criteria such as temperature from water-based energy generation projects can be significant depending on the size and placement of these projects. Given the broad range of waterways this NWP could apply to, an individual WQC is appropriate to ensure that state water quality standards for fish and aquatic life uses and criteria under NR 102.04, Wis. Adm. Code are satisfied.

<u>Nationwide Permits For Which Water Quality Certification Is Not Required:</u>

This water quality certification decision reflects the NWPs for which certification was requested on November 12, 2020. As stated in the notice, NWPs 1, 2, 9, 10, 11, 28, and 35 do not require section 401 water quality certification because they would authorize activities which, in the opinion of the Corps, could not reasonably be expected to result in a discharge into waters of the United States. Additionally, the notice stipulated that the St. Paul District is proposing to revoke the following NWPs in both Minnesota and Wisconsin: 8, 12, 14, 15, 21, 23, 24, 34, 49, 50, A, B, C,

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water quality certification

and D. WDNR is not taking action on these NWPs for these reasons and concludes that a new notification and pre-filing meeting would be required for these NWPs should the position of the St. Paul District change.

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NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that Wisconsin Statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

To request a contested case hearing pursuant to section 227.42, Wisconsin Statutes, you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources.

This determination becomes final in accordance with the provisions of s. NR 299.05(7), Wisconsin Administrative Code, and is judicially reviewable when final. For judicial review of a decision pursuant to Sections 227.52 and 227.53, Wisconsin Statutes, you have 30 days after the decision becomes final to file your petition with the appropriate circuit court and to serve the petition on the Secretary of the Department of Natural Resources. The petition must name the Department of Natural Resources as the respondent.

Reasonable accommodation, including the provision of informational material in an alternative format, will be provided for qualified individuals with disabilities upon request.

This notice is provided pursuant to section 227.48(2), Wisconsin Statutes.

Dated at Madison, Wisconsin 10/11/2021 | 11:26 AM CDT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

DocuSigned by:
By Dave Siebert
D2E3F67B71CE4F2...
David R. Siebert

US Army Corps of Engineers ®
St. Paul District

COMPLIANCE CERTIFICATION

Regulatory File Number: MVP-2024-01148-ALH

Name of Permittee: Tom Harrigan

County/State: Waukesha, Wisconsin

Date of Issuance: 11/5/2024

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the Corps contact identified in your verification letter within 30 days.

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit, you are subject to permit suspension, modification, or revocation.

By signing below, the permittee is certifying that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the permit, and any required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

WDNR WDNR-G11: Wetland Statewide General Permit for Wetland Disturbance - Municipal Development

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
1027 W St. Paul Ave.
Milwaukee, WI, 53233

Tony Evers, Governor

Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

11/7/2024

GP-SE-2024-68-03425

Tom Harrigan
13600 Juneau Blvd.
Elm Grove, WI 53122

RE: Coverage under the wetland statewide general permit (WDNR-G11) for Wetland Disturbance - Municipal Development, located in the Village of Elm Grove, Waukesha County

Dear Tom Harrigan:

Thank you for submitting an application for a General Permit for Wetland Disturbance - Municipal Development located in the NE 1/4 of NW 1/4, Section 25, Township 07, Range 20E, Village of Elm Grove, Waukesha County. Based on the application information submitted, your project meets the eligibility criteria for this activity, so you may proceed with your project.

STANDARDS AND CONDITIONS

You are responsible for meeting all general permit eligibility standards and permit conditions. Please re-read the permit eligibility standards and conditions attached to this letter in the final statewide general permit document. This includes notifying the Department before starting the project and submitting photographs within one week of project completion. Please note your coverage is valid for 5 years from the date of the department's determination or until the activity is completed, whichever occurs first.

You are also responsible for obtaining any other local, state, tribal, or federal permits that are required before starting your project. Note that **U.S. Army Corps of Engineers and local zoning authorization for work in floodplains or shorelands may also be required for your project**.

EXPIRATION

This activity is authorized under WDNR-GP11-2021 for a period of 5 years from the date of this letter or until the activity is completed, whichever occurs first.

INSPECTIONS AND PROJECT MODIFICATIONS

The Department conducts routine and annual compliance monitoring inspections. Our staff may follow up and inspect your project to verify compliance with state statutes and codes and the requirements and conditions of this general permit.

NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that the Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions shall be filed. To seek a contested case hearing under section 227.42, Wis. Stats., you have 30 days after the date of the decision to serve a petition for hearing on the Department. For judicial review of a decision pursuant to sections 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

If you have questions about this letter or need to modify your project, please contact me, your local Water Management Specialist, Alison Masek, at (608) 575-9849 or at alison.masek@wisconsin.gov to discuss your proposed modifications and determine next steps.

Sincerely,

Alison Masek
Water Management Specialist

Email CC:
USACE Project Manager
Local Zoning Administrator

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
WETLAND GENERAL PERMIT TO DISCHARGE DREDGED OR FILL MATERIAL INTO A WETLAND OF THE STATE FOR MUNICIPAL DEVELOPMENT

Permittee: The General Public in Wisconsin

Permit No. WDNR-GP11-2021

Issuing Office: Waterways and Wetlands Section, Bureau of Waterways, Wisconsin Department of Natural Resources (Department)

Issuance Date: 06/01/2021

Expiration Date: 05/31/2026

GENERAL PERMIT AUTHORIZATIONS: In compliance with the provision(s) of section 281.36 (3b)(b), Wis. Stats., no person may discharge/place dredged or fill material into a wetland unless the discharge is authorized by a wetland general permit or individual permit issued by the Department of Natural Resources (Department) or the discharge is exempt under s. 281.36(4). The Department has authority to issue general permits under s. 281.36(3g)(a), Wis. Stats.
In compliance with 281.36(3b), Wis. Stats., a wetland general permit issued by the Department constitutes the water quality certification required by 33 USC 1341(a) (Clean Water Act section 401) for federal permits that authorize the discharge of dredged or fill material into wetlands regulated under 33 USC 1344(a) (Clean Water Act section 404).

Sections 281.36 (3g)(a), Wis. Stats., authorize any person in the State of Wisconsin to perform work in accordance with the terms and conditions of the general permit specified below after satisfying all applicable permit terms and conditions. Please refer to the following sections of this permit for the specific eligibility standards, application requirements, certification requirements and responsibilities, conditions, findings of fact, conclusions of law, and definitions required by WDNR-GP11-2021.

Note: WDNR GP11-2021 does not apply to proposed tribal activities located on Federal Indian Trust Land.
Note: Coverage under this permit authorizes the permittee to undertake specified activity/activities in compliance with the above statutes and the terms of this permit but does not authorize a permittee to undertake any activity prohibited by other applicable federal, state, or local law.

OTHER AUTHORIZATIONS NECESSARY: WDNR-GP11-2021 authorizations are subject to all applicable terms and conditions specified in this permit. However, **WDNR-GP11-2021 authorizations do not supersede any other local, state or federal authority so additional permits may be required before any work may proceed.** U.S. Army Corps of Engineers wetland permits are required for discharges to federal wetlands. U.S. Army Corps of Engineers permits are also required for any deposit or removal of material from waters of the United States.

PROJECT DESCRIPTION AND LOCATION: WDNR-GP11-2021 applies to certain temporary or permanent discharges of dredged or fill material into wetlands where the discharge affects up to 10,000 square feet of wetlands for the purposes of municipal development or redevelopment that is not exempt under state law. Municipal transportation projects are not within the scope of this general

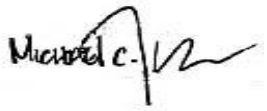
permit. Other permits may be available if this project description and location is not applicable for specific projects. These permits may include:

- Municipal transportation project general permit; and
- Commercial, industrial or residential development projects less than 10,000 square feet of wetland fill.

Please visit dnr.wi.gov, keyword “water permit” for more information about these, and other, wetland general permits.

GENERAL PERMIT COVERAGE: Unless notified by the Department to the contrary, the effective date of coverage under this general permit is 30 calendar days after a complete application package has been received by the Department at the office designated in the permit application materials provided by the Department. **WDNR-GP11-2021 permit coverage is valid for 5 years after the date the coverage is granted by the department.** If the project is not completed within 5 years after the date of coverage another application must be submitted. If the project scope changes within the valid period of the permit coverage the department may require a new application or modify coverage if the project continues to meet all eligibility criteria. The 5 year timeline is based on the date coverage is granted by the department, not the expiration date of **WDNR-GP11-2021.**

State of Wisconsin Department of Natural Resources
For the Secretary



05/26/2021

_____ _____

Mike Thompson – Director
Bureau of Waterways

Date

TABLE OF CONTENTS **Page(s)**

SECTION	**1**	ELIGIBILITY STANDARDS AUTHORIZATION	1
SECTION	**2**	APPLICATION REQUIREMENTS	2
SECTION	**3**	CERTIFICATION & RESPONSIBILITIES	6
SECTION	**4**	GENERAL PERMIT CONDITIONS	6
SECTION	**5**	FINDINGS OF FACT	9
SECTION	**6**	CONCLUSIONS OF LAW	10
SECTION	**7**	DEFINITION OF TERMS	10

WDNR-GP11-2021 TERMS AND CONDITIONS

The following sections describe the general permit authorization procedures implemented by the DNR in WDNR-GP11-2021. Projects must meet all the terms and conditions of this permit to be eligible for coverage under WDNR-GP11-2021.

NOTE: The term "you" and its derivatives, as used in this general permit, means the permittee, which is the landowner. The term “the Department” or "this office" refers to the appropriate Wisconsin Department of Natural Resources (WDNR or DNR) Service Center, DNR Region or Central Office headquarters of the WDNR having jurisdiction over the authorized activity or the appropriate official of that office acting under the authority of the Secretary of the Department.

The project must meet **all** the following standards to be eligible for coverage and authorization under this general permit. Persons proposing to do work should note that Section 281.36 (3g)(h), Wis. Stats. requires applicants to demonstrate that adverse impacts to wetlands functions and values have been avoided and minimized to the maximum extent practicable.

NOTE: Projects that do not meet all standards below are not eligible for this general permit and are therefore excluded from coverage under WDNR-GP11-2021. In these cases, persons may apply for an Individual Permit as outlined in s. 281.36(3m), Wis. Stats. The Department also has authority under s. 281.36(3g)(i), Wis. Stats. to require an individual permit in lieu of a general permit, if the Department has determined that conditions specific to the site require additional restrictions on the discharge to provide reasonable assurance that no significant adverse impacts to wetland functional values will occur.

NOTE: Projects that may impact tribal lands or a legally recognized treaty right may need additional coordination.

SECTION 1 – WDNR-GP11-2021 ELIGIBLITY CRITERIA

A. GENERAL STANDARDS

1. The applicant is a municipality or has legal authorization from the municipality to undertake the project on the land shown in the application. The applicant may be a municipal stormwater or sewer utility.

2. The project does not result in permanent placing or discharging of fill material (as defined in section 7) to more than 10,000 square feet (0.23 acres) of wetlands as part of a single and complete project.

3. The project does not result in temporary placing or discharging fill material onto more than 2 acres of wetland as part of a single and complete project.

4. The purpose of the project is not to fill wetlands to create a buildable lot to be sold and/or developed at a later date.

5. The direct or secondary impacts to the wetland do not result in the conversion of wetlands to treat stormwater. This includes the conversion of wetlands into stormwater ponds, infiltration basins or other similar features, excluding subsurface infrastructure for the conveyance of stormwater, wastewater or potable water supply.

   NOTE: Construction or land disturbance to install a stormwater best management practice to comply with chs. NR 151 or 216, Wis. Adm. Code, may occur outside of a natural wetland so long as the practice complies with applicable standards specified in this general permit.

6. If a stormwater treatment feature is not directly connected to a navigable waterway AND all wetland conversion for the purpose of stormwater treatment occurred prior to August 1, 1991, this general permit may be utilized for maintenance of that stormwater treatment feature pursuant to applicable technical standards specified in chs. NR 151 or 216, Wis. Adm. Code, so long as the other eligibility criteria of this general permit are satisfied.

7. The purpose of the project is to conduct municipal activities associated with a single and complete project and cannot be segmented for the purpose of meeting eligibility requirements for this general permit.

8. The purpose of the project is not for a municipal public transportation project to construct, reconstruct or maintain a highway, bridge arch or culvert.

   NOTE: These activities are eligible for the municipal transportation general permit.

9. The project will not flood or impede drainage of the adjacent properties or upstream properties unless appropriate signed agreements have been made with affected landowners.

10. Temporary water control structures must be placed in a manner that prevents the collection, removal, or dispersal of sediment into natural surface waters or wetlands to the maximum extent practicable. Temporary sediment control measures used to accomplish this should be completely removed from the wetland and/or waterbody after the installation activity is completed and the site is stabilized.

11. The project may not result in significant adverse impacts to the public rights and interests, cause environmental pollution as defined in Wis. Stats. s. 299.01(4), or result in material injury to the riparian rights of any riparian owner pursuant to Wis. Stats. s. 30.206(3r)(a)2. The project also may not materially interfere with navigation or have an adverse impact on the riparian property rights of adjacent riparian owners pursuant to Wis. Stats. s. 30.206(1)(am).

12. The discharge will cause only minimal adverse environmental effects.

13. The project is not eligible for authorization under a "Superior Special Area Management Plan (SAMP)" permit reviewed by the City of Superior, Wisconsin.

14. A project **is not** eligible for this general permit if it has the potential to negatively impact a cold water community as defined in s. NR 102.04(3)(a), Wis. Admin. Code, or the project is proposed in an area with evidence of spring activity.

15. No activity is authorized which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act and/or State law or which is likely to destroy or adversely modify the critical habitat of a species as identified under the Federal Endangered Species Act.

16. The project shall not result in significant adverse impacts to fishery spawning habitat, including obstruction of fish passage, or adversely affect bird breeding areas or substantially disrupts the movement of species that normally migrate from open water to upland or vice versa (i.e. amphibians, reptiles and mammals) as determined by the Department.

17. The project will not occur in a mapped floodplain (official Federal Emergency Management Agency (FEMA) or local zoning map), or if the project does occur within a mapped floodplain the project will meet the local government's floodplain zoning standards and obtain applicable local floodplain development permit.

18. Discharges will not occur in the following resources: Great Lakes ridge and swale complexes, interdunal wetlands, coastal plain marshes, emergent marshes containing wild rice, sphagnum bogs that are located in the area located south of a horizontal line drawn across the state based on the routes of STH 16 and STH 21 west of Lake Winnebago and on USH 151 east of Lake Winnebago, boreal rich fens, or calcareous fens.

19. The activity will not result in adverse impacts to historical or cultural resources and will comply with s. 44.40, Wis. Stats., as determined by the Department.

20. Construction shall be accomplished in such a manner as to minimize erosion and siltation into surface waters and wetlands. All erosion control measures shall meet or exceed the Department approved technical standards of ss. NR 151.11 and 151.12, Wis. Admin. Code. The technical standards are found at: http://dnr.wi.gov/topic/stormwater/.

21. All equipment used for the project, including but not limited to tracked vehicles, hoses, sheet piles, and pumps, shall be de-contaminated for invasive and exotic viruses and species prior to use and after use.

22. Follow the most recent department approved washing and disinfection protocols and department approved best management practices to avoid the spread of invasive species as outlined in ch. NR 40, Wis. Adm. Code. These protocols and practices can be found on the Department website at http://dnr.wi.gov/topic/Invasives/bmp.html Keyword: "equipment operator" and at http://dnr.wi.gov/topic/Invasives/documents/EquipOper.pdf.

23. The proposed project cannot avoid wetland impacts.

24. The proposed project minimizes wetland impacts to the greatest extent practicable. This includes limiting lateral drainage impacts to adjacent wetlands to the greatest extent practicable.

25. The project will be constructed in a manner that will maintain wetland hydrology in the remaining wetland complex.

26. A site-specific erosion and sediment control plan, containing the information required by s. NR 216.46, Wis. Admin. Code, shall be implemented.

27. A site-specific vegetative plan must be included for projects that require significant grading or for projects where the remaining wetland complex is dominated by native or non-invasive vegetation. Native vegetation shall be established as soon as possible and monitored for one year after completing the project. During the monitoring period, the site shall be inspected regularly, and any areas requiring additional stabilization or re-vegetation shall be addressed to ensure final stabilization. The vegetation plan shall only include species native to the area of Wisconsin where the project is located, such as Virginia Wild-Rye (*Elymus virginicus*).

28. If the project purpose is to expand an existing solid waste disposal facility within the boundaries of the property where the existing facility is located or on property immediately adjacent to the existing solid waste disposal facility, then the facility must have a valid feasibility determination from the department.

29. Projects proposed with existing recorded deed restrictions within the project area, including easements limiting construction and land use activities, are not eligible for this general permit.

SECTION 2 - WDNR-GP11-2021 APPLICATION REQUIREMENTS FOR COVERAGE

You are required to comply with the following application requirements:

1. After you have carefully confirmed the proposed project meets all the terms and conditions of this permit you must submit a *complete application package* as outlined in item 6 below to the Department. Pursuant to s. 281.36(3g)(h)1., Wis. Admin. Code, the complete application package should be received a minimum of 30 calendar days before the desired project start date. Permit application materials can be found and submitted online at http://dnr.wi.gov/permits/water.

2. Unless notified by the Department to the contrary, the effective date of coverage under this permit is 30 calendar days after the designated DNR office receives a complete application package (s. 281.36(3g)(h)2., Wis. Stats.).

3. The Department has one opportunity to request that you provide additional information necessary to verify compliance with the terms and conditions of this permit. If additional information is needed, the Department will notify you within 30 calendar days after receiving your application package. If the Department makes a request for additional information, the 30-day period is paused on the date the person applying for authorization receives the request for additional information. The clock remains paused until the date that the Department receives the information at the designated DNR office, at which point the clock resumes from the point it was initially stopped (s. 281.36(3g)(h)3., Wis. Stats.).

4. If adverse weather conditions prevent the Department from conducting an accurate on-site inspection or assessing the potential for site-specific impacts during the 30-day application period, the Department shall give notice to the applicant of this condition and shall complete the inspection as soon as weather conditions permit (s. 281.36 (3g)(h)2m., Wis. Stats.).

5. As provided under s. 281.36(3g)(i), Wis. Stats., the Department may determine the project is not eligible for this general permit and require the project be reviewed through the individual permit process outlined in s. 281.36(3m), Wis. Stats. If the Department determines your project is not eligible for this permit, you will be notified within 30 calendar days after your complete application package is received by DNR.

6. A complete application package must include all of the following information:

a. Complete and signed application form certifying project meets the terms and conditions of WDNR-GP11-2021. This form can be found at http://dnr.wi.gov/permits/water.
b. Permit fees except as follows:
    i. Wetland projects are exempt from wetland permit fees under s. 281.36(12)(e), Wis. Stat., *only* if the project is *conducted* by a federal or state agency.
c. Project plans that include final project design and construction including a project diagram.
d. Maps of the project site with information that includes: most recent Soil Survey map, WI Wetland Inventory map, topographic map, floodplain information, and aerial photographs. All maps must show basic map elements (e.g., scale) and clear directions to the project site

with project and property boundaries clearly labeled. The aerial photo shall also show the locations of all proposed wetland fill or discharge clearly labeled, if applicable.

e. Current photographs that represent existing site conditions where the project will occur.
f. A copy of a concurred-with wetland delineation, a wetland delineation conducted by an assured wetland delineator, or a waiver by the WDNR Water Management Specialist (WMS) stating that a delineation is not needed.

    Note: More information about the wetland confirmation service is available at https://dnr.wisconsin.gov/topic/Wetlands/identification.html.

g. Documentation verifying the project will not result in an adverse impact to federal or state threatened/endangered resources and/or cultural/historical resources.
h. Detailed documentation that clearly demonstrates why any proposed wetland impacts cannot be avoided, the practicable alternatives that were considered, and how the impact to the wetland will be minimized as required by s. 281.36(3g)(h)1., Wis. Stats.
i. If applicable, a vegetative plan including seed mixture and inspection timeline.
j. If applicable, a demonstration that the stormwater feature was constructed prior to August 1, 1991.

SECTION 3 - WDNR-GP11-2021 CERTIFICATION AND RESPONSIBILITIES

You certify and agree that upon submittal of a complete application package to DNR, the wetland project will be conducted in compliance with all the terms and conditions of WDNR-GP11-2021.

SECTION 4 - WDNR-GP11-2021 GENERAL PERMIT CONDITIONS

The applicant agrees to comply with the following conditions:

1. **Application**. You shall submit a complete application package to the Department as outlined in the application materials and Section 2 of this permit. If requested, within a reasonable timeframe, you shall furnish the Department any information it needs to verify compliance with the terms and conditions of this permit.

2. **Certification**. Acceptance of general permit WDNR-GP11-2021, and efforts to begin work on the activities authorized by this general permit, signifies that you have certified the project meets all eligibility standards outlined above and that you have read, understood, and agreed to follow all terms and conditions of this general permit.

   NOTE: You are responsible for obtaining any other permit or approval that may be required for your project by local zoning ordinances, other local authority, other state permits, and by the U.S. Army Corps of Engineers before starting your project.

3. **Reliance on Applicant's Data.** The determination by this office that a confirmation of authorization is not contrary to wetland water quality standards will be based upon the information provided by the applicant and any other information required by the Department.

4. **Project Plans**. This permit does not authorize any work other than what is specifically described in the notification package and plans submitted to the Department and is certified by you to comply with the terms and conditions of WDNR-GP11-2021.

5. **Expiration**. This WDNR-GP11-2021 expires on 05/31/2026. The time limit for completing an activity authorized by the provisions of WDNR-GP11-2021 ends 5 years after the date on which the activity is considered to be authorized under WDNR-GP11-2021 or until the activity is completed, whichever occurs first, regardless of whether WDNR-GP11-2021 expired before the activity is completed.

6. **Authorization Distribution**. You must supply a copy of the permit coverage authorization to every contractor working on the project.

7. **Project Start**. You shall notify the Department before starting construction.

8. **Permit Posting**. You must post a copy of this permit coverage letter at a conspicuous location on the project site before beginning the permitted activity. The copy of the permit coverage letter must remain posted at that location until at least five days after the area where the activity took place is stabilized. You must also keep a copy of the permit coverage letter and the approved plan available at the project site at all times until the project is complete.

9. **Permit Compliance**. The department may modify or revoke coverage of this permit if it is not constructed in compliance with the terms and conditions of this permit, or if the Department determines the project will be detrimental to wetland water quality standards. Any act of noncompliance with this permit constitutes a permit violation and is grounds for enforcement action. Additionally, if any applicable conditions of this permit are found to be invalid or unenforceable, authorization for all activities to which that condition applies is denied.

10. **Construction Timing**. Once wetland work begins, all wetland construction activities must be continuous to the extent practicable. During periods of inactivity in wetlands, the site must be stabilized until the work is resumed and completed.

11. **Construction**. No other portion of the wetland may be disturbed except the area designated in the submitted plans.

12. **Project Completion**. Within one week after completing the regulated activity, you shall submit to the Department a statement certifying the project complied with all the terms and conditions of this permit, and photographs of the activities authorized by this permit. This statement must reference the Department-issued docket number and be submitted to the Department staff member that authorized coverage.

13. **Proper Maintenance**. You must maintain the activity authorized by WDNR-GP11-2021 in good condition and in conformance with the terms and conditions of this permit using best

management practices. Any structure or fill authorized shall be properly maintained to ensure no additional impacts to the remaining wetlands.

14. **Site Access**. Upon reasonable notice, you shall allow access to the site to any Department employee who is investigating the project's construction, operation, maintenance or permit compliance with the terms and conditions of WDNR-GP11-2021 and applicable laws.

15. **Erosion and siltation controls**. The project site shall implement erosion and sediment control measures that adequately control or prevent erosion and prevent damage to wetlands as outlined in s. NR 151.11(6m), Wis. Admin. Code. These standards can be found at the following website: http://dnr.wi.gov/topic/stormwater/standards/const_standards.html. Any area where topsoil is exposed during the project should be immediately seeded and mulched to stabilize disturbed areas and prevent soils from being eroded and washed into waterways or wetlands.

16. **Equipment use**. The equipment used in the wetlands must be low ground weight equipment as specified by the manufacturer specifications.

17. **Wetland protection**. You shall not store any vegetation, material, or equipment in wetlands unless authorized to do so through an approved project design. The project will be constructed in a manner that will maintain wetland hydrology in the remaining wetland complex, if applicable.

18. **Invasive Species**. All project equipment shall be decontaminated for removal of invasive species prior to and after each use on the project site by using best management practices to avoid the spread of invasive species as outlined in ch. NR 40, Wis. Adm. Code. For more information, refer to http://dnr.wi.gov/topic/Invasives/bmp.html. Keyword: "equipment operator" or "invasive bmp".

19. **Federal and State Threatened and Endangered Species**. WDNR-GP11-2021 does not affect the DNR's responsibility to ensure that all authorizations comply with Section 7 of the Federal Endangered Species Act, s. 29.604, Wis. Stats., and applicable state laws. No DNR authorization under this permit will be granted for projects found not to comply with these acts/laws. No activity is authorized which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act and/or state law or which is likely to destroy or adversely modify the critical habitat of a species as identified under the Federal Endangered Species Act. Documentation options include:

    a. An ER Review Verification Form showing that the project is covered by the Broad Incidental Take Permit for no/low impact activities and therefore does not require a review.
    b. An ER Preliminary Assessment from the NHI Public Portal stating that no further actions are necessary or that further actions are recommended. The NHI Public Portal is located here: http://dnr.wi.gov/topic/erreview/publicportal.html.

c. If the ER Preliminary Assessment from the NHI Public Portal shows that "Further actions are required" then submit one of the following:
    i. A DNR ER Review letter. This request form for an ER Review letter is located here: http://dnr.wi.gov/topic/erreview/review.html.
    ii. A Certified ER Review letter. The list of Certified Reviewers is located here: http://dnr.wi.gov/topic/ERReview/Documents/CertifiedReviewers.pdf.

20. **Special Concern Species**. If the Wisconsin National Heritage Inventory lists a known special concern species to be present in the project area you will take reasonable action to prevent significant adverse impacts or to enhance the habitat for the species of concern.

21. **Historic Properties and Cultural Resources**. WDNR-GP11-2021 does not affect the DNR's responsibility to ensure that all authorizations comply with Section 106 of the National Historic Preservation Act and s. 44.40, Wis. Stats. No DNR authorization under this permit will be granted for projects found not to comply with these acts/laws. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places. If cultural, archaeological, or historical resources are unearthed during activities authorized by this permit, work must be stopped immediately and the State Historic Preservation Officer must be contacted for further instruction.

22. **Preventive Measures**. Measures must be adopted to prevent potential pollutants from entering a wetland or waterbody. Construction materials and debris, including fuels, oil, and other liquid substances, will not be stored in the construction area in a manner that would allow them to enter a wetland or waterbody as a result of spillage, natural runoff, or flooding. If a spill of any potential pollutant should occur, it is the responsibility of the permittee to remove such material, to minimize any contamination resulting from this spill, and to immediately notify the State Duty Officer at **1-800-943-0003**.

23. **Suitable fill material.** All fill authorized under this permit must consist of clean suitable soil, as defined by s. NR 500.03(214), Wis. Admin. Code, free from hazardous substances as defined by s. 289.01(11), Wis. Stats., and free from solid waste as defined by s. 289.01(33), Wis. Stats.

24. **Standard for Coverage**. Wetland impacts from the project will cause only minimal adverse environmental impacts as determined by the Department.

25. **Transfers**. Coverage under this permit is transferable to any person upon prior written approval of the transfer by the Department.

26. **Reevaluation of Decision**. The Department may suspend, modify or revoke authorization of any previously authorized activity and may take enforcement action if the following occur:

    a. The applicant fails to comply with the terms and conditions of WDNR-GP11-2021.
    b. The information provided by the applicant in support of the permit application proves to have been false, incomplete, or inaccurate.

c. Significant new information surfaces which the Department did not consider in reaching the original public interest decision.

SECTION 5 - WDNR-GP11-2021 FINDINGS OF FACT

1. The Department has determined that projects that meet the eligibility criteria and conditions and are granted coverage under this general permit will cause only minimal adverse environmental impacts, will not materially interfere with navigation, and will not have an adverse impact on the riparian property rights of adjacent riparian owners pursuant to § 30.206(1)(am), Wis. Stats., nor result in significant adverse impacts to the public rights and interest, cause environmental pollution as defined § 299.01(4), Wis. Stats., or result in material injury to the riparian rights of any riparian owner pursuant to § 30.206(3r)(a)2., Wis. Stats., if completed in accordance with this permit.

2. Pursuant to § NR 299.04(1), Wis. Adm. Code, the Department has reasonable assurance that projects that meet the eligibility criteria and conditions and are granted coverage under this general permit will meet all applicable water quality standards.

3. The Department has determined pursuant to wetland water quality standards under § NR 103.03, Wis. Adm. Code, and § 281.36(3g)(d), Wis. Stats., that projects that meet the eligibility criteria and conditions and are granted coverage under this general permit will only result in minimal adverse environmental effects.

4. For activities authorized under this general permit, the Department has determined that projects that meet all eligibility criteria, for which all information required in the application requirements section above, and for which the Department has not required a wetland individual permit pursuant to § 281.36(3g)(i), Wis. Stats, have adequately avoided and minimized wetland impacts to the greatest extent practicable and will result in minimal adverse environmental impacts. This finding is based on the information submitted in accordance with the application requirements listed above and the fact that the project scope is confined to the project area, which is limited to the minimum area needed to place, replace, or maintain the project.

5. The Department and the applicant have completed all procedural requirements, and projects that meet the eligibility criteria and conditions and are granted coverage under this general permit will comply with all applicable requirements of WDNR-GP11-2021, § 281.36(3g) and ch. 31, Wis. Stats., and chs. NR 102,103,150, 299, and 310, Wis. Adm. Code.

SECTION 6 - WDNR-GP11-2021 CONCLUSIONS OF LAW

1. The Department has authority under §§ 281.36(3g) to issue this general permit.

2. The Department has determined that issuance of this general permit is a prior compliance action under § NR 150.20(3)(b), Wis. Adm. Code, based on the Environmental Analysis and Environmental Impact Statements prepared previously for statewide general permits. The Department has determined that on that basis it has complied with chs. NR 102 and 103, Wis. Adm. Code, and § 1.11, Wis. Stats.

6. Issuance of coverage under this general permit constitutes federal Water Quality Certification under 33 U.S.C. s. 1341.

SECTION 7 - WDNR-GP11-2021 DEFINITION OF TERMS

For the purposes of this general permit, you accept the following definitions:

1. Buildable lot for the purposes of this general permit means a property lot which has at least some portion of uplands present within the development footprint and the need and purpose for the development is clear and consistent with local land use plans and ordinances.

2. Boreal rich fens are a rare open peatland community of northern Wisconsin that are associated with glacial moraines, or less commonly, outwash landforms, in which the underlying substrate includes calcareous materials.

3. Calcareous fens occur mostly in southern Wisconsin, on sites that are fed by carbonate-enriched groundwater and are often associated and can intergrade with more abundant and widespread wetland communities such as southern sedge meadow, wet prairie, shrub-carr, emergent marsh, and southern tamarack swamp.

4. Coastal plain marshes are typically within the sandy beds or margins of extinct glacial lakes, on level or gently sloping glacial outwash sands, and, possibly in glacial tunnel channels.

5. Complete application package means a completed and signed application, the information specified in Section 2 of this permit and any other information which can reasonably be required from an applicant that the department needs to make a decision.

6. Directly connected for the purpose of this general permit means contiguous surface water discharge from a stormwater treatment feature to a navigable waterway during non-storm events (e.g. online pond). Note: stormwater ponds within 500 feet of a navigable waterway not previously authorized under Ch. 30, Wis. Stats., may require additional Department approvals before stormwater maintenance projects can commence.

7. Emergent marshes containing wild rice are typically emergent aquatic communities that have wild rice as a component. Substrates supporting wild rice usually consist of poorly consolidated, semi-organic sediments. Water fertility is low to moderate, and a slow current is present.

8. Department means the Department of Natural Resources or WDNR.

9. Fill material has the meaning given in 33 CFR 323.2(e), and means material placed wetlands where the material has the effect of replacing any portion of a wetland with dry land; or changing the bottom elevation of any wetland. Examples of such fill material include, but are not limited to: rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mining or other excavation activities, and materials used to create any structure or infrastructure in a wetland. The term fill material does not include trash or garbage.

10. Floodplain has the meaning in ch. NR 116, Wis. Admin. Code, which means the land which has been or may be hereafter covered by flood water during the regional flood. Note: http://dnr.wi.gov/topic/floodplains/ordinances.html.

11. Great Lakes ridge and swale complexes are associated closely with Great Lakes shorelines and are a series of narrow sandy ridges alternate with low swales, parallel to the lakeshore. The vegetation on the dry ridges can vary from open herbaceous or shrub communities on the semi-stabilized dunes closest to the shoreline, dry forests dominated by pines and oaks farther inland, and mixed mesophytic forests of northern hardwoods or hemlock hardwoods farthest from the shore.

12. Interdunal wetlands occupy wind-created hollows that intersect the water table within active dune fields along the Great Lakes shores. They may also occur where moving sand encroaches on nearby wetlands, surrounding and isolating all or portions of them.

13. Invasive Plants are non-native or native plant species that invade natural plant communities and wild areas replacing desirable native vegetation. For a listing of common invasive plants found in Wisconsin visit DNR's website at http://dnr.wi.gov/invasives/plants.asp.

14. Impact to wetlands includes temporary or permanent conversion of a wetland.

15. Maintenance of a stormwater treatment feature for the purpose of the general permit may include, but is not limited to, the following activities within the original footprint of the pond: removing accumulated sediment, reshaping the pond walls and bank, modifying or redesigning inlet and outlet structures, and adding riprap or other stabilization practices.

16. Permanent impacts for the purposes of this general permit means all other wetland impacts that do not meet the definition of temporary impacts.

17. Single and complete project means the total project proposed by the project proponent. For example, if construction of a residential development affects several different wetland areas, the cumulative total of all impacted areas is the basis for deciding the project's total wetland impact. For "phased" developments, each phase may constitute a single and complete project if it has independent utility and would accomplish its intended purpose whether or not other phases were constructed.

18. Southern sphagnum bogs are bogs that are located in the area located south of a horizontal line drawn across the state based on the routes of STH 16 and STH 21 west of Lake Winnebago and on USH 151 east of Lake Winnebago. They are typically composed of a carpet of living sphagnum moss growing over a layer of acidic peat. Sedges, forbs and/or the low shrubs of the heath family (Ericaceae) colonize the sphagnum moss mat.

19. Stabilize means the process of making a site steadfast or firm, minimizing soil movement by the use of practices such as mulching and seeding, sodding, landscaping, paving, graveling or other appropriate measures.

20. Temporary impacts for the purposes of this general permit means short-term impacts which will not occur for more than 6 months in duration and for which active restoration is not required to return the site back to its original condition before the project occurred.

21. Wetland has the meaning in s. 23.32, Wis. Stats., and means an area where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wetland conditions.

22. Wetland Complex for the purposes of this general permit means wetlands that are hydrologically connected through surface or ground water connections.

23. Wetland Functional Values means the physical, chemical and biological process or attributes that occur in a wetland and the benefit society derives from certain functions as listed in s. NR 103.03(1), Wis. Admin. Code, and include the following: (1) Floral Diversity (2) Fish and Wildlife Habitat; (3) Flood Protection; (4) Water Quality Protection; (5) Shoreline Protection; (6) Groundwater Recharge and Discharge and (7) Aesthetics, Recreation, Education and Science.

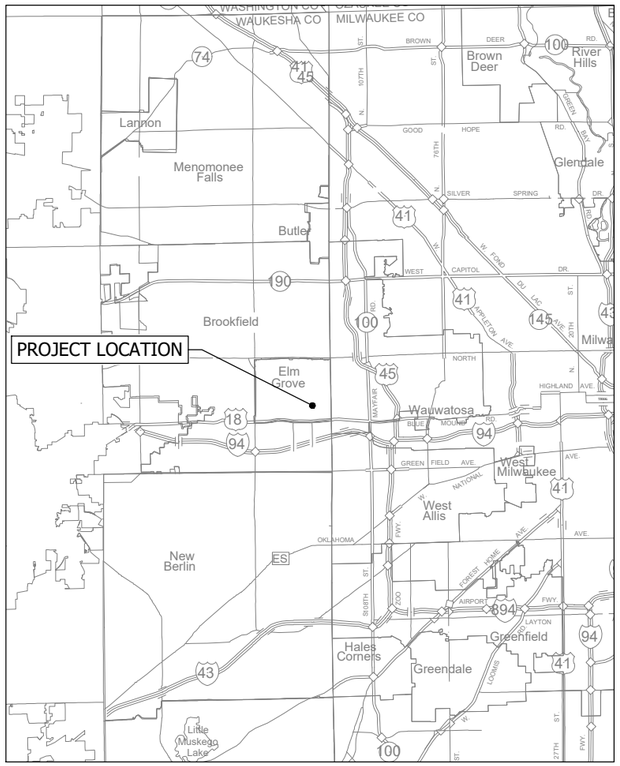
WDNR Ch 30
(to be included by Addendum)

THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING - ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO STANTEC IMMEDIATELY. ALL STANDARDS, SPECIFICATIONS, REPORTS, THE COPYRIGHTS TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF STANTEC. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY STANTEC IS FORBIDDEN.

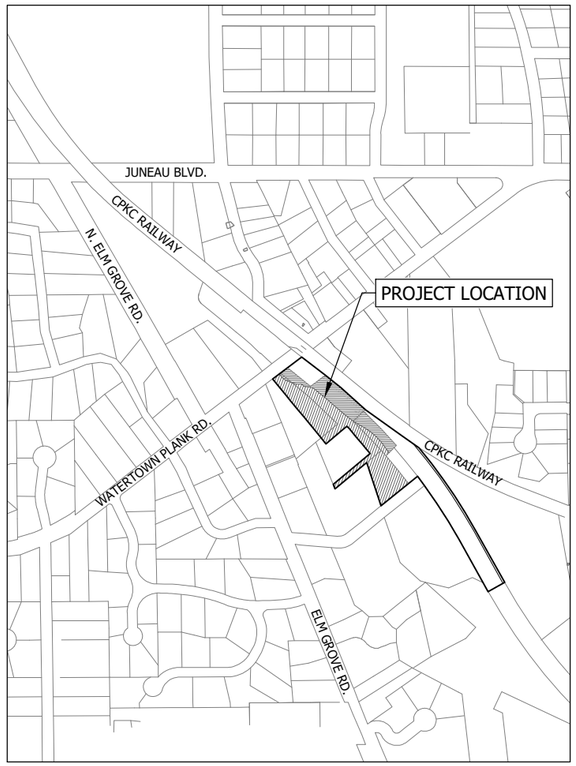
UNDERWOOD CREEK DAYLIGHTING

VILLAGE OF ELM GROVE, WISCONSIN

JANUARY 2026



VICINITY MAP



LOCATION MAP

CONTACT INFORMATION:

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SPECTRUM
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DESIGNER - STANTEC:
Richard Klein P.E.
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DIGGERS HOTLINE
Dial 811 or (800)242-8511
www.DiggersHotline.com

SHEET NO.	DRAWING NO.	DRAWING TITLE
		GENERAL
1	G-1	TITLE SHEET
2	G-2	LEGEND AND GENERAL NOTES
3	G-3	ALIGNMENTS, EASEMENTS, AND GEOTECHNICAL SOIL BORING LOCATIONS
4	G-4	ALIGNMENT DATA
5	G-5	STRUCTURAL NOTES
6	G-6	STRUCTURAL NOTES
		EROSION CONTROL
7	EC-1	SUGGESTED EROSION CONTROL MEASURES
		DEMOLITION
8	D-0	DEMOLITION AND REMOVALS SHEET INDEX
9	D-1	DEMOLITION AND REMOVALS PLAN
10	D-2	DEMOLITION AND REMOVALS PLAN
11	D-3	DEMOLITION AND REMOVALS PLAN
		STORM SEWERS
12	ST-0	STORM SEWER PLAN SHEET INDEX
13	ST-1	STORM SEWER STRUCTURE TABLE
14	ST-2	STORM SEWER PLAN & PROFILE
15	ST-3	STORM SEWER PLAN & PROFILE
16	ST-4	STORM SEWER PLAN & PROFILE
17	ST-5	STORM SEWER PLAN & PROFILE
18	ST-6	STORM SEWER DETAILS
		CHANNEL
19	CH-0	CHANNEL PLAN SHEET INDEX
20	CH-1	CHANNEL PLAN & PROFILE
21	CH-2	CHANNEL PLAN & PROFILE
22	CH-3	CHANNEL PLAN & PROFILE
23	CH-4	CHANNEL TYPICAL SECTIONS
24	CH-5	CHANNEL DETAILS
25	CH-6	CHANNEL SEQUENCE
26	CH-7	CHANNEL STRUCTURE DETAILS
27	CH-8	TOE WOOD DETAIL
28	CH-CS1	CHANNEL CROSS SECTIONS
29	CH-CS2	CHANNEL CROSS SECTIONS
30	CH-CS3	CHANNEL CROSS SECTIONS
31	CH-CS4	CHANNEL CROSS SECTIONS
32	CH-CS5	CHANNEL CROSS SECTIONS
33	CH-CS6	CHANNEL CROSS SECTIONS
34	CH-CS7	CHANNEL CROSS SECTIONS
35	CH-CS8	CHANNEL CROSS SECTIONS
36	CH-CS9	CHANNEL CROSS SECTIONS
37	CH-CS10	CHANNEL CROSS SECTIONS
38	CH-CS11	CHANNEL CROSS SECTIONS
39	CH-CS12	CHANNEL CROSS SECTIONS
40	CH-CS13	CHANNEL CROSS SECTIONS
41	CH-CS14	CHANNEL CROSS SECTIONS
42	CH-CS15	CHANNEL CROSS SECTIONS
43	CH-CS16	CHANNEL CROSS SECTIONS
44	CH-CS17	CHANNEL CROSS SECTIONS
45	CH-CS18	CHANNEL CROSS SECTIONS
46	CH-CS19	CHANNEL CROSS SECTIONS
47	CH-CS20	CHANNEL CROSS SECTIONS
48	CH-CS21	CHANNEL CROSS SECTIONS
49	CH-CS22	CHANNEL CROSS SECTIONS
50	CH-CS23	CHANNEL CROSS SECTIONS
51	CH-CS24	CHANNEL CROSS SECTIONS

SHEET NO.	DRAWING NO.	DRAWING TITLE
		CHANNEL BANK WALLS AND REVETMENTS
52	CB-0	CHANNEL BANK SHEET INDEX
53	CB-1	EAST CHANNEL BANK WALL
54	CB-2	WEST CHANNEL BANK WALL
55	CB-3	UPSTREAM EAST QUARRY STONE BANK
56	CB-4	UPSTREAM WEST QUARRY STONE BANK
57	CB-5	DOWNSTREAM EAST QUARRY STONE BANK
58	CB-6	DOWNSTREAM WEST QUARRY STONE BANK
59	CB-7	EAST BANK QUARRY STONE TYPICAL SECTION
60	CB-8	WEST BANK QUARRY STONE TYPICAL SECTION
61	CB-9	EAST CHANNEL BANK WALL - TYPICAL SECTIONS
62	CB-10	WEST CHANNEL BANK WALL - TYPICAL SECTIONS
63	CB-11	GUARD RAILS
64	CB-12	GUARD RAIL ANCHOR DETAILS
65	CB-13	CONSTRUCTION DETAILS - STRUCTURE STR-A
66	CB-14	CONSTRUCTION DETAILS - STRUCTURE STR-A
67	CB-15	CONSTRUCTION DETAILS - CHANNEL BANK WALLS
68	CB-16	CONSTRUCTION DETAILS - QUARRY STONE BANKS
		PEDESTRIAN BRIDGE AND ABUTMENTS
69	PB-0	PEDSTRIAN BRIDGE AND ABUTMENTS SHEET INDEX
70	PB-1	PEDESTRIAN BRIDGE GENERAL PLAN
71	PB-2	PEDESTRIAN BRIDGE ABUTMENTS
72	PB-3	PEDESTRIAN BRIDGE TIMBER RAIL DETAILS
		WALL STREET CROSSING
73	WS-0	WALL STREET CROSSING SHEET INDEX
74	WS-1	WALL STREET CROSSING PLAN AND PROFILE
75	WS-2	WALL STREET CROSSING TYPICAL SECTION
76	WS-3	BOX CULVERT HEADWALL VIEWS
77	WS-CS1	WALL STREET CROSSING CROSS SECTIONS
78	WS-CS2	WALL STREET CROSSING CROSS SECTIONS
		EAST PATH
79	EP-0	EAST PATH SHEET INDEX
80	EP-1	EAST PATH PLAN & PROFILE
81	EP-2	EAST PATH PLAN & PROFILE
82	EP-3	EAST PATH TYPICAL SECTION
83	EP-CS1	EAST PATH CROSS SECTIONS
84	EP-CS2	EAST PATH CROSS SECTIONS
85	EP-CS3	EAST PATH CROSS SECTIONS
86	EP-CS4	EAST PATH CROSS SECTIONS
		GRADING
87	GR-0	GRADING PLAN SHEET INDEX
88	GR-1	SOIL MANAGEMENT PLAN
89	GR-2	GRADING PLAN
90	GR-3	GRADING PLAN
91	GR-4	GRADING PLAN
		VEGETATION AND PAVEMENT RESTORATION
92	VP-0	SURFACE RESTORATION SHEET INDEX
93	VP-1	SURFACE RESTORATION PLAN
94	VP-2	SURFACE RESTORATION PLAN
95	VP-3	SURFACE RESTORATION PLAN
96	VP-4	SURFACE RESTORATION PLANTING TABLES
97	VP-5	CHANNEL PLANTING ZONES
98	VP-6	CONSTRUCTION DETAILS

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

TITLE SHEET

DRAWING NO.	G-1
SHEET NO.	1
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_G.dwg

Plot Date: 12/30/2025 - 8:20am
Plot Name: C:\Users\...\193806812_G.dwg
Xrefs: Border: 193806812_XIP, 193806812_XNO, 193806812_2XIT

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SYMBOLS

- BENCH — BENCH
- BM — BENCH MARK
- CATCH BASIN
- CLVT — CULVERT END
- ELECTRIC MANHOLE
- FLARED END SECTION
- G-METER — GAS METER
- GAS — GAS VALVE
- G-VENT — GAS VENT
- GUY POLE
- GUY WIRE
- HYDRANT
- LIGHT POLE
- MAIL — MAIL BOX
- SAMPLING WELL — MONITORING WELL
- MONUMENT - SET
- OHWM — ORDINARY HIGH WATER MARK
- POST
- POWER METER
- POWER POLE
- RAILROAD SIGNAL
- SANITARY MANHOLE
- SIGN (NON-TRAFFIC)
- SPRINKLER — SPRINKLER HEAD
- STORM MANHOLE
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- TRAFFIC SIGN
- TRAFFIC SIGNAL
- TRAN — TRANSFORMER - POWER
- TREE - DECIDUOUS
- UNKNOWN MANHOLE
- WATER VALVE
- WELL — WATER WELL

EXISTING LINES

- FENCE - CHAIN LINK
- FENCE - DECORATIVE
- FENCE - STOCKADE
- GUARD RAIL
- TREE LINE
- WETLAND
- PROPERTY LINE
- 21" SAN — SANITARY SEWER
- 8" SAN — SANITARY SERVICE
- 12" STO — STORM SEWER
- 12" W — WATER MAIN
- 2" W — WATER SERVICE
- CTV — CABLE TV
- FO — FIBER OPTIC
- E — POWER QUALITY
- G — GAS
- C — COMMUNICATION
- OHP — OVERHEAD POWER
- OHC — OVERHEAD COMMUNICATION
- OHU — OVERHEAD UTILITIES

EXISTING CONDITIONS HATCHES

- CONCRETE
- WETLAND

GENERAL NOTES

1. EXISTING UTILITIES SHOWN ARE INDICATED IN ACCORDANCE WITH AVAILABLE RECORDS. OTHER UTILITIES MAY ALSO BE PRESENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING EXACT LOCATIONS AND ELEVATIONS OF ALL UTILITIES FROM THE OWNERS OF THE RESPECTIVE UTILITIES. ALL UTILITY OWNERS SHALL BE NOTIFIED BY THE CONTRACTOR A MINIMUM OF FIVE (5) WORKING DAYS PRIOR TO EXCAVATION.
2. ALL UTILITY ELEVATIONS ARE SHOWN AS INVERT ELEVATIONS UNLESS OTHERWISE NOTED.
3. INVERT ELEVATIONS ARE AT THE CENTERLINE OF THE STRUCTURE UNLESS OTHERWISE NOTED.
4. LIMITS OF CONSTRUCTION AREA SHALL BE FENCED PRIOR TO COMMENCEMENT OF WORK.
5. ANTICIPATED CONSTRUCTION SEQUENCE: CONSTRUCT NEW CHANNEL FROM DOWNSTREAM END TO APPROXIMATELY STN C1+00, INCLUDING NEW CROSSING AT WALL STREET AND NEW PEDESTRIAN BRIDGE. CONSTRUCT PLUNGE POOL AND CHANNEL SECTION IMMEDIATELY DOWNSTREAM OF WATERTOWN PLANK ROAD. COMPLETE CONNECTION TO NEW CHANNEL, AND TRANSFER STREAM FLOW TO NEW CHANNEL. CONSTRUCT NEW STORM SEWERS. ABANDON EXISTING BOX CULVERT AND CHANNEL UPSTREAM OF WALL STREET. COMPLETE PARKING LOT MODIFICATIONS AND PAVING.
6. ALL COORDINATES ARE BASED ON WISCONSIN STATE PLANE COORDINATE SYSTEM SOUTH ZONE NAD83. ELEVATIONS ARE REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (NGVD29).

CALLOUT DEFINITION

- A — TRENCH SURFACE RESTORATION
- N — TRENCH CLASSIFICATION
- 8" @ 0.4% / III — CLASS III, IV, V RCP OR TYPE OF PIPE AS NOTED, SIZE & SLOPE OF PIPE (8" CLASS III PIPE AND 0.40 PERCENT SLOPE)

SECTION AND DETAIL TITLES

SECTION B (88-888) — ¼ = 1' -0"

DETAIL 1 (88-888) — ¼ = 1' -0"

SECTION AND DETAIL REFERENCE (WHERE TAKEN AND SHOWN)

SECTION (LETTER) OR DETAIL (NUMERICAL) DESIGNATION → B / 88-888

SYMBOL WHERE SECTION OR DETAIL IS TAKEN: DRAWING NO. WHERE SECTION IS SHOWN

SYMBOL WHERE SECTION OR DETAIL IS SHOWN: DRAWING NO. WHERE SECTION IS TAKEN

DRAWING NUMBER REPLACED WITH A LINE IF TAKEN AND SHOWN ON SAME DRAWING → B

SYMBOL WHERE SECTION OR DETAIL IS TAKEN AND SHOWN: USE LINE WHERE SECTION IS TAKEN AND SHOWN

WISCONSIN — RICHARD J. KLEIN — E-33601 — PORT WASHINGTON WI — PROFESSIONAL ENGINEER

Klein, Richard J
2025.12.30 14:23:10-06'00'

ABOVE STAMP APPLIES TO SHEETS 1 THROUGH 51, AND SHEETS 73 THROUGH 98.

WISCONSIN — RICHARD S MCDANIEL — E-47641 — GRANITE CITY IL — PROFESSIONAL ENGINEER

Digitally signed by Richard S McDaniel
Date: 2025.12.30 14:12:56-05'00'

ABOVE STAMP APPLIES TO SHEETS 52 THROUGH 72.

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

LEGEND AND GENERAL NOTES

DRAWING NO.	G-2
SHEET NO.	2
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_G.dwg

Plot Date: 12/30/2025 - 8:20pm
Plot By: Richard Klein
Xrefs: Borders: 193806812_XR; Topo: 193806812_XNO; 193806812_XXT
C:\Users\richard.klein\Documents\Projects\193806812_G.dwg

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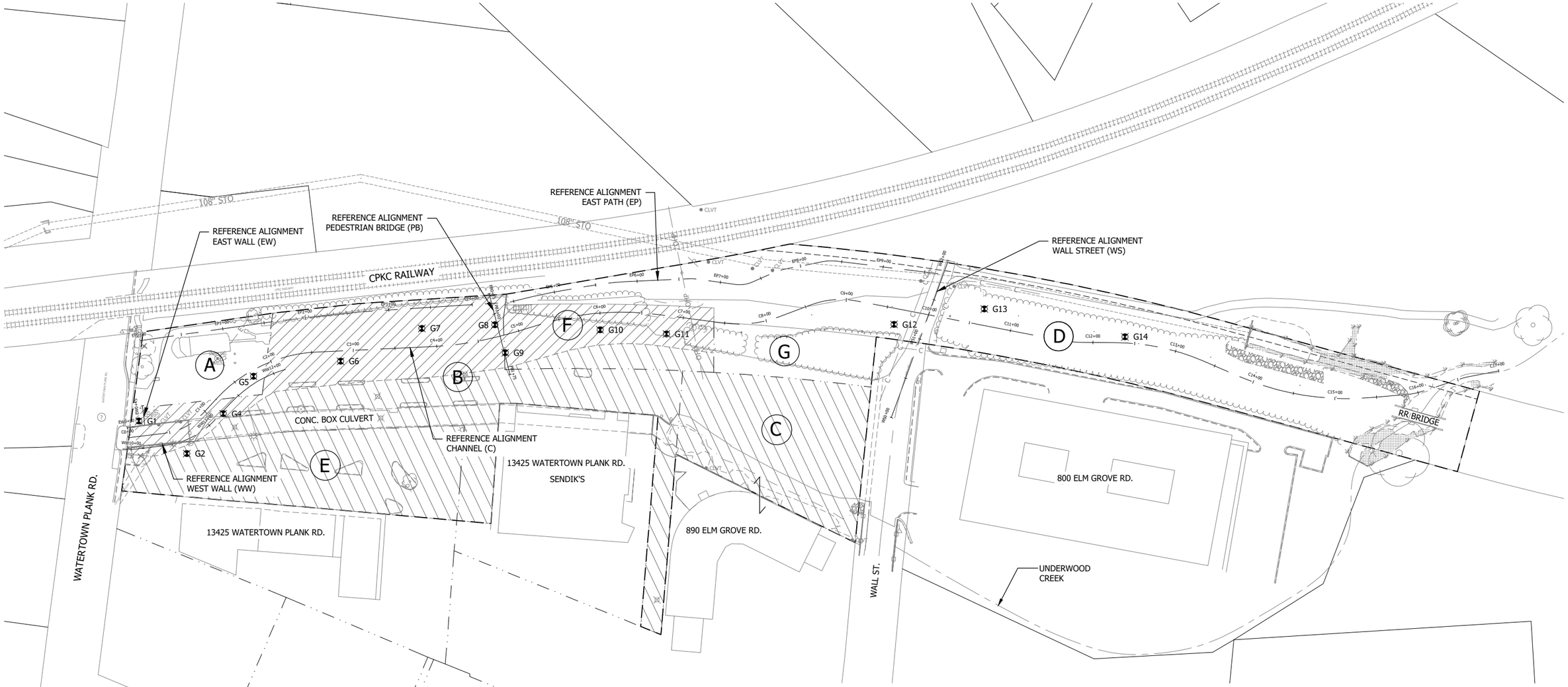

PARCEL ID	OWNER	TAX KEY	ADDRESS
A	VILLAGE OF ELM GROVE	EGV 1106973	13405 WATERTOWN PLANK ROAD
B	ELM GROVE ASSOCIATES	EGV 1106961	13425 WATERTOWN PLANK ROAD
C	VILLAGE COURT LLC	EGV 1106964	890 ELM GROVE ROAD
D	VILLAGE OF ELM GROVE	-	-
E	ELM GROVE PARK AND SHOP LLC	EGV 1106965	13425 WATERTOWN PLANK ROAD
F	ELM GROVE ASSOCIATES	EGV 1106961001	905 WALL STREET
G	VILLAGE OF ELM GROVE	EGV 1106953	-

ALIGNMENT	START STATION	END STATION
CHANNEL (C)	C0+00	C17+00
EAST PATH (EP)	EP0+00	EP9+66
EAST WALL (EW)	EW0+00	EW0+45
PEDESTRIAN BRIDGE (PB)	PB0+75	PB1+75
WALL STREET (WS)	WS0+00	WS2+00
WEST WALL (WW)	WW9+90	WW12+15

LEGEND

- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- PROJECT AREA
- PARCELS

NOTES

1. SOIL BORING LOGS ARE INCLUDED IN THE GEOTECHNICAL DATA REPORT IN THE PROJECT MANUAL.

N

0 60' 120'

FOR BIDDING AND CONSTRUCTION

DESIGNER M. SIERACKI
DRAWN BY A. ROCK
CHECKER D. AMUNDSEN
APPROVED R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

ALIGNMENTS, EASEMENTS, AND GEOTECHNICAL SOIL BORING LOCATIONS

DRAWING NO.	G-3
SHEET NO.	3
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_G.dwg

Plot Date: 12/30/2025 - 8:20cm
Drawing Name: C:\Users\mike.sieracki\Documents\ACAD Drwgs\Sheets\193806812_G.dwg
Xrefs: Border: I:\938\06812_JDP\...\193806812_JUNO\...\193806812_JUNIT

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CHANNEL (C)
(0+00 TO 17+00)

Type	Start Station	PI Station	End Station	Northing	Easting	Bearing	Length	Delta angle	Chord Bearing	Chord length	Radius	Tangent Distance	Degree of Curve
Line	0+00		0+43.09'	385964.02	2481890.05	S51°23'14"E	43.09'						
Curve	0+43.09	0+70.75'	0+96.09'	385937.13	2481923.72		53.01'	40°29'36"	S71°38'02"E	51.91'	75.00'	27.66'	76°23'40"
Line	0+96.09		1+20.04'	385920.77	2481972.98	N88°07'10"E	23.95'						
Curve	1+20.04	1+91.92'	2+56.44'	385921.56	2481996.92		136.40'	44°39'29"	S69°33'05"E	132.97'	175.00'	71.88'	32°44'26"
Line	2+56.44		3+92.36'	385875.1	2482121.52	S47°13'21"E	135.92'						
Curve	3+92.36	4+42.88'	4+92.90'	385782.79	2482221.28		100.54'	14°02'06"	S54°14'24"E	100.28'	410.42'	50.52'	13°57'37"
Line	4+92.90		5+29.67'	385724.19	2482302.66	S61°15'27"E	36.77'						
Curve	5+29.67	6+00.37'	6+68.97'	385706.5	2482334.9		139.30'	24°06'45"	S49°12'04"E	138.27'	331.00'	70.70'	17°18'36"
Line	6+68.97		7+49.15'	385616.16	2482439.57	S37°08'42"E	80.18'						
Curve	7+49.15	7+83.62'	8+16.71'	385552.24	2482487.99		67.56'	28°02'59"	S51°10'11"E	66.89'	138.00'	34.47'	41°31'07"
Line	8+16.71		8+57.23'	385510.31	2482540.09	S65°11'40"E	40.52'						
Curve	8+57.23	8+85.48'	9+12.30'	385493.31	2482576.87		55.07'	31°33'08"	S49°25'06"E	54.38'	100.00'	28.25'	57°17'45"
Line	9+12.30		10+78.08'	385457.93	2482618.17	S33°38'32"E	165.79'						
Line	10+78.08		11+61'	385319.91	2482710.02	S33°42'35"E	82.92'						
Curve	11+61	11+74.73'	11+88.38'	385250.94	2482756.04		27.38'	10°27'30"	S38°56'20"E	27.34'	150.00'	13.73'	38°11'50"
Line	11+88.38		12+27.16'	385229.67	2482773.22	S44°10'05"E	38.78'						
Curve	12+27.16	12+81.69'	13+34.78'	385201.85	2482800.24		107.61'	22°50'11"	S32°44'59"E	106.90'	270.00'	54.53'	21°13'14"
Line	13+34.78		13+82.71'	385111.94	2482858.07	S21°19'54"E	47.93'						
Curve	13+82.71	14+64.14'	15+42.28'	385067.29	2482875.51		159.57'	28°07'51"	S35°23'49"E	157.97'	325.00'	81.43'	17°37'46"
Line	15+42.28		15+84.48'	384938.52	2482967.01	S49°27'45"E	42.20'						
Curve	15+84.48	15+96.15'	16+07.71'	384911.1	2482999.08		23.23'	13°18'42"	S56°07'05"E	23.18'	100.00'	11.67'	57°17'45"
Line	16+07.71		16+54.98'	384898.17	2483018.33	S62°46'26"E	47.27'						
Curve	16+54.98	16+58.05'	16+61.11'	384876.55	2483060.36		6.13'	7°01'33"	S59°15'40"E	6.13'	50.00'	3.07'	114°35'30"
Line	16+61.11		17+00'	384873.41	2483065.63	S55°44'53"E	38.89'						

EAST PATH (EP)
(0+00 TO 9+66)

Type	Start Station	PI Station	End Station	Northing	Easting	Bearing	Length	Delta Angle	Chord Direction	Chord length	Radius	Tangent Distance	Degree of Curve
Line	0+00'		1+61.72'	386035.55	2481982.66	S52°42'25"E	161.72'						
Line	1+61.72'		2+64.97'	385937.57	2482111.31	S50°56'24"E	103.25'						
Line	2+64.97'		4+40.36'	385872.51	2482191.49	S48°12'38"E	175.39'						
Curve	4+40.36'	4+45.11'	4+49.83'	385755.63	2482322.26		9.47'	10°51'08"	S53°38'12"E	9.46'	50.00'	4.75'	114°35'30"
Line	4+49.83'		4+52.12'	385750.03	2482329.87	S59°03'46"E	2.30'						
Curve	4+52.12'	4+83.83'	5+15.50'	385748.84	2482331.84		63.38'	4°50'31"	S56°38'31"E	63.36'	750.00'	31.71'	7°38'22"
Line	5+15.50'		5+51.32'	385714	2482384.76	S54°13'16"E	35.81'						
Curve	5+51.32'	5+68.25'	5+85.15'	385693.07	2482413.82		33.83'	7°02'54"	S50°41'49"E	33.81'	275.00'	16.94'	20°50'05"
Line	5+85.15'		6+64.11'	385671.65	2482439.98	S47°10'21"E	78.97'						
Curve	6+64.11'	6+66.36'	6+68.59'	385617.97	2482497.89		4.47'	10°15'13"	S42°02'45"E	4.47'	25.00'	2.24'	229°10'59"
Line	6+68.59'		7+19.11'	385614.65	2482500.88	S36°55'08"E	50.52'						
Curve	7+19.11'	7+29.03'	7+38.44'	385574.26	2482531.23		19.33'	31°38'59"	S52°44'37"E	19.09'	35.00'	9.92'	163°42'08"
Line	7+38.44'		7+67.70'	385562.71	2482546.42	S68°34'07"E	29.26'						
Curve	7+67.70'	7+72.67'	7+77.60'	385552.02	2482573.66		9.90'	12°36'09"	S62°16'03"E	9.88'	45.00'	4.97'	127°19'26"
Line	7+77.60'		8+26.55'	385547.42	2482582.41	S55°57'58"E	48.95'						
Curve	8+26.55'	8+35.53'	8+44.34'	385520.02	2482622.98		17.79'	18°31'53"	S46°42'02"E	17.71'	55.00'	8.97'	104°10'27"
Line	8+44.34'		9+66.00'	385507.87	2482635.87	S37°26'05"E	121.66'						

EAST WALL (EW)
(0+00 TO 0+45)

Type	Start Station	PI Station	End Station	Northing	Easting	Bearing	Length	Delta angle	Chord Direction	Chord length	Radius	Tangent Distance	Degree of Curve
Line	0+00'		0+21.17'	385973.32	2481897.70	S51°23'22"E	21.17'						
Line	0+21.17'		0+45'	385960.11	2481914.25	N38°36'38"E	23.83'						

WEST WALL (WW)
(0+00 TO 11+42.50)

Type	Start Station	PI Station	End Station	Northing	Easting	Bearing	Length	Delta angle	Chord Direction	Chord length	Radius	Tangent Distance	Degree of Curvature
Line	9+95'		10+02.20'	385955.53	2481879.02	S42°21'06"E	7.20'						
Line	10+02.20'		10+39.78'	385950.21	2481883.86	S51°23'22"E	37.59'						
Curve	10+39.78'	10+77.20'	11+11.38'	385903.40	2481942.47		71.60'	41°05'31"	S71°56'07"E	70.07'	99.83'	37.42'	57°23'31"
Line	11+11.38'		11+28.99'	385905.02	2481979.85	N87°32'55"E	17.61'						
Curve	11+28.99'	11+35.75	11+42.50'	385906.07	248004.20		13.51'	4°13'17"	N89°39'34"E	13.51'	183.34'	6.76'	31°15'02"

PEDESTRIAN BRIDGE
(0+00 to 1+75)

Type	Start Station	End Station	Start Northing	Start Easting	Bearing	Length	End Northing	End Easting
Line	0+75	1+75	385777.28	2482315.84	S30°58'46"W	25.00'	385691.54	2482264.37

WALL STREET (WS)
(0+00 TO 2+00)

Type	Start Station	End Station	Northing	Easting	Bearing	Length
Line	0+00'	2+00'	385330.11	2482593.44	N65°21'51"E	200.00'

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

ALIGNMENT DATA

DRAWING NO.	G-4
SHEET NO.	4
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_G.dwg

Plot Date: 12/30/2025 - 8:20am
User Name: mmeyer
Xrefs: Border: 193806812_XPL, 193806812_XSNO, 193806812_XSXT

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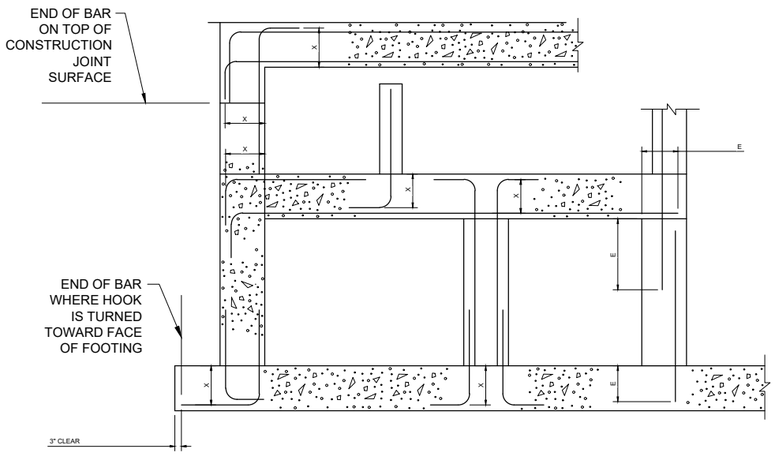


SECTION

REINFORCEMENT LENGTHS AND EMBEDMENTS				
BAR SIZE	BAR LAP LENGTHS SLABS OR FOOTINGS		STANDARD HOOKS	
	STD.	TOP BAR*	LENGTH	EMBEDMENT
#3	17 IN.	22 IN	6 IN.	6 IN.
#4	22 IN.	29 IN.	8 IN.	7 IN.
#5	28 IN.	36 IN.	10 IN.	8 IN.
#6	33 IN.	43 IN.	12 IN.	10 IN.
#7	48 IN.	63 IN.	14 IN.	12 IN.
#8	55 IN.	72 IN.	16 IN.	14 IN.
#9	62 IN.	81 IN.	19 IN.	15 IN.
#10	69 IN.	90 IN.	21 IN.	17 IN.
#11	76 IN.	99 IN.	23 IN.	19 IN.

* TOP BAR LAP SPLICES ARE HORIZONTAL REINFORCEMENT PLACED SUCH THAT MORE THAN 12 IN. OF CONCRETE IS CAST IN THE MEMBER BELOW THE SPLICE.

NOTES:

1. USE BAR LAP SPLICE LENGTHS AS SHOWN IN THE TABLE UNLESS SHOWN OTHERWISE.
2. VALUES SHOWN IN TABLE APPLY TO f'c = 5,000 PSI, fy = 60,000 PSI, 1.5" MIN. CONCRETE COVER AND 3" MIN BAR SPACING.
3. VALUES SHOWN COMPLY WITH THE MOST CONSERVATIVE REQUIREMENTS OF BOTH ACI 318 AND A.R.E.M.A.
4. MULTIPLY LAP SPLICE LENGTHS SHOWN IN THE TABLE BY 1.5 FOR EPOXY COATED REINFORCING.
5. WHEN BARS OF DIFFERENT SIZES ARE LAB SPLICED, BAR LAP LENGTH SHALL BE THE LARGER OF: EMBEDMENT LENGTH OF LARGER BAR OR LAP LENGTH OF SMALLER BAR.
6. USE MECHANICAL COUPLERS FOR SPLICES OF #11 AND LARGER BARS UNLESS DRAWINGS INDICATE LAP SPLICES SHOWN IN TABLE ARE UNACCEPTABLE.

STANDARD 90° BAR HOOKS, EMBEDMENT LENGTHS AND LAP LENGTHS

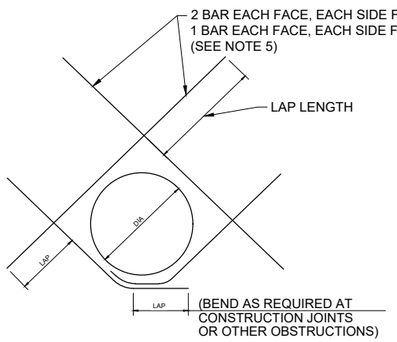
NTS

1

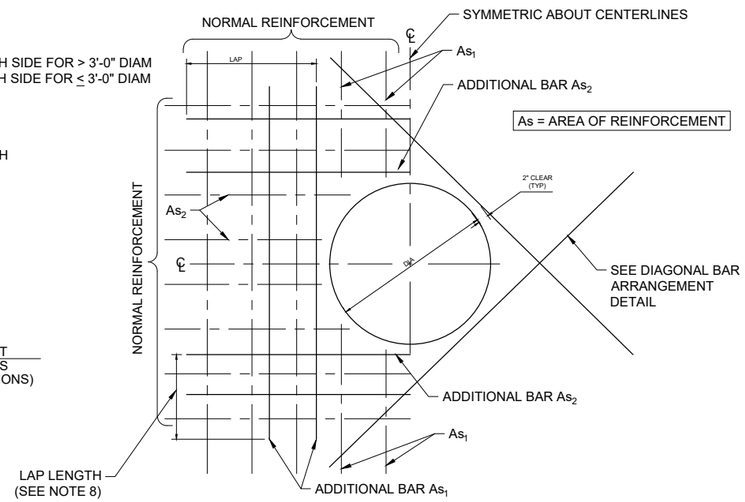
NOTES TO DESIGNER:

A. LAP LENGTHS ARE PER ACI 318-11 AND 12.2.3, Cb=1.5, Ktr=0.

B. THESE LAPS DO NOT NECESSARILY APPLY FOR BEAMS AND COLUMNS. DETERMINE THOSE SPLICE LENGTHS PER ACI 318 AND SHOW ON DRAWINGS.



DIAGONAL BAR ARRANGEMENT



NOTES:

1. THIS DETAIL TO BE USED AT ALL CIRCULAR OPENINGS EXCEPT WHEN OTHER DETAILING IS INDICATED ON THE DRAWINGS.
2. CUT NORMAL REINFORCEMENT 2" CLEAR OF OPENING.
3. CUT NORMAL REINFORCEMENT AT OPENINGS:
   A. As_1 AND As_2 = ½ AREA OF TOTAL CUT BARS TO BE ADDED ON EACH SIDE OF OPENING.
4. DIAGONAL AND ADDITIONAL BARS As_1 AND As_2 TO BE PLACED.
   A. AT CENTERLINE OF WALLS OR SLABS WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
   B. AT EACH FACE OF WALLS OR SLABS WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
5. UNLESS OTHERWISE NOTED, SIZE OF DIAGONAL BARS SHALL BE THE SIZE OF THE LARGEST NORMAL REINFORCING BAR CUT.
6. INCREASE SIZE OF ADDITIONAL BARS AS NEEDED TO FIT WITHIN A DISTANCE OF 2X WALL/ SLAB THICKNESS FROM OPENING, PROVIDE 2" MIN CLEAR BETWEEN BARS.
7. WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPENING, ADDITIONAL BARS ON THAT SIDE OF THE OPENING MAY BE OMITTED.
8. WHEN THE LAP LENGTH OF THE ADDITIONAL BARS CANNOT BE ACHIEVED DUE TO AN ADJACENT WALL OR SLAB, ADDITIONAL CORNER BARS OR SLAB DOWELS, RESPECTIVELY, MATCHING THE CUT BARS, ARE TO BE INCLUDED IN THE ADJACENT WALL OR SLAB TO LAP WITH THE ADDITIONAL BARS.

ADDITIONAL REINFORCEMENT AT CIRCULAR OPENINGS

NTS

2

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

STRUCTURAL NOTES

DRAWING NO.	G-5
SHEET NO.	5
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_G.dwg

Plot Date: 12/30/2025 - 8:20pm
Plotted by: Bunsen Wilson
Xrefs: Bunsen 193806812_XR, 193806812_XNO, 193806812_JOIT

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STRUCTURAL NOTES

GENERAL

1. THESE NOTES ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.
2. STRUCTURAL DIMENSIONS CONTROLLED BY OR RELATED TO MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE COORDINATED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. BOLT SIZES, TYPES, AND PATTERNS SHALL BE VERIFIED WITH THE MANUFACTURER. ALL BOLT PATTERNS SHALL BE TEMPLATED TO ENSURE ACCURACY OF PLACEMENT.
3. MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED FOR PRIOR TO PLACING CONCRETE.
4. STRUCTURAL DRAWINGS SHALL BE USED IN COORDINATION WITH MECHANICAL, ELECTRICAL, ARCHITECTURAL, CIVIL DRAWINGS AND SHOP DRAWINGS PROVIDED BY MANUFACTURERS OF EQUIPMENT.
5. STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL, HYDROSTATIC, AND BACKFILL LOADS ON THE COMPLETED STRUCTURES. THE STRUCTURES HAVE NOT BEEN DESIGNED TO RESIST THESE LOADS WHILE ONLY PARTIALLY CONSTRUCTED. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED FROM ALL CONSTRUCTION LOADS BY BRACING AND BALANCING UNTIL ALL STRUCTURAL ELEMENTS ARE IN PLACE, AND ALL CONCRETE HAS REACHED THE SPECIFIED 28 DAY COMPRESSIVE STRENGTH. OVERLOADING OF ANY STRUCTURAL ELEMENT IS PROHIBITED.
6. UNLESS OTHERWISE SHOWN, ON ALL STRUCTURAL DRAWINGS THE FINISHED GRADE AROUND STRUCTURES IS SHOWN THUS, ////////// INDICATING EITHER GROUND SURFACE, TOP OF CONCRETE SLAB, OR AC PAVEMENT. FOR DETAILS OF FINISH SURFACES, SEE CIVIL DRAWINGS.

REINFORCED CAST-IN-PLACE CONCRETE

1. ALL STRUCTURAL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH PER CONCRETE MIX SCHEDULE IN SECTION 03 30 00 OF THE TECHNICAL SPECIFICATIONS.
2. REINFORCEMENT STEEL SHALL BE PER SECTION 03 21 00 OF THE TECHNICAL SPECIFICATIONS.
3. ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS, UNLESS OTHERWISE INDICATED, SHALL BE IN ACCORDANCE WITH ACI-315, "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", LATEST EDITION.
4. TOLERANCES IN PLACING REINFORCEMENT SHALL BE:

   +/- 3/8 INCH FOR MEMBERS WITH DEPTH D </= 8 INCHES

   +/- 1/2 INCH FOR MEMBERS WITH DEPTH D > 8 INCHES
5. ALL CONSTRUCTION JOINTS, SHALL BE ROUGH AND THOROUGHLY CLEANED FOR BOND.
6. LOCATION OF ALL CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER. ALL CONSTRUCTION JOINTS LOCATED ON THE DRAWINGS, OR REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON THE DRAWINGS, SHALL HAVE A 6" FLATSTRIP WATERSTOP IF IN CONTACT WITH WATER. IN ADDITION, JOINTS IN ALL SLABS COVERED WITH WATER SHALL HAVE BOTH A 6" FLATSTRIP WATERSTOP AND A SEALANT GROOVE.
7. DOWELS, PIPE, WATERSTOPS AND OTHER INSTALLED MATERIALS AND ACCESSORIES SHALL BE HELD SECURELY IN POSITION WHILE CONCRETE IS BEING PLACED.
8. UNLESS OTHERWISE INDICATED, ASIDE FROM NORMAL ACCESSORIES USED TO HOLD REINFORCING BARS FIRMLY IN POSITION, THE FOLLOWING SHALL BE ADDED:

   A. IN SLABS #5 RISER BARS AT 36 INCHES OC MAXIMUM TO SUPPORT TOP REINFORCING BARS.

   B. IN WALLS WITH 2 CURTAINS #3 U OR Z SHAPE SPACERS AT 6 FEET OC EACH WAY.

   +/- 3/8 INCH FOR MEMBERS WITH DEPTH D </= 8 INCHES

   +/- 1/2 INCH FOR MEMBERS WITH DEPTH D > 8 INCHES
9. VERTICAL REINFORCEMENT FOR CONCRETE SHALL BE SPLICED WITH DOWEL BARS OF THE SAME SIZE AND SPACING FROM THE FOUNDATION USING A STANDARD SPLICE LENGTH UNLESS INDICATED OTHERWISE.
10. SEALANT SHALL BE PLACED AT THE TOP OF ALL JOINTS RECEIVING EXPANSION JOINT FILLER. SEALANT DEPTH SHALL BE THE JOINT FILL THICKNESS OR 1/2", WHICHEVER IS LESS.
11. ALL GROUT SHALL BE NON-SHRINK GROUT PER SECTION 03 60 00 OF THE TECHNICAL SPECIFICATIONS, UNLESS INDICATED OTHERWISE.
12. METAL CLIPS OR SUPPORTS SHALL NOT BE PLACED IN CONTACT WITH THE FORMS OR THE SUBGRADE. CONCRETE BLOCKS (OR DOBIES) SUPPORTING BARS ON SUBGRADE SHALL BE IN SUFFICIENT NUMBERS TO SUPPORT THE BARS WITHOUT SETTLEMENT, BUT IN NO CASE SHALL SUCH SUPPORT BE CONTINUOUS.
13. DOWELS SHALL BE WIRED OR OTHERWISE HELD IN POSITION. THEY SHALL NOT BE INSERTED INTO FRESHLY PLACED CONCRETE.
14. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, LAPS OF REINFORCEMENT SHALL BE AS SHOWN ON DWG NO. G-5.
15. REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY PIPE, PIPE FLANGE OR METAL PARTS EMBEDDED IN CONCRETE, A MINIMUM OF 2 INCHES CLEARANCE SHALL BE PROVIDED AT ALL TIMES.
16. ALL ITEMS EMBEDDED IN CONCRETE SHALL BE SPACED ON CENTER AT LEAST 3 TIMES THEIR OUTSIDE DIMENSION. THE OUTSIDE DIMENSION SHALL NOT EXCEED ONE THIRD OF THE MEMBER THICKNESS
17. UNLESS OTHERWISE SHOWN ON THE DRAWINGS CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS:

FOR CONCRETE PLACED AGAINST EARTH (SEE CONSTRUCTION JOINT DETAILS FOR THIN SLABS-ON-GRADE, BOTTOM COVER MAY BE LESS THAN 3" IF SO INDICATED)	3"
FOR SURFACES IN CONTACT WITH WATER OR WEATHER AND FORMED SURFACES IN CONTACT WITH EARTH	2" PLUS THICKNESS OF CONCRETE FORMLINER IF APPLICABLE
FOR CONCRETE NOT EXPOSED TO WEATHER, OR IN CONTACT WITH WATER OR EARTH	1 1/2" PLUS THICKNESS OF CONCRETE FORMLINER IF APPLICABLE

18. UNLESS OTHERWISE NOTED, WALLS AND SLABS SHOWN WITH A SINGLE LAYER OF REINFORCEMENT SHALL HAVE THAT REINFORCEMENT CENTERED
19. SLABS WITH SLOPING SURFACES SHALL HAVE THE INDICATED SLAB THICKNESS MAINTAINED AS THE MINIMUM. SLAB-ON-GRADE BOTTOMS MAY EITHER SLOPE WITH THE TOP SURFACE OR BE LEVEL. REINFORCING IN SLABS WITH SLOPING SURFACES SHALL BE PLACED AT THE REQUIRED CLEARANCE FROM THE SLAB SURFACES.

RETAINING WALL DESIGN CRITERIA

DESIGN LOADINGS/CRITERIA:

DEAD LOAD	
CONCRETE STRUCTURE WEIGHT	150 PCF
SUPERIMPOSED DEAD LOAD	
SATURATED SOIL WEIGHT	130 PCF
MOIST SOIL WEIGHT	125 PCF
AT-REST LATERAL EARTH COEFF.	0.45
LIVE LOADS	
CONSTRUCTION LIVE LOAD - UNIFORM	250 PSF
VEHICLE LIVE LOAD - CONCENTRATED	H20 - 16 KIP WHEEL
WIND	
RETAINING WALL	50 PSF
SEISMIC CRITERIA	NOT APPLICABLE
MINIMUM ALLOWABLE BEARING PRESSURE	4,000 PSF

RETAINING WALL STRUCTURAL NOTES

CONCRETE	PLANT READY-MIX MINIMUM 28 DAY COMPRESSIVE STRENGTH, f'c = 4,500 PSI PER CONCRETE MIX SCHEDULE IN SECTION 03 30 00 OF THE TECHNICAL SPECIFICATIONS
REINFORCEMENT	REINFORCEMENT SHALL BE ASTM A615, fy = 60 ksi PER SECTION 03 21 00 OF THE TECHNICAL SPECIFICATIONS
WATERSTOP	
TYPE 1	9" TEE WATERSTOP
TYPE 2	6" WIDE PVC
TYPE 3	9" WIDE PVC
TYPE 4	SIKE HYDROTITE CJ-1020-2K OR APPROVED EQUAL

1. FIELD VERIFY DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
2. DEMOLISH AND REMOVE EXISTING WALL AND FOUNDATION AS SHOWN ON SHEET DWG NO. D-1 THRU DWG NO. D-3. EXCAVATE SOILS AS NECESSARY FOR FLOOD WALL CONSTRUCTION OPERATIONS.
3. EXCAVATE FOR CONCRETE SHEAR KEY. DEPTHS MAY VARY. SOIL SHEAR STRENGTHS MEET OR EXCEED 2,000 PSF (COHESIVE SOILS) OR 32 DEGREES (GRANULAR SOILS). COMPACT BASE SOILS PRIOR TO PLACING CONCRETE. VERIFY. IMPROVE BASE SOILS AS NECESSARY.
4. REINFORCEMENT LAP SPLICES AND 90 DEG. END HOOKS SHALL BE AS SHOWN IN THE TABLE ON SHEET DWG NO. G-5 UNLESS NOTED.
5. REINFORCING BARS SHALL HAVE THE FOLLOWING CONCRETE COVER UNLESS NOTED:

   A. CONCRETE EXPOSED TO FLOWING WATER 4"

   B. CONCRETE CAST AGAINST EARTH 3"

   C. ALL OTHER CONCRETE 2"
8. CONCRETE SHALL BE PLACED WITHOUT CONSTRUCTION JOINTS EXCEPT WHERE SPECIFICALLY SHOWN ON THE DRAWINGS OR AS APPROVED BY THE ENGINEER.
9. PROVIDE WATERSTOP AT ALL CONCRETE CONSTRUCTION JOINTS.
10. BEVEL ALL EXPOSED CORNERS OF CONCRETE 3/4" X 3/4".

FOR BIDDING AND CONSTRUCTION

DESIGNER M. SIERACKI
DRAWN BY A. ROCK
CHECKER D. AMUNDSEN
APPROVED R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

STRUCTURAL NOTES

DRAWING NO.	G-6
SHEET NO.	6
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_G.dwg

Plot Date: 12/30/2025 - 8:20am
User Name: mike.sieracki
Xrefs: Border: 193806812_XPL, 193806812_KNO: 193806812_2ASIT

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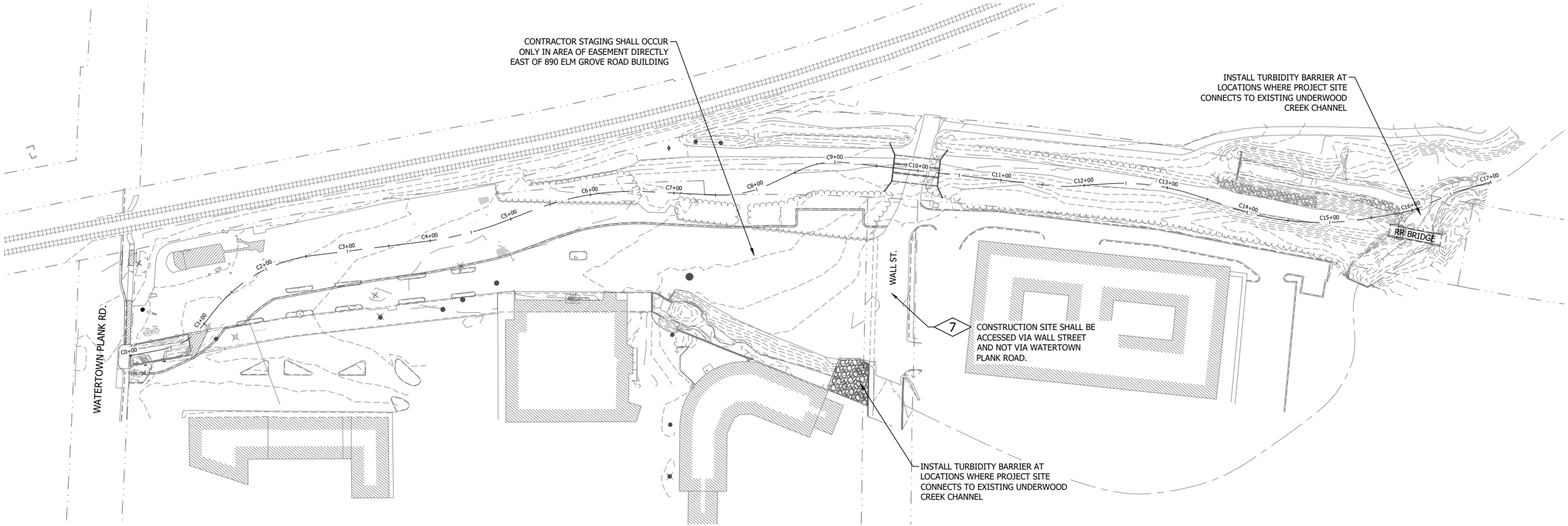


1 EROSION CONTROL NOTES

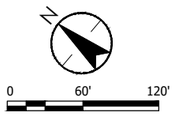
1. POST WDNR CERTIFICATE OF PERMIT COVERAGE ON SITE AND MAINTAIN UNTIL CONSTRUCTION ACTIVITIES HAVE CEASED, THE SITE IS STABILIZED, AND A NOTICE OF TERMINATION IS FILED WITH WDNR.
2. KEEP A COPY OF THE CURRENT EROSION CONTROL PLAN ON SITE THROUGHOUT THE DURATION OF THE PROJECT.
3. SUBMIT PLAN REVISIONS OR AMENDMENTS TO THE WDNR AT LEAST 5 DAYS PRIOR TO FIELD IMPLEMENTATION.
4. CONTRACTOR IS RESPONSIBLE FOR ROUTINE SITE INSPECTIONS AT LEAST ONCE EVERY 7 DAYS AND WITHIN 24 HOURS AFTER A RAINFALL EVENT OF 0.5 INCHES OR GREATER. KEEP INSPECTION REPORTS ON-SITE AND MAKE THEM AVAILABLE UPON REQUEST.
5. INSPECT AND MAINTAIN ALL INSTALLED EROSION CONTROL PRACTICES UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.
6. REFER TO THE WDNR STORMWATER CONSTRUCTION TECHNICAL STANDARDS AT http://dnr.wi.gov/topic/stormwater/standards/const_standards.html.
7. INSTALL CONSTRUCTION ENTRANCE(S) PRIOR TO ANY LAND-DISTURBING ACTIVITIES, INCLUDING CLEARING AND GRUBBING. USE **WDNR TECHNICAL STANDARD *TRACKOUT CONTROL PRACTICES #1057*** FOR CONSTRUCTION ENTRANCE(S).
8. INSTALL INLET PROTECTION PRIOR TO LAND-DISTURBING ACTIVITIES IN THE CONTRIBUTING DRAINAGE AREA AND/OR IMMEDIATELY UPON INLET INSTALLATION. COMPLY WITH **WDNR TECHNICAL STANDARD *STORM DRAIN INLET PROTECTION FOR CONSTRUCTION SITES #1060.***
9. PROVIDE ANTI-SCOUR PROTECTION AND MAINTAIN NON-EROSIVE FLOW DURING DEWATERING. PERFORM DEWATERING OF ACCUMULATED SURFACE RUNOFF IN ACCORDANCE WITH **WDNR TECHNICAL STANDARD *DEWATERING PRACTICES FOR SEDIMENT CONTROL #1061.***
10. INSTALL AND MAINTAIN PERIMETER SEDIMENT CONTROL PER **WDNR TECHNICAL STANDARD *PERIMETER SEDIMENT CONTROL AND SLOPE INTERRUPTION #1056.***
11. LOCATE, INSTALL, AND MAINTAIN DITCH CHECKS PER **WDNR TECHNICAL STANDARD *DITCH CHECKS #1062.***
12. IMMEDIATELY STABILIZE STOCKPILES AND SURROUND STOCKPILES AS NEEDED WITH SILT FENCE OR OTHER PERIMETER CONTROL IF STOCKPILES WILL REMAIN INACTIVE FOR 7 DAYS OR LONGER.
13. IMMEDIATELY STABILIZE ALL DISTURBED AREAS THAT WILL REMAIN INACTIVE FOR 14 DAYS OR LONGER.
14. STABILIZE AREAS OF FINAL GRADING WITHIN 7 DAYS OF REACHING FINAL GRADE.
15. SWEEP/CLEAN UP ALL SEDIMENT/TRASH THAT MOVES OFF-SITE DUE TO CONSTRUCTION ACTIVITY OR STORM EVENTS BEFORE THE END OF THE SAME WORKDAY OR AS DIRECTED BY THE OWNER. SEPARATE SWEPT MATERIALS (SOILS AND TRASH) AND DISPOSE OF APPROPRIATELY.
16. CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST PER **WDNR TECHNICAL STANDARD *DUST CONTROL #1068.***
17. MAKE PROVISIONS FOR WATERING DURING THE FIRST 8 WEEKS FOLLOWING SEEDING OR PLANTING OF DISTURBED AREAS WHENEVER MORE THAN 7 CONSECUTIVE DAYS OF DRY WEATHER OCCUR.
18. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL-APPLICABLE WDNR REQUIREMENTS FOR HANDLING AND DISPOSING OF CONTAMINATED MATERIALS.

CHANNEL SEQUENCING

IT IS ANTICIPATED THAT THE NEW UNDERWOOD CREEK CHANNEL WILL BE CONSTRUCTED IN THE DRY, BEGINNING AT THE DOWNSTREAM END SOUTH OF WALL STREET AND PROCEEDING UPSTREAM TO WHERE THE NEW CHANNEL CONNECTS TO THE EXISTING CHANNEL NEAR WATERTOWN PLANK ROAD. THE NEW CHANNEL BED AND BANKS WILL BE EXCAVATED AND SHAPED AS THE WORK PROCEEDS UPSTREAM. THE CHANNEL BANKS, CONSISTING OF EITHER REINFORCED CONCRETE WALLS, STEPPED QUARRY STONE BLOCKS, OR VEGETATED SLOPES, WILL BE CONSTRUCTED AS THE EXCAVATION PROCEEDS. THE CHANNEL BED, CONSISTING OF SEQUENCES OF GLIDE, RIFFLE, RUN, AND POOL SECTIONS, WILL BE INSTALLED IN CONJUNCTION WITH THE CHANNEL BANKS.

THE CHANNEL BED WILL BE STABILIZED THROUGH PLACEMENT OF APPROPRIATE BED MATERIALS. THE CONCRETE AND STONE PORTIONS OF THE CHANNEL BANKS WILL BE STABILIZED BY THE INHERENT SCOUR RESISTANCE OF THE CONCRETE OR STONE MATERIAL. THE VEGETATED BANKS WILL BE SEEDED AND STABILIZED WITH APPROPRIATE EROSION CONTROL MATTING. STREAM BANKS WILL BE SEEDED AND MATTED AS THE CHANNEL CONSTRUCTION PROGRESSES.

AFTER THE NEW CHANNEL IS COMPLETED AS FAR UPSTREAM AS POSSIBLE PRIOR TO CONNECTION TO THE EXISTING CHANNEL, FLOW WILL BE DIVERTED INTO THE NEW CHANNEL AND THE CHANNEL CONSTRUCTION WILL BE COMPLETED. THE CONNECTION WILL BE MADE DURING LOW FLOW CONDITIONS. AFTER DIVERTING STREAM FLOW INTO THE NEW CHANNEL, THE OLD BOX CULVERT WILL BE ABANDONED AND BULKHEADED. THE VILLAGE OF ELM GROVE WILL BE RESPONSIBLE FOR LONG-TERM MAINTENANCE OF THE NEW CHANNEL.



FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

SUGGESTED EROSION CONTROL MEASURES

DRAWING NO.	EC-1
SHEET NO.	7
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_EC.dwg

Plot Date: 12/30/2025 - 8:20am
Plot By: Andrew Rock
Xrefs: Border: I:\193806812_XAT_193806812_CAD\Sheets\193806812_EC.dwg
Xrefs: Border: I:\193806812_XAT_193806812_CAD\Sheets\193806812_KNU_193806812_XAP_193806812_XSNO

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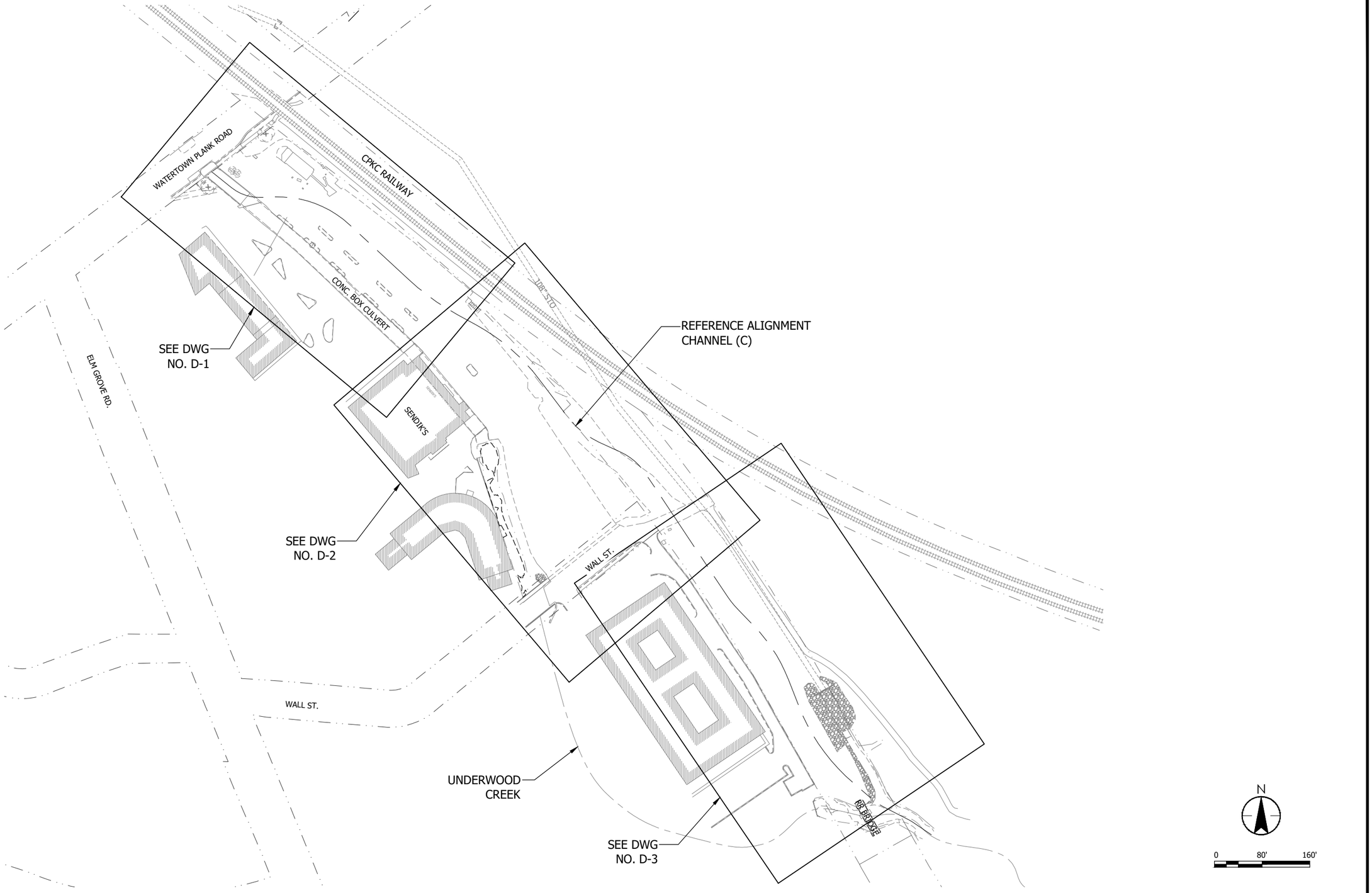

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

DEMOLITION AND REMOVALS SHEET INDEX

DRAWING NO.	D-0
SHEET NO.	8
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_D.dwg

Plot Date: 12/30/2025 - 8:20pm
Plot By: Andrew Rock
Xrefs: Border: 193804812_XSIT, 193804812_XPr, 193804488_XQ4_2022_Easements, 193804812_XXNO

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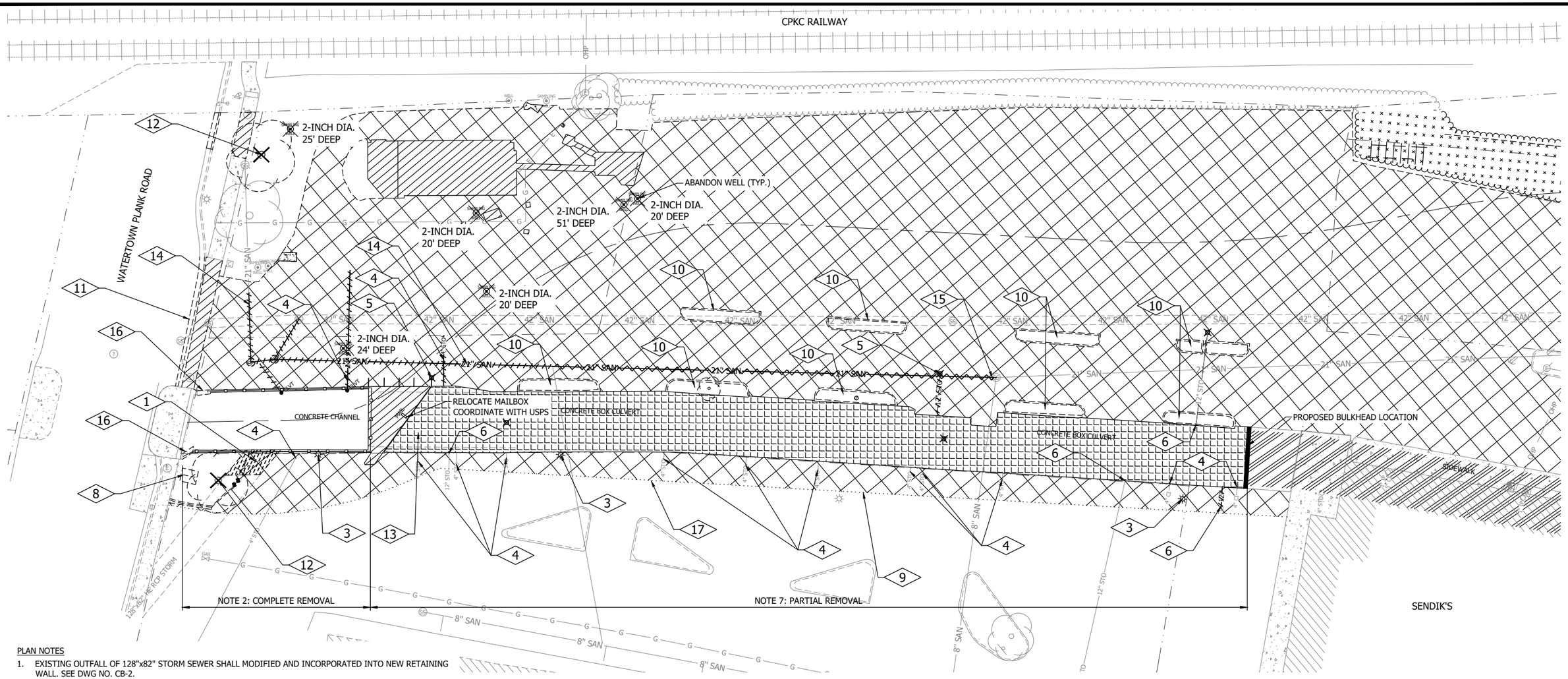

PLAN NOTES

1. EXISTING OUTFALL OF 128"x82" STORM SEWER SHALL MODIFIED AND INCORPORATED INTO NEW RETAINING WALL. SEE DWG NO. CB-2.
2. REMOVE CONCRETE CHANNEL, INCLUDING; WALLS, RAILINGS, PAVED INVERT AND ASSOCIATED ITEMS. SEE DWG NO. CB-2 AND DWG NO. CB-3 FOR REMOVAL LIMITS ADJACENT TO WATERTOWN PLANK ROAD.
3. SALVAGE LIGHT POLE AND FIXTURE, STORE, AND REINSTALL AFTER COMPLETION OF CHANNEL CONSTRUCTION.
4. ABANDON STORM SEWER
5. ABANDON STORM INLET AND STORM PIPE
6. EXISTING STORM LINES CONNECTED TO THE BOX CULVERT SHALL BE RECONNECTED TO THE PROPOSED STORM SEWER AS SHOWN IN DWG NO. ST-3.
7. REMOVE THE TOP OF THE CONCRETE BOX CULVERT. REMOVE THE WALLS OF THE CULVERT TO MINIMUM 3-FEET BELOW GROUND SURFACE OR AS REQUIRED FOR SEWER CONSTRUCTION.
8. SIGN TO BE REMOVED BY OTHERS. CONTRACTOR TO REMOVE AND DISPOSE OF MASONRY PEDESTAL AND ASSOCIATED WIRING.
9. SAWCUT ASPHALT
10. REMOVE PARKING LOT ISLANDS AND VEGETATION.
11. REMOVE PARKING LOT ENTRANCE. REPLACE WITH STANDARD CURB AND SIDEWALK
12. REMOVE TREES
13. COMPLETELY REMOVE UPSTREAM END OF EXISTING CULVERT AS NECESSARY TO ALLOW UNOBSTRUCTED CONSTRUCTION OF RETAINING WALL.
14. REMOVE EXISTING 21-INCH SANITARY SEWER AND MANHOLES AS NECESSARY TO ALLOW UNOBSTRUCTED CONSTRUCTION OF CHANNEL AND BANKS. BULKHEAD SEWER AT BOTH ENDS OF REMOVAL.
15. BULKHEAD END OF ABANDONED 21-INCH SANITARY SEWER AT THE EXISTING MANHOLE.
16. SAWCUT AND REMOVE BRIDGE WING WALLS.
17. ERECT CONSTRUCTION FENCING ALONG CONSTRUCTION LIMITS.

REMOVALS LEGEND

- SAWCUT ASPHALT
- CURB & GUTTER REMOVAL
- SANITARY SEWER REMOVAL
- SANITARY SEWER ABANDONMENT
- ASPHALT REMOVAL
- CONCRETE REMOVAL
- BOX CULVERT ABANDONMENT - BULKHEAD
- BOX CULVERT ABANDONMENT - PARTIAL REMOVAL
- CLEAR AND GRUBBING
- SALVAGE RIPRAP
- REMOVE SANITARY MANHOLE

0 20' 40'

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
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CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

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REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

DEMOLITION AND REMOVALS PLAN

DRAWING NO.	D-1
SHEET NO.	9
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_D.dwg

Plot Date: 12/30/2025 - 8:20am
File Name: C:\Users\mike.sieracki\Desktop\193806812_D.dwg
Xrefs: Border: 193806812_XAT, 193806812_XER, 193804499_XSM_20222 Easements, 193806812_XSNO

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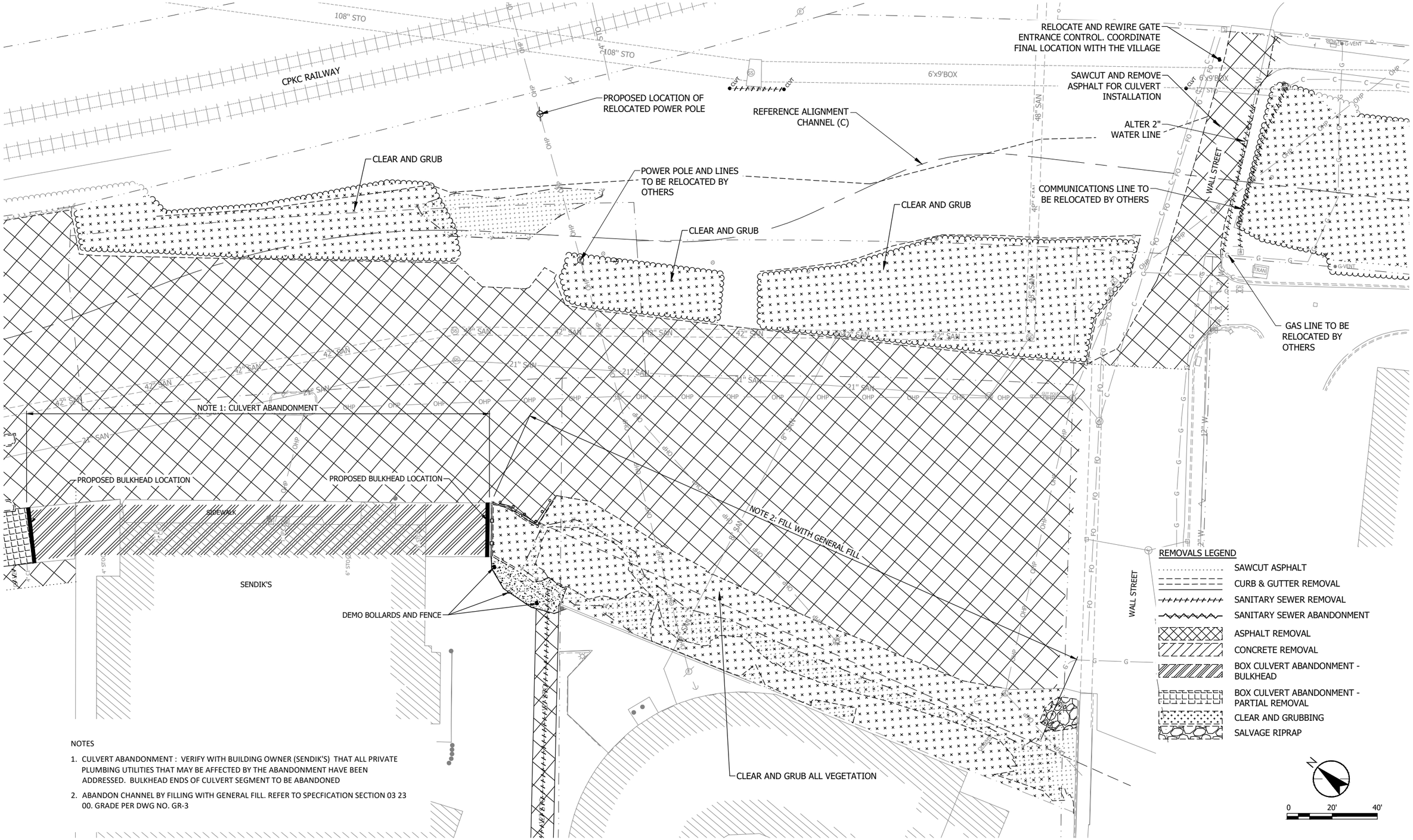

NOTES

1. CULVERT ABANDONMENT : VERIFY WITH BUILDING OWNER (SENDIK'S) THAT ALL PRIVATE PLUMBING UTILITIES THAT MAY BE AFFECTED BY THE ABANDONMENT HAVE BEEN ADDRESSED. BULKHEAD ENDS OF CULVERT SEGMENT TO BE ABANDONED
2. ABANDON CHANNEL BY FILLING WITH GENERAL FILL. REFER TO SPECFICATION SECTION 03 23 00. GRADE PER DWG NO. GR-3

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

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REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

DEMOLITION AND REMOVALS PLAN

DRAWING NO.	D-2
SHEET NO.	10
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_D.dwg

Plot Date: 12/30/2025 - 8:21 am
Plotted by: Andrew.Rock
Xrefs: Border: I:\193806812_XSPI: I:\193806812_XSPI: I:\193804469_JOB_2022_Easements_193806812_JOBO

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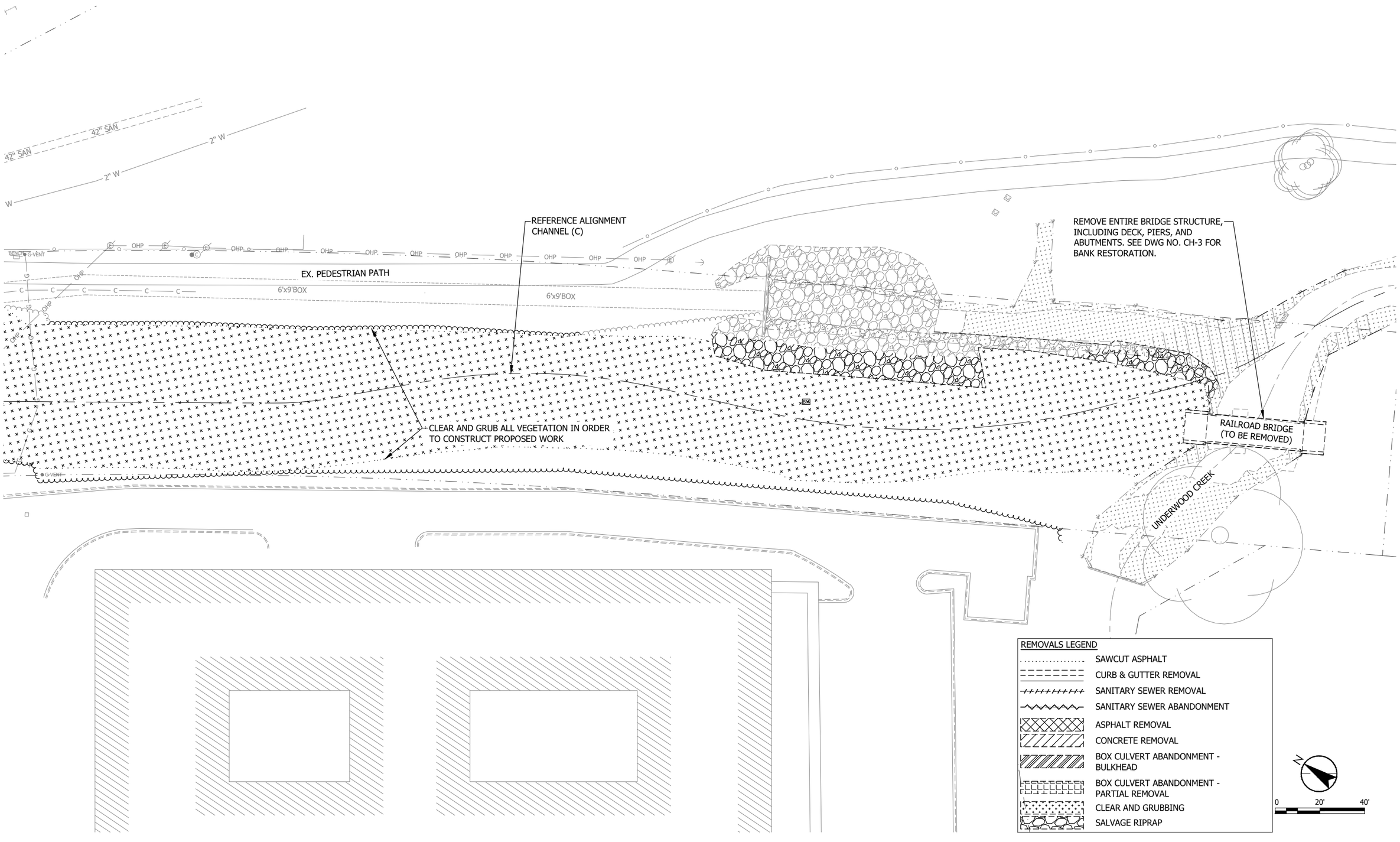

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APPROVED	R. KLEIN

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REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

DEMOLITION AND REMOVALS PLAN

DRAWING NO.	D-3
SHEET NO.	11
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_D.dwg

Plot Date: 12/30/2025 - 8:21 cm
User Name: Amundsen, Dan
Xrefs: Border: I:\193806812_XSIT_I193806812_XUR_193806489_XJM_2022_Easements_193806812_XSNO
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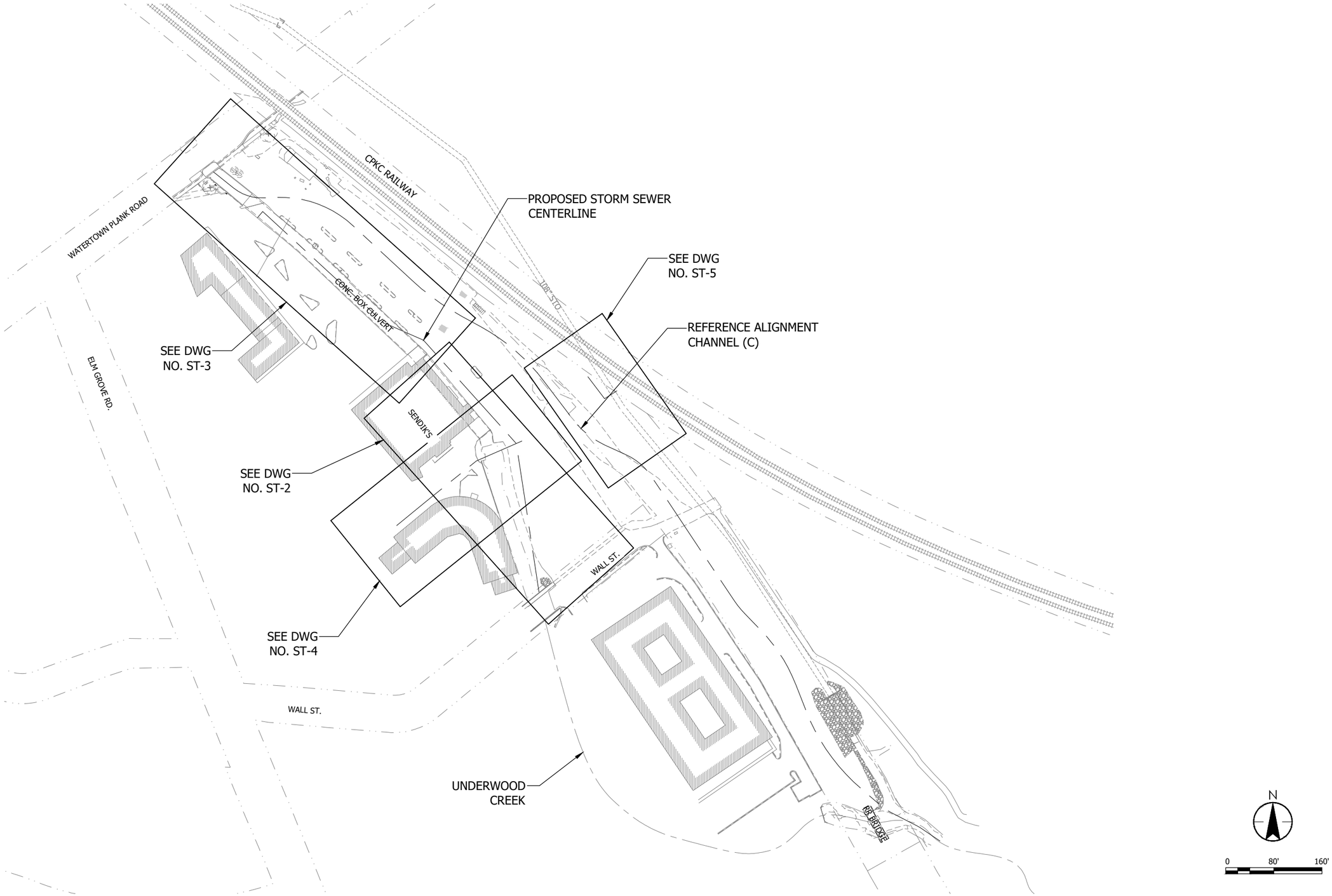

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DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

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REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

STORM SEWER PLAN SHEET INDEX

DRAWING NO.	ST-0
SHEET NO.	12
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_ST.dwg

Plot Date: 12/30/2025 - 8:21 pm
Plotted by: Amundsen, Dan (STC-CAD)
Xrefs: Border: I:\193806812_ADMT_193806812_ADMT_CAD\Civil\Sheets\193806812_ST.dwg
Plotted by: Amundsen, Dan (STC-CAD)
Xrefs: Border: I:\193806812_ADMT_193806812_ADMT_CAD\Civil\Sheets\193806812_JOINS.dwg

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STRUCTURE TABLE

STRUCTURE	DESCRIPTON	PLAN & PROFILE DWG NO.	SIZE	CASTING		RIM OR FLOW LINE	PIPE(S) IN		PIPE(S) OUT		NORTHING	EASTING
				FRAME	GRATE		SIZE	INVERT	SIZE	INVERT		
OF-1	FLARED END SECTION	ST-2	--			--	34"x53"	729.96	--	--	385273.39	2482426.24
MH-1	STORM INLET MANHOLE	ST-2	96"	NEENAH R-2050	TYPE D	737.67	36" 12"	731.47 733.34	34"x53"	730.84	385512.55	2482393.60
MH-2	STORM INLET MANHOLE	ST-3	60"	NEENAH R-2050	TYPE D	739.62	36"	732.26	36"	732.26	385684.30	2482239.25
MH-3	STORM INLET MANHOLE	ST-3	60"	NEENAH R-2050	TYPE D	739.81	36" 12" 12"	732.48 734.00 734.08	36"	732.41	385702.60	2482197.87
MH-4	STORM INLET MANHOLE	ST-3	60"	NEENAH R-2050	TYPE D	740.01	24" 12"	733.57 735.25	36"	732.57	385713.27	2482173.73
MH-5	STORM INLET MANHOLE	ST-3	48"	NEENAH R-2050	TYPE D	740.31	18"	734.36	24"	733.86	385764.26	2482118.13
MH-6	STORM INLET MANHOLE	ST-3	48"	NEENAH R-3246	TYPE L	741.86	12"	735.79	18"	735.06	385898.19	2481972.06
CB-1	STORM CATCH BASIN	ST-3	2'X3'	NEENAH R-3246	TYPE L	739.12	--	--	12"	734.84	385730.26	2482227.45
MH-7	STORM INLET MANHOLE	ST-4	48"	NEENAH R-2050	TYPE D	737.82	12"	733.83	12"	733.83	385483.50	2482327.20
MH-8	STORM INLET MANHOLE	ST-4	48"	NEENAH R-2050	TYPE D	737.71	12"	734.56	12"	734.56	385416.10	2482243.39
MH-9	STORM INLET MANHOLE	ST-4	48"	NEENAH R-2050	TYPE D	737.78	--	--	12"	734.98	385376.86	2482195.57
MH-10	STORM INLET MANHOLE	ST-5	48"	NEENAH R-2050	TYPE D	736.83	24"	732.69	24"	732.59	385587.03	2482540.23
MH-11	STORM INLET MANHOLE	ST-5	48"	NEENAH R-2050	TYPE D	737.25	--	--	24"	733.00	385610.91	2482522.08

NOTE:
- NORTHING AND EASTING FOR MANHOLES AND CATCH BASINS ARE CENTER OF STRUCTURE.
- NORTHING AND EASTING FOR FLARED END SECTION (FES) ARE THE DOWNSTREAM END OF FES.

NON-PROFILE PIPE TABLE

Structure		Plan & Profile Dwg No.	Length (FT)	Size (IN)	Slope (FT/FT)	Material	Class	U/S Invert	D/S Invert
From	To								
MH-3	EXISTING	ST-3	31	12	0.032	RCP	CLASS V	735.00	734.00
MH-4	EXISTING	ST-3	12	12	0.010	RCP	CLASS V	735.37	735.25
MH-6	EXISTING	ST-3	17	12	0.018	RCP	CLASS V	736.09	735.79

SANITARY STRUCTURE TABLE

STRUCTURE	DESCRIPTON	PLAN & PROFILE DWG NO.	SIZE	CASTING		RIM OR FLOW LINE	PIPE(S) IN		PIPE(S) OUT		NORTHING	EASTING
				FRAME	COVER		SIZE	INVERT	SIZE	INVERT		
SAN MH-1	SANITARY MANHOLE	ST-3	48"	NEENAH R-1550-A	SOLID LID	743.34	21"	730.27	21"	730.17	385988.09	2481942.17

FOR BIDDING AND CONSTRUCTION

DESIGNER M. SIERACKI
DRAWN BY A. ROCK
CHECKER D. AMUNDSEN
APPROVED R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

STORM SEWER STRUCTURE TABLE

DRAWING NO.	ST-1
SHEET NO.	13
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_ST.dwg

Plot Date: 12/30/2025 - 8:21 am
User Name: Amundsen, Dan
Xrefs: Borders 193806812_XM1, 193806812_XM2, C:\D-Drive\Projects\193806812_ST.dwg, 193806812_XM3, 193806812_XM4, 193806812_XM5, 193806812_XM6, 193806812_XM7, 193806812_XM8, 193806812_XM9, 193806812_XM10, 193806812_XM11, 193806812_XM12, 193806812_XM13, 193806812_XM14, 193806812_XM15, 193806812_XM16, 193806812_XM17, 193806812_XM18, 193806812_XM19, 193806812_XM20, 193806812_XM21, 193806812_XM22, 193806812_XM23, 193806812_XM24, 193806812_XM25, 193806812_XM26, 193806812_XM27, 193806812_XM28, 193806812_XM29, 193806812_XM30, 193806812_XM31, 193806812_XM32, 193806812_XM33, 193806812_XM34, 193806812_XM35, 193806812_XM36, 193806812_XM37, 193806812_XM38, 193806812_XM39, 193806812_XM40, 193806812_XM41, 193806812_XM42, 193806812_XM43, 193806812_XM44, 193806812_XM45, 193806812_XM46, 193806812_XM47, 193806812_XM48, 193806812_XM49, 193806812_XM50, 193806812_XM51, 193806812_XM52, 193806812_XM53, 193806812_XM54, 193806812_XM55, 193806812_XM56, 193806812_XM57, 193806812_XM58, 193806812_XM59, 193806812_XM60, 193806812_XM61, 193806812_XM62, 193806812_XM63, 193806812_XM64, 193806812_XM65, 193806812_XM66, 193806812_XM67, 193806812_XM68, 193806812_XM69, 193806812_XM70, 193806812_XM71, 193806812_XM72, 193806812_XM73, 193806812_XM74, 193806812_XM75, 193806812_XM76, 193806812_XM77, 193806812_XM78, 193806812_XM79, 193806812_XM80, 193806812_XM81, 193806812_XM82, 193806812_XM83, 193806812_XM84, 193806812_XM85, 193806812_XM86, 193806812_XM87, 193806812_XM88, 193806812_XM89, 193806812_XM90, 193806812_XM91, 193806812_XM92, 193806812_XM93, 193806812_XM94, 193806812_XM95, 193806812_XM96, 193806812_XM97, 193806812_XM98, 193806812_XM99, 193806812_XM100, 193806812_XM101, 193806812_XM102, 193806812_XM103, 193806812_XM104, 193806812_XM105, 193806812_XM106, 193806812_XM107, 193806812_XM108, 193806812_XM109, 193806812_XM110, 193806812_XM111, 193806812_XM112, 193806812_XM113, 193806812_XM114, 193806812_XM115, 193806812_XM116, 193806812_XM117, 193806812_XM118, 193806812_XM119, 193806812_XM120, 193806812_XM121, 193806812_XM122, 193806812_XM123, 193806812_XM124, 193806812_XM125, 193806812_XM126, 193806812_XM127, 193806812_XM128, 193806812_XM129, 193806812_XM130, 193806812_XM131, 193806812_XM132, 193806812_XM133, 193806812_XM134, 193806812_XM135, 193806812_XM136, 193806812_XM137, 193806812_XM138, 193806812_XM139, 193806812_XM140, 193806812_XM141, 193806812_XM142, 193806812_XM143, 193806812_XM144, 193806812_XM145, 193806812_XM146, 193806812_XM147, 193806812_XM148, 193806812_XM149, 193806812_XM150, 193806812_XM151, 193806812_XM152, 193806812_XM153, 193806812_XM154, 193806812_XM155, 193806812_XM156, 193806812_XM157, 193806812_XM158, 193806812_XM159, 193806812_XM160, 193806812_XM161, 193806812_XM162, 193806812_XM163, 193806812_XM164, 193806812_XM165, 193806812_XM166, 193806812_XM167, 193806812_XM168, 193806812_XM169, 193806812_XM170, 193806812_XM171, 193806812_XM172, 193806812_XM173, 193806812_XM174, 193806812_XM175, 193806812_XM176, 193806812_XM177, 193806812_XM178, 193806812_XM179, 193806812_XM180, 193806812_XM181, 193806812_XM182, 193806812_XM183, 193806812_XM184, 193806812_XM185, 193806812_XM186, 193806812_XM187, 193806812_XM188, 193806812_XM189, 193806812_XM190, 193806812_XM191, 193806812_XM192, 193806812_XM193, 193806812_XM194, 193806812_XM195, 193806812_XM196, 193806812_XM197, 193806812_XM198, 193806812_XM199, 193806812_XM200, 193806812_XM201, 193806812_XM202, 193806812_XM203, 193806812_XM204, 193806812_XM205, 193806812_XM206, 193806812_XM207, 193806812_XM208, 193806812_XM209, 193806812_XM210, 193806812_XM211, 193806812_XM212, 193806812_XM213, 193806812_XM214, 193806812_XM215, 193806812_XM216, 193806812_XM217, 193806812_XM218, 193806812_XM219, 193806812_XM220, 193806812_XM221, 193806812_XM222, 193806812_XM223, 193806812_XM224, 193806812_XM225, 193806812_XM226, 193806812_XM227, 193806812_XM228, 193806812_XM229, 193806812_XM230, 193806812_XM231, 193806812_XM232, 193806812_XM233, 193806812_XM234, 193806812_XM235, 193806812_XM236, 193806812_XM237, 193806812_XM238, 193806812_XM239, 193806812_XM240, 193806812_XM241, 193806812_XM242, 193806812_XM243, 193806812_XM244, 193806812_XM245, 193806812_XM246, 193806812_XM247, 193806812_XM248, 193806812_XM249, 193806812_XM250, 193806812_XM251, 193806812_XM252, 193806812_XM253, 193806812_XM254

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SEE DWG NO. ST-3

MATCHLINE

SEE DWG NO. ST-4

MH-1

MH-7

36" STO

36" STO

34"x53" STO

34"x53" STO

34"x53" STO

12" STO

12" STO

15" STO

6" STO

6" STO

SIDEWALK

WALL ST.

WE ENERGIES TO SUPPORT AND RE-GUY POLE

OF-1

RIPRAP

3
ST-6

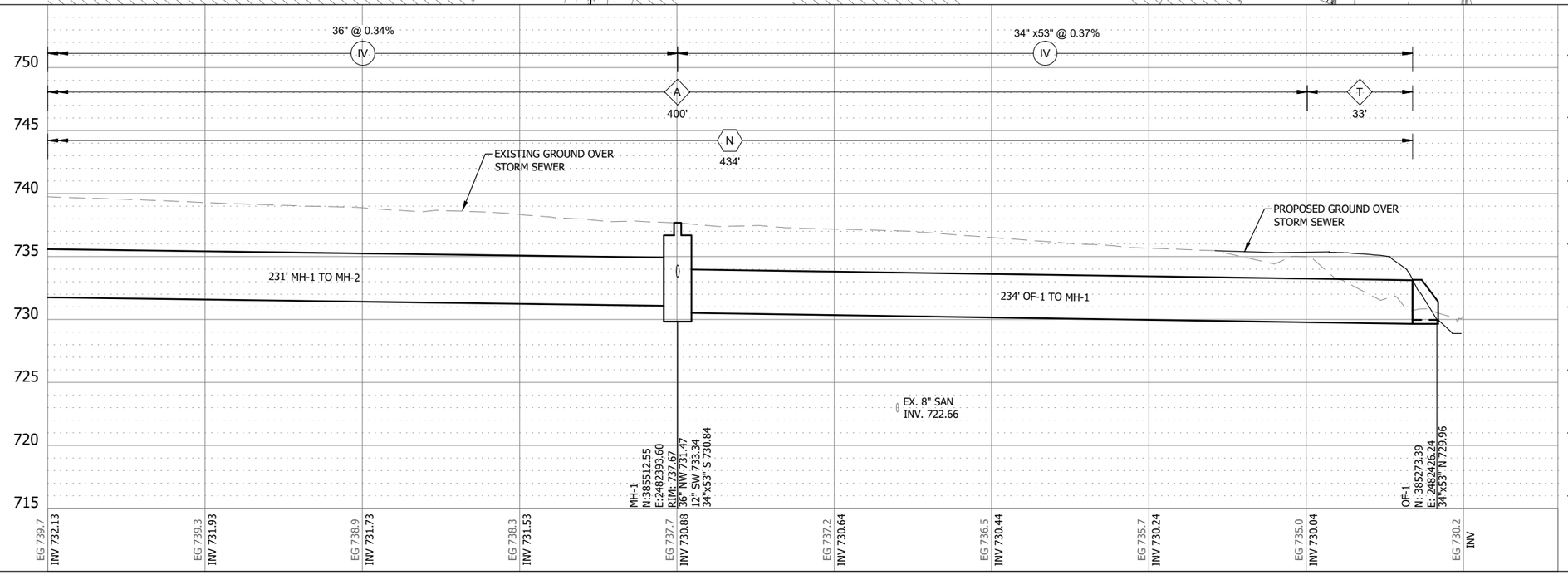
EXISTING 12" PIPE OUTLET TO REMAIN INV. 732.73

NOTES

1. REFER TO DWG NO. ST-6 FOR TRENCH CLASSIFICATION AND TRENCH SURFACE RESTORATION.
2. REFER TO DWG NO. ST-1 FOR STRUCTURE AND NON-PROFILE PIPE TABLE.

0 20' 40'
HORIZONTAL

0 5' 10'
VERTICAL



FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

STORM SEWER PLAN & PROFILE

DRAWING NO.	ST-2
SHEET NO.	14
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_ST.dwg

Plot Date: 12/30/2025 - 8:21am
Plotted by: Aaron.Rock
Xrefs Bound: I:\193806812_ST\1_193806812_XSNU_193806812_XSNO_193806812_XSP1

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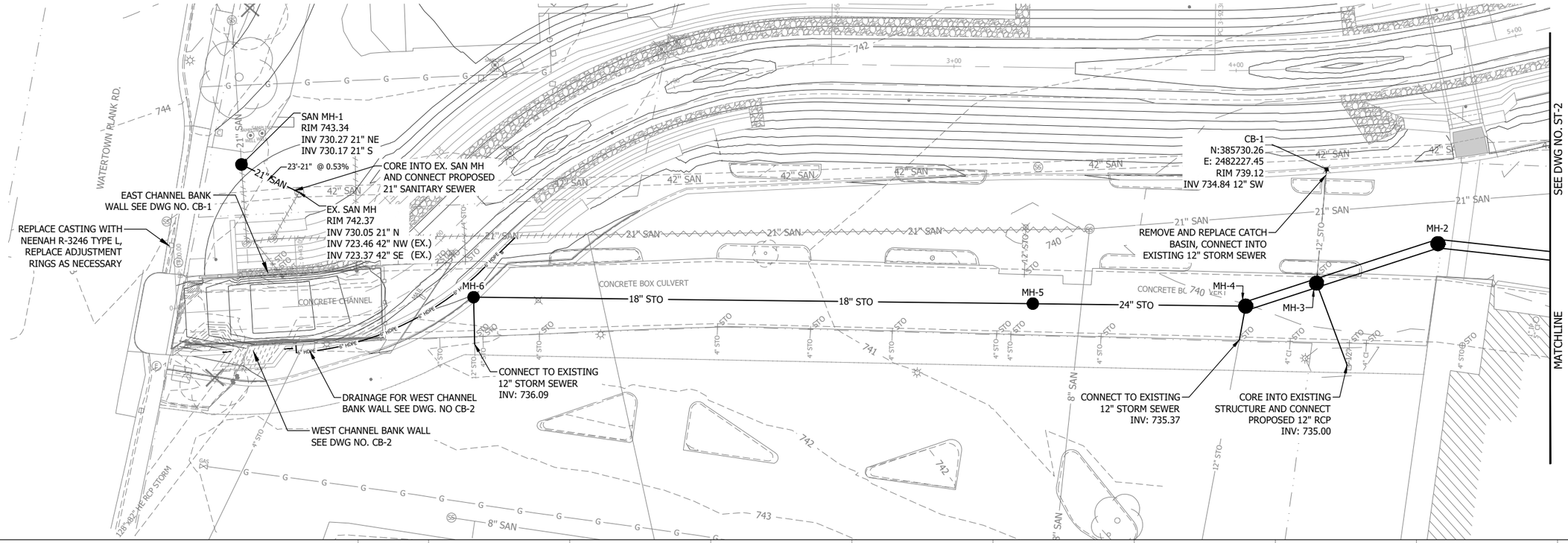

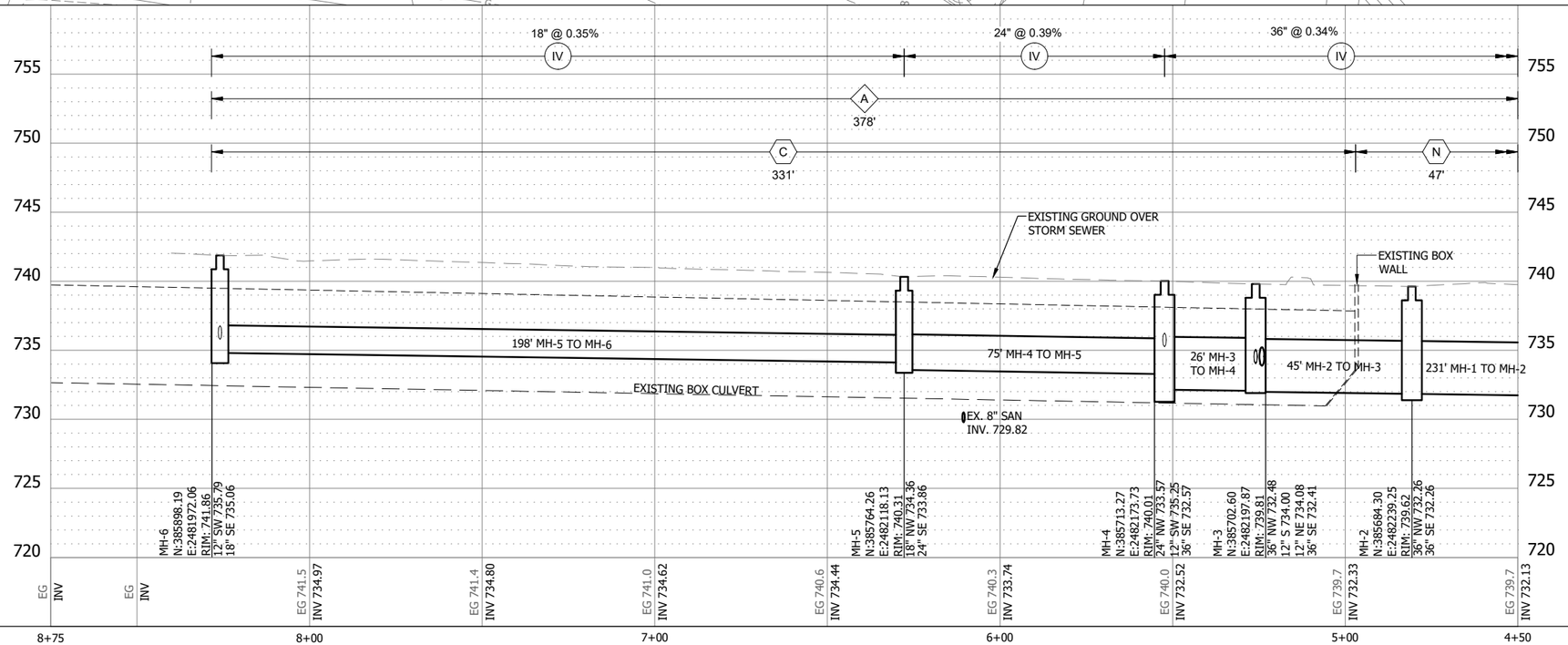

NOTE:
1. REFER TO DW NO. ST-6 FOR TRENCH CLASSIFICATION AND TRENCH SURFACE RESTORATION.
2. REFER TO DWG NO. ST-1 FOR STRUCTURE AND NON-PROFILE PIPE TABLE.
3. STORM SEWER BETWEEN MH-6 AND UPSTREAM OF MH-2 IS CONSTRUCTED WITHIN ABANDONED CULVERT WALLS. SEE DETAIL 2 / ST-6

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

STORM SEWER PLAN & PROFILE

DRAWING NO.	ST-3
SHEET NO.	15
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_ST.dwg

Plot Date: 12/30/2025 - 8:21am
Plotted by: Amundsen, Dan
Project Number: 193806812
Xrefs Bound: 193806812_ASTT, 193806812_CAD-Dyn\Sheets\193806812_ST.dwg
193806812_ASNU, 193806812_CAD-Dyn\Sheets\193806812_ST.dwg
193806812_ASNU, 193806812_ASNG, 193806812_ASPL

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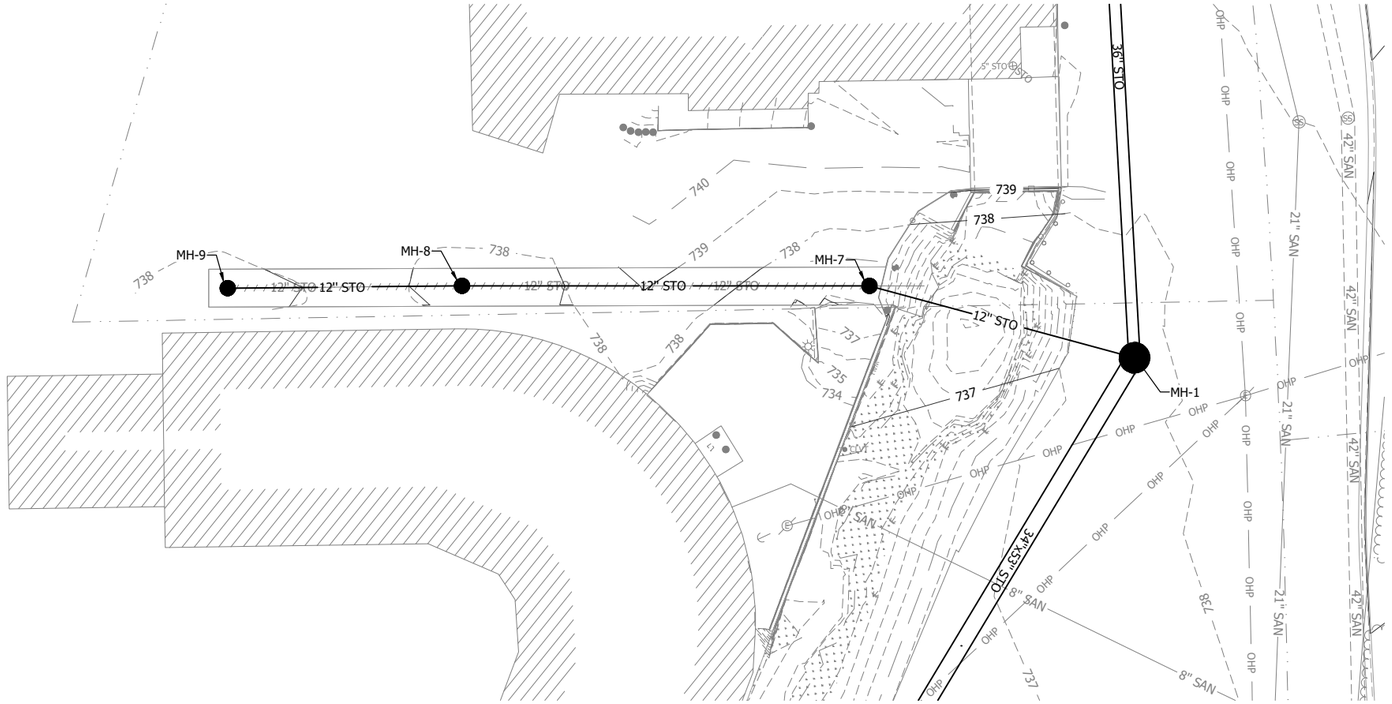
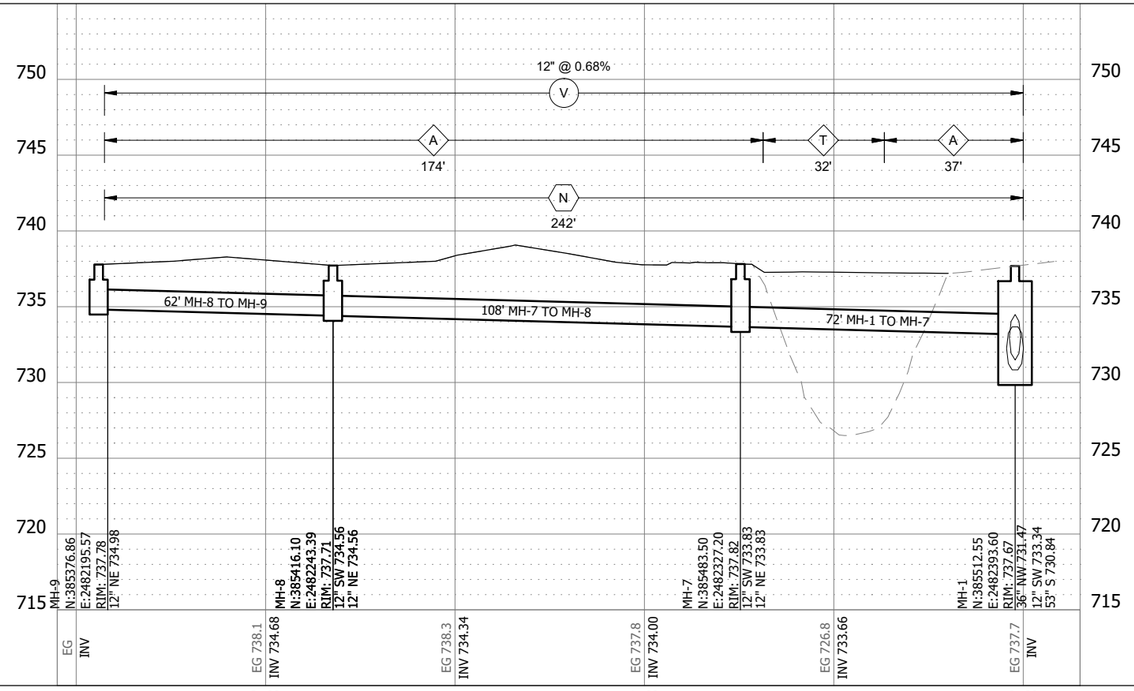


NOTES

1. REFER TO DWG NO. ST-6 FOR TRENCH CLASSIFICATION AND TRENCH SURFACE RESTORATION.
2. REFER TO DWG NO. ST-1 FOR STRUCTURE AND NON-PROFILE PIPE TABLE.
3. AN ADDITIONAL NEW STORM SEWER TO ADDRESS REQUIRED DRAINAGE FOR THE 890 ELM GROVE ROAD BUILDING WILL BE PROVIDED BY OTHERS AND AMENDED THE CONTRACT.



FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

STORM SEWER PLAN & PROFILE

DRAWING NO.	ST-4
SHEET NO.	16
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_ST.dwg

Plot Date: 12/30/2025 - 8:21am
Plotted by: mary.rock@stantec.com
Drawing Path: I:\2019\03\193806812\CAD\Civil\Sheets\193806812_ST.dwg
Xrefs: Border: 193806812_ART, 193806812_XBK, I:\193806812_XNU, I:\193806812_JUH, I:\193806812_XPL

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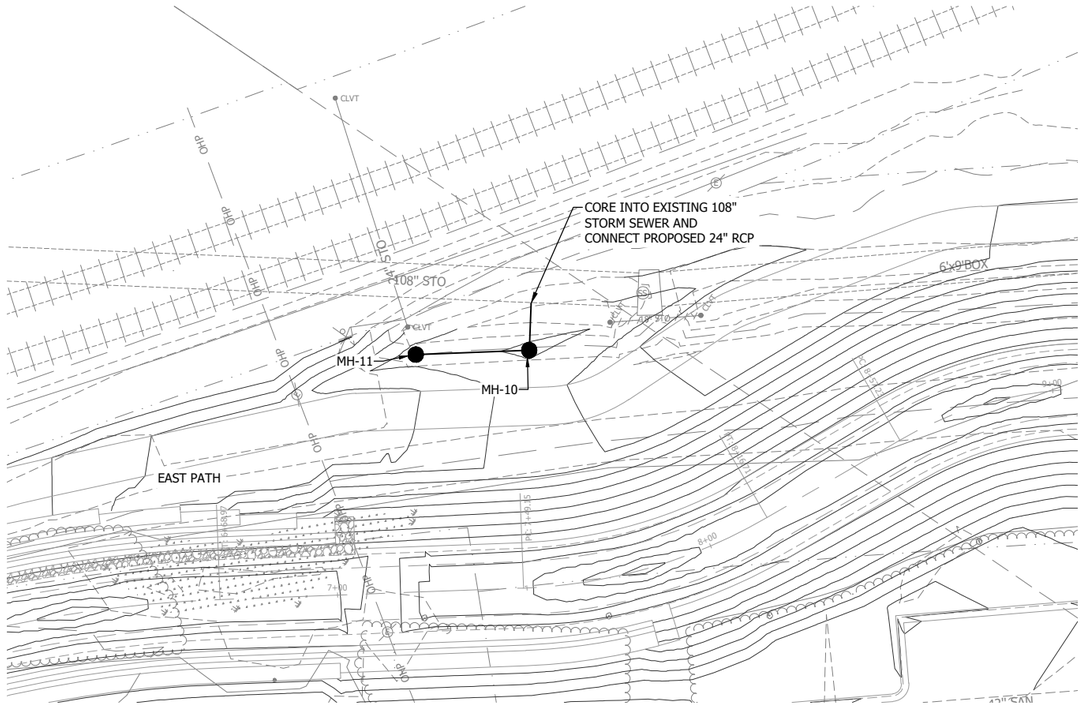
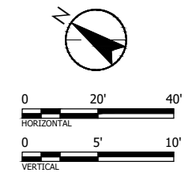
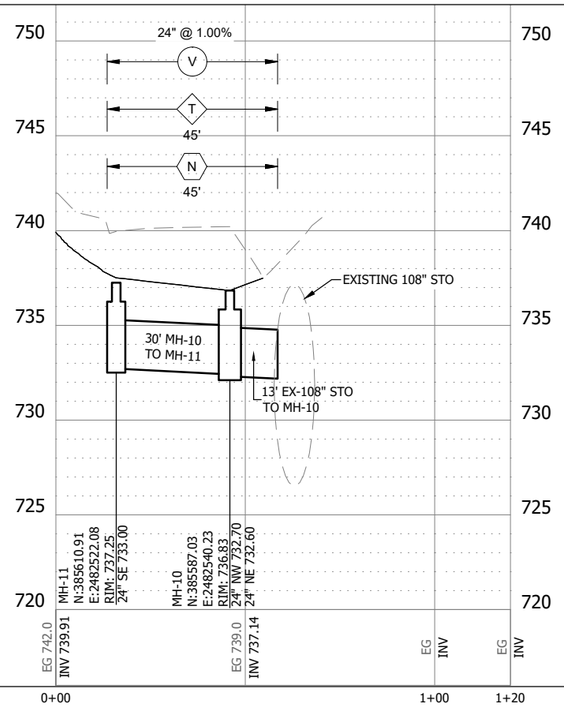




NOTES

1. REFER TO DWG NO. ST-6 FOR TRENCH CLASSIFICATION AND TRENCH SURFACE RESTORATION.
2. REFER TO DWG NO. ST-1 FOR STRUCTURE AND NON-PROFILE PIPE TABLE.



FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

STORM SEWER PLAN & PROFILE

DRAWING NO.	ST-5
SHEET NO.	17
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_ST.dwg

Plot Date: 12/30/2025 - 8:21am
Plotted by: Andrew.Rock@stantec.com
Drawing Path: I:\2019\19380\193806812\CAD\Civil\Sheets\193806812_ST.dwg
Xrefs: Border: I:\2019\19380\193806812_XAR_193806812_XBND_I:\2019\19380\193806812_XBND_193806812_XSPL

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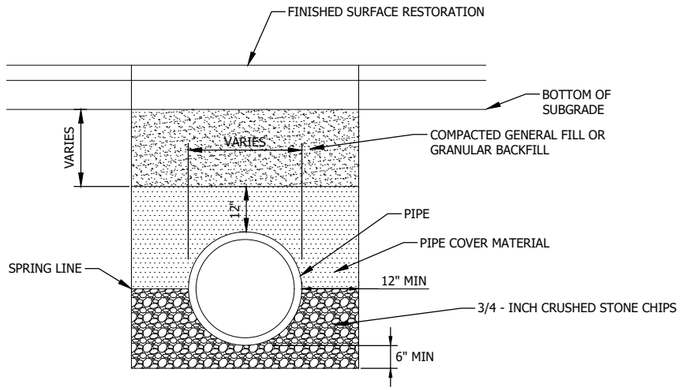
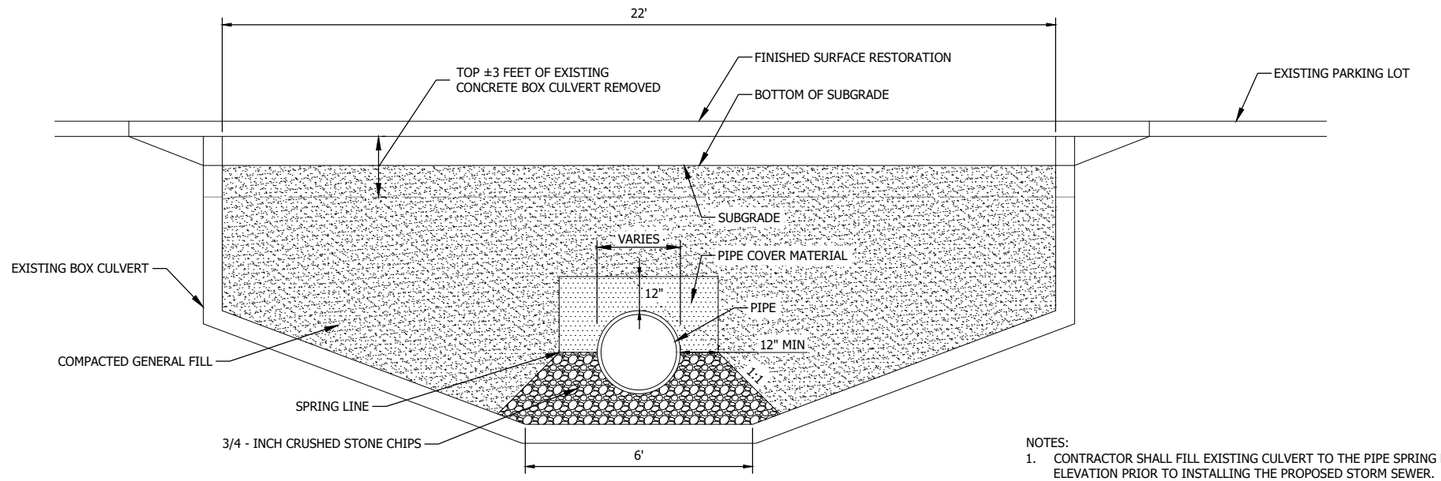


PIPE CONSTRUCTED IN NEW TRENCH - CLASS "N" (1)

NOT TO SCALE

ST-2

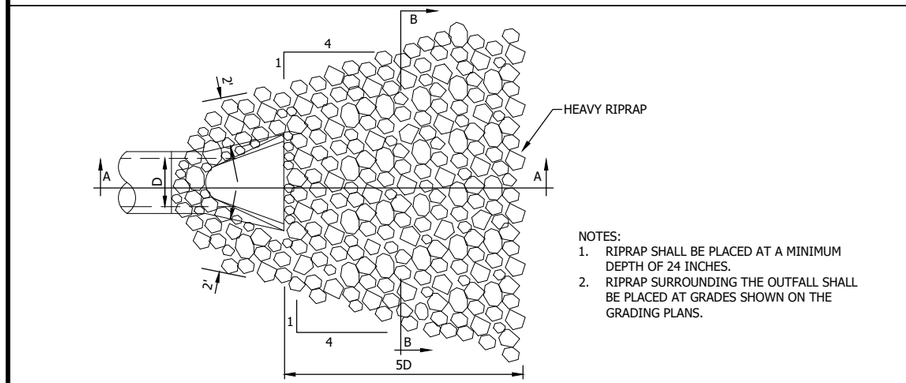


NOTES:
1. CONTRACTOR SHALL FILL EXISTING CULVERT TO THE PIPE SPRING LINE ELEVATION PRIOR TO INSTALLING THE PROPOSED STORM SEWER.
2. ABANDON THE EXISTING CULVERT IN A SEQUENCE TO ALLOW FOR DRAINAGE OF EXISTING STORM SEWERS DURING CONSTRUCTION OF THE PROPOSED STORM SEWER.

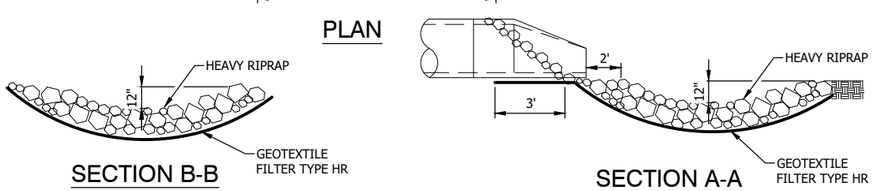
PIPE CONSTRUCTED WITHIN ABANDONED CULVERT WALLS - CLASS "C" (2)

NOT TO SCALE

ST-3



PLAN



SECTION B-B

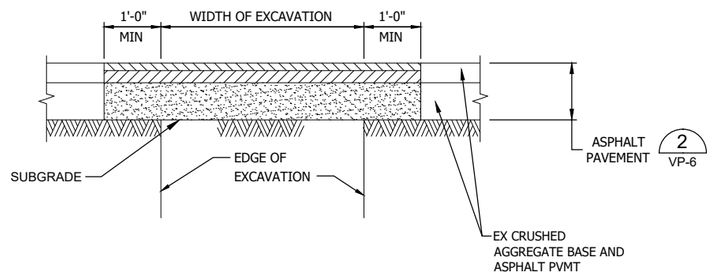
SECTION A-A

NOTES:
1. RIPRAP SHALL BE PLACED AT A MINIMUM DEPTH OF 24 INCHES.
2. RIPRAP SURROUNDING THE OUTFALL SHALL BE PLACED AT GRADES SHOWN ON THE GRADING PLANS.

STORM OUTFALL RIPRAP DETAIL (3)

NTS

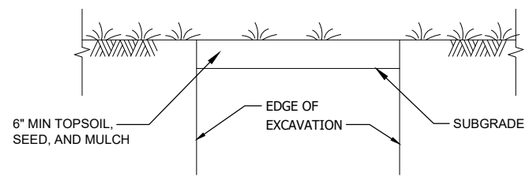
ST-2



ASPHALT PARKING LOT RESTORATION - TYPE "A" (4)

NTS

ST-2



TURF GRASS RESTORATION TYPE "T" (5)

NTS

ST-2

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

STORM SEWER DETAILS

DRAWING NO.	ST-6
SHEET NO.	18
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_ST.dwg

Plot Date: 12/30/2025 - 8:21am
Plotted by: Andrew.Rock@stantec.com
Xrefs: Border: I:\193806812_ARK\...\193806812_ST.dwg
Xrefs: Border: 193806812_XAR; 193806812_XNU; I:\193806812_XNU; 193806812_XSP1

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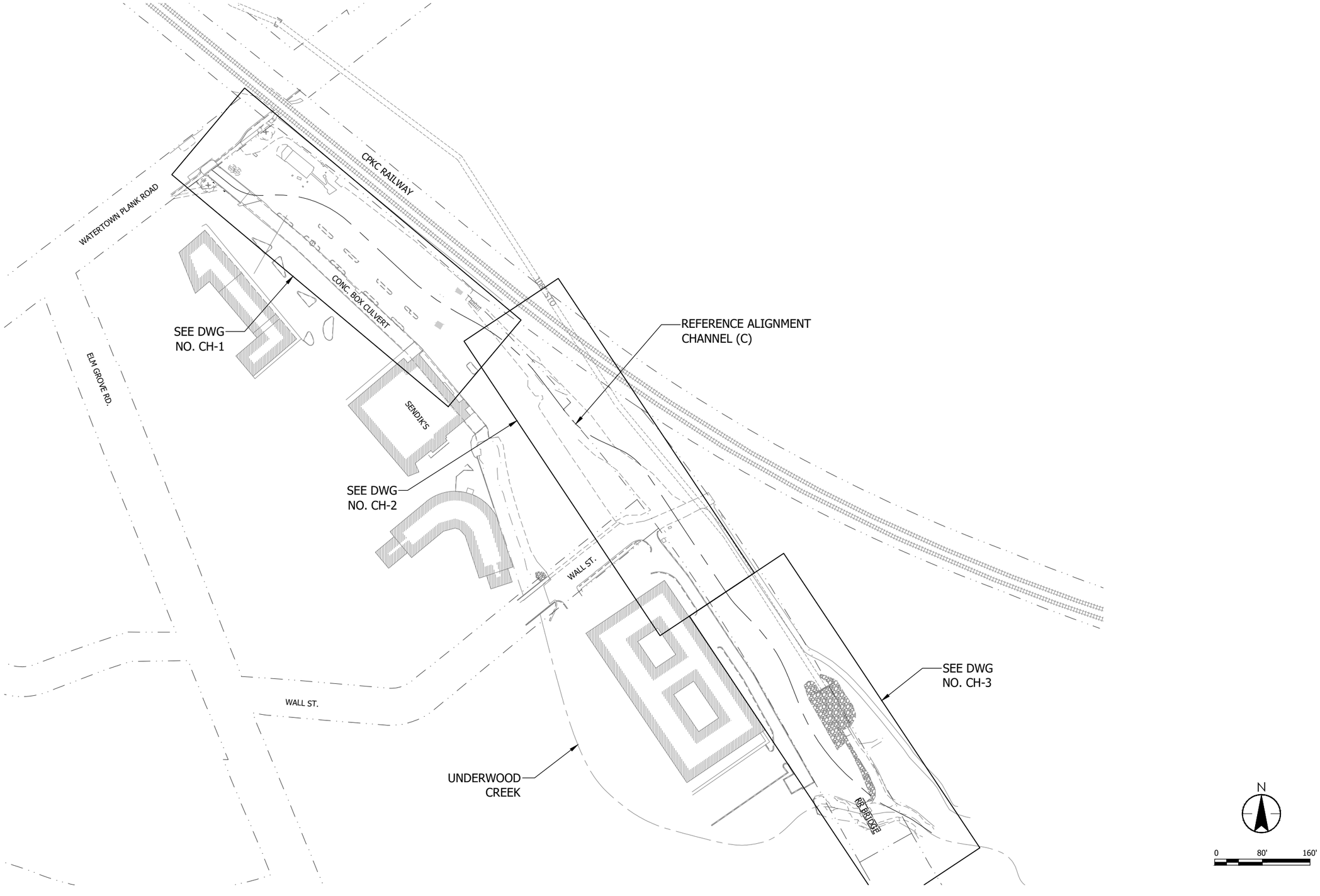

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL PLAN SHEET INDEX

DRAWING NO.	CH-0
SHEET NO.	19
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH.dwg

Plot Date: 12/30/2025 - 8:21am
Plotted by: Andrew.Rock
Xrefs: Border: I:\193806812_XSHT\193806812_XSNU.I:\193806812_XSPL: I:\193806812_XSNO

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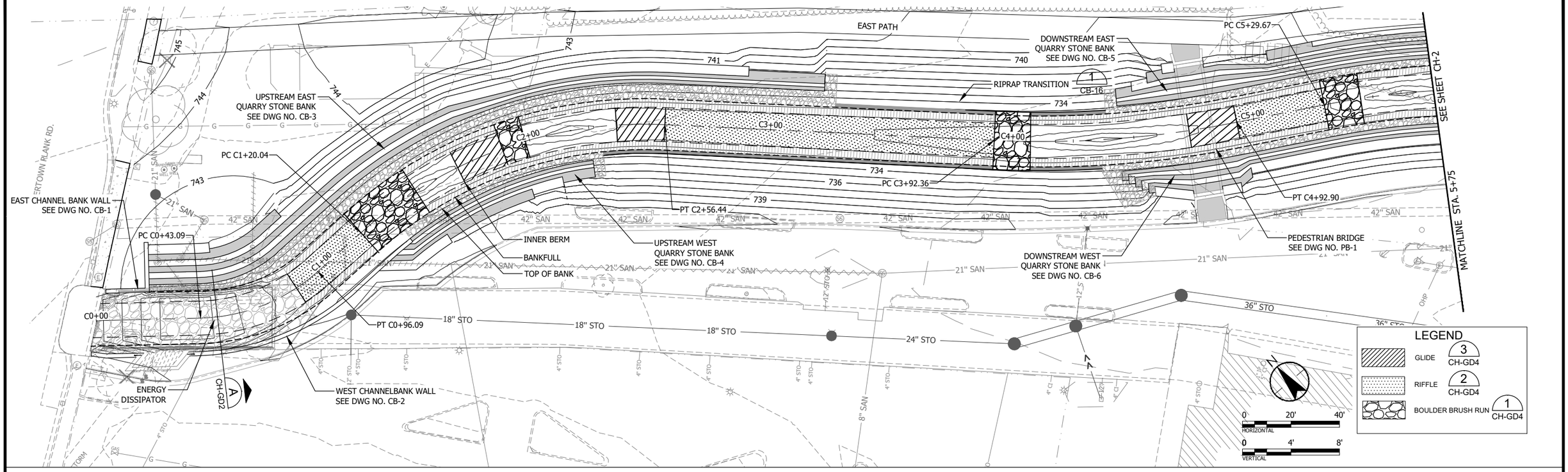

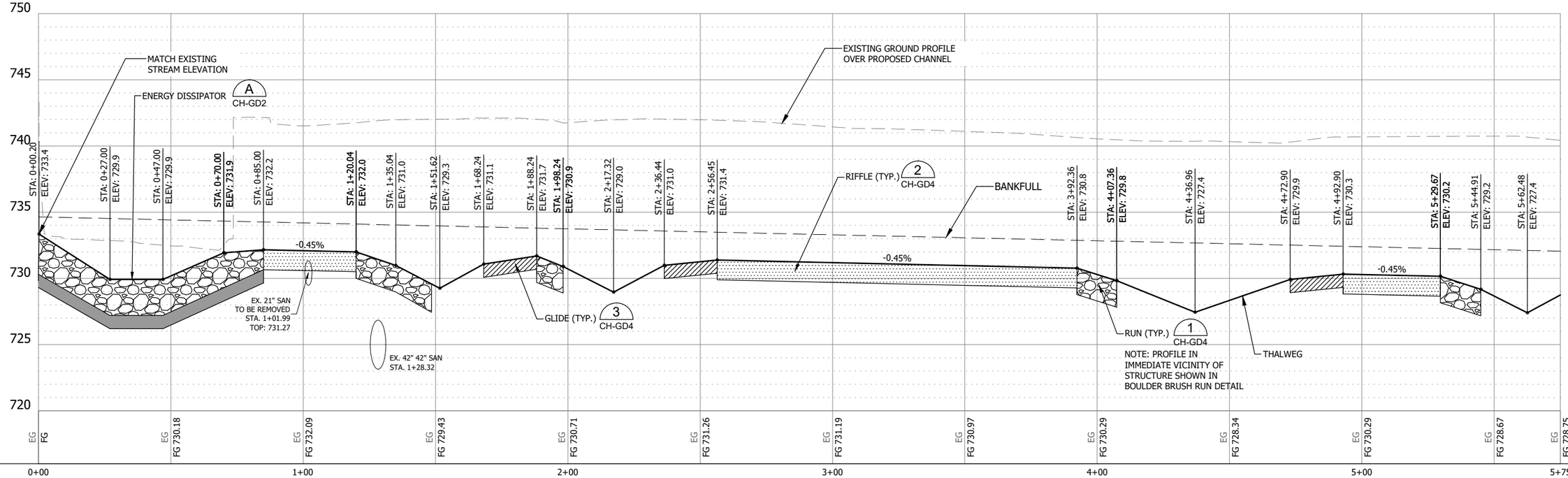

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL PLAN & PROFILE

DRAWING NO.	CH-1
SHEET NO.	20
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH.dwg

Plot Date: 12/30/2025 - 8:22am
Drawing Name: C:\Users\mike.sieracki\Documents\ACADDocs\Sheets\193806812_CH1.dwg
Xrefs Bound: I:\938\06812_JOI\1_193806812_XBND\193806812_ADP1_193806812_XSNO

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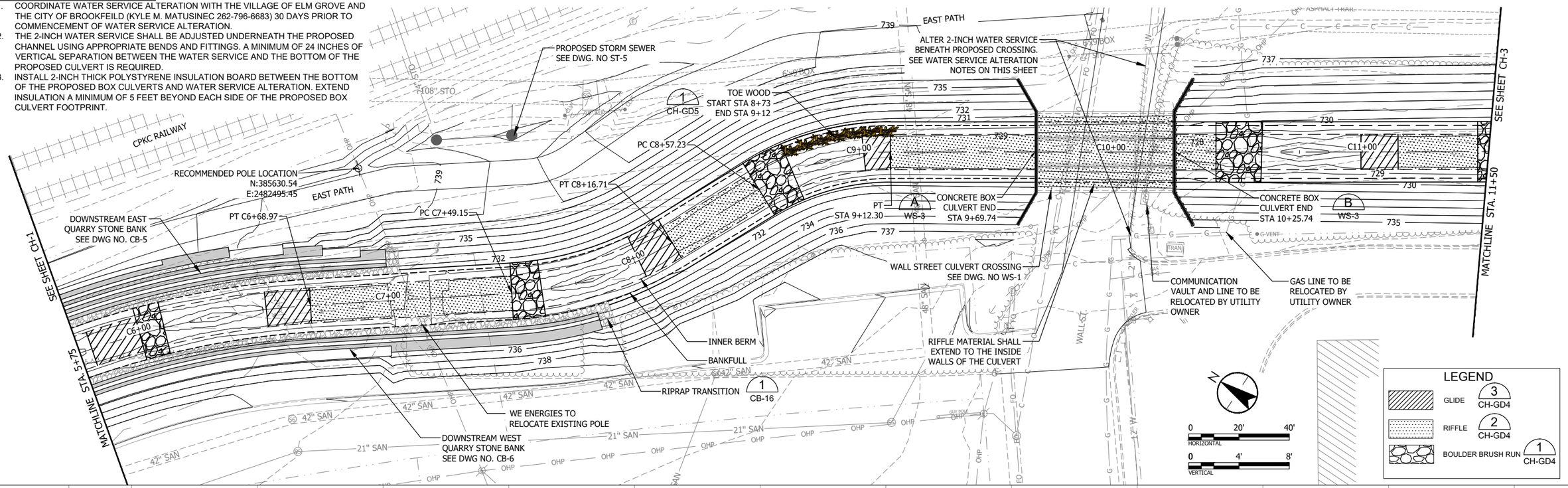
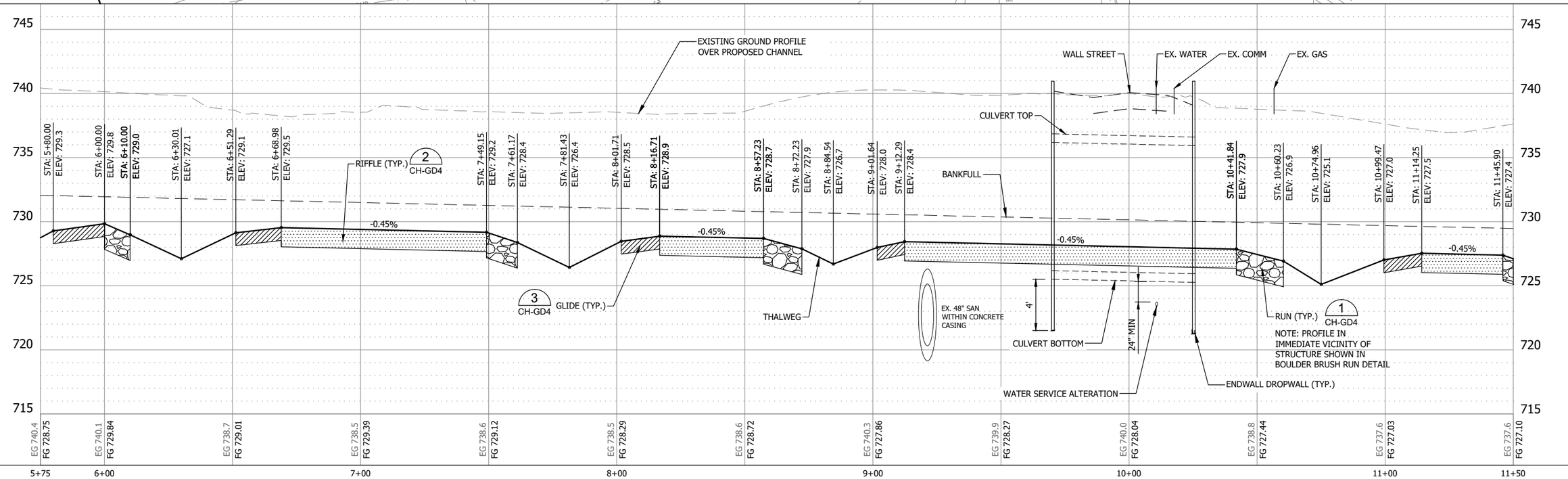
WATER SERVICE ALTERATION NOTES:

1. COORDINATE WATER SERVICE ALTERATION WITH THE VILLAGE OF ELM GROVE AND THE CITY OF BROOKFEILD (KYLE M. MATUSINEC 262-796-6683) 30 DAYS PRIOR TO COMMENCEMENT OF WATER SERVICE ALTERATION.
2. THE 2-INCH WATER SERVICE SHALL BE ADJUSTED UNDERNEATH THE PROPOSED CHANNEL USING APPROPRIATE BENDS AND FITTINGS. A MINIMUM OF 24 INCHES OF VERTICAL SEPARATION BETWEEN THE WATER SERVICE AND THE BOTTOM OF THE PROPOSED CULVERT IS REQUIRED.
3. INSTALL 2-INCH THICK POLYSTYRENE INSULATION BOARD BETWEEN THE BOTTOM OF THE PROPOSED BOX CULVERTS AND WATER SERVICE ALTERATION. EXTEND INSULATION A MINIMUM OF 5 FEET BEYOND EACH SIDE OF THE PROPOSED BOX CULVERT FOOTPRINT.





FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL PLAN & PROFILE

DRAWING NO.	CH-2
SHEET NO.	21
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH.dwg

Plot Date: 12/30/2025 - 8:22pm
Plotted By: Matthew.Lutz@stantec.com
Xrefs Bound: I:\193806812_XSIT_193806812_CAD-Dwgs\Sheets\193806812_CH.dwg
I:\193806812_XSIT_193806812_CAD-Dwgs\Sheets\193806812_XSNO

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SEE SHEET CH-2

MATCHLINE STA. 11+50

OHP

6'x9'BOX

PC C11+61.00

PT C11+88.38

PC C12+27.16

1 CH-GD5

TOE WOOD
START STA 12+30
END STA 13+50

C12+00

C13+00

C14+00

C15+00

C16+00

INNER BERM

BANKFULL

TOP OF BANK

PT C13+34.78

PC C13+82.71

TOE WOOD
START STA 13+99
END STA 15+84

TOE WOOD
START STA 11+56
END STA 12+06

CONSTRUCT RIFFLE TO PROVIDE A SMOOTH TRANSITION BETWEEN CHANNELS

PT C16+61.11

PC C16+54.98

PT C16+07.71

PC C15+84.48

PT C15+42.28

TRANSITIONS AREA: THE CONTRACTOR SHALL ADJUST THE CHANNEL TYPICAL SECTIONS STARTING AT STATION 16+37 TO PROVIDE A SMOOTH AND EVEN TRANSITION FROM PROPOSED TO EXISTING CHANNEL. CHANNEL MATCH POINT MAY BE ADJUSTED TO MATCH EXISTING CHANNEL

VEGETATED RIPRAP BANK AT CONFLUENCE 3 CH-GD2

RAILROAD BRIDGE TO BE REMOVED

CONFLUENCE AREA: THE CONTRACTOR SHALL ADJUST THE CHANNEL TYPICAL SECTIONS TO CONNECT INTO ADJOINING CHANNELS. REFER TO CHANNEL CROSS SECTIONS AND THE GRADING PLAN

N

0 20' 40'
HORIZONTAL

0 4' 8'
VERTICAL

LEGEND

GLIDE 3 CH-GD4

RIFFLE 2 CH-GD4

BOULDER BRUSH RUN 1 CH-GD4

EXISTING GROUND PROFILE OVER PROPOSED CHANNEL

BANKFULL

-0.45%

THALWEG

1 CH-GD4 RUN (TYP.)
NOTE: PROFILE IN IMMEDIATE VICINITY OF STRUCTURE SHOWN IN BOULDER BRUSH RUN DETAIL

GLIDE (TYP.) 3 CH-GD4

2 CH-GD4 RIFFLE (TYP.)

STA	ELEV	EG	FG
STA: 11+55.90	ELEV: 726.7		
STA: 11+73.36	ELEV: 724.7		
STA: 11+88.38	ELEV: 726.8		
STA: 12+03.38	ELEV: 727.1		
STA: 12+14.99	ELEV: 727.1		
STA: 12+29.99	ELEV: 726.3	EG 727.10	FG 727.04
STA: 12+46.30	ELEV: 724.3		
STA: 12+67.00	ELEV: 726.4		
STA: 12+82.00	ELEV: 726.8	EG 724.70	FG 725.68
STA: 12+97.00	ELEV: 726.0		
STA: 13+15.86	ELEV: 724.0		
STA: 13+35.38	ELEV: 726.1		
STA: 13+50.38	ELEV: 726.5	EG 726.46	FG 725.29
STA: 13+83.69	ELEV: 726.3		
STA: 13+98.69	ELEV: 725.4		
STA: 14+23.42	ELEV: 723.0	EG 725.56	FG 723.20
STA: 14+48.50	ELEV: 725.5		
STA: 14+63.48	ELEV: 726.0		
STA: 14+78.50	ELEV: 725.0	EG 725.57	FG 723.25
STA: 14+99.91	ELEV: 723.2		
STA: 15+27.00	ELEV: 725.1		
STA: 15+43.26	ELEV: 725.6	EG 723.25	FG 725.14
STA: 15+74.02	ELEV: 725.5		
STA: 15+84.02	ELEV: 724.7		
STA: 16+06.58	ELEV: 722.6		
STA: 16+27.00	ELEV: 724.7		
STA: 16+37.00	ELEV: 725.2		
STA: 16+87.48	ELEV: 725.0	EG	FG

745 740 735 730 725 720 715

11+50 12+00 13+00 14+00 15+00 16+00 17+00

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL PLAN & PROFILE

DRAWING NO.	CH-3
SHEET NO.	22
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH.dwg

Plot Date: 12/30/2025 - 8:22am
Plotted by: Brandon Bonsen
Xrefs: Borders 193806812_XAT1 193806812_XNU 193806812_APP1 193806812_XNO

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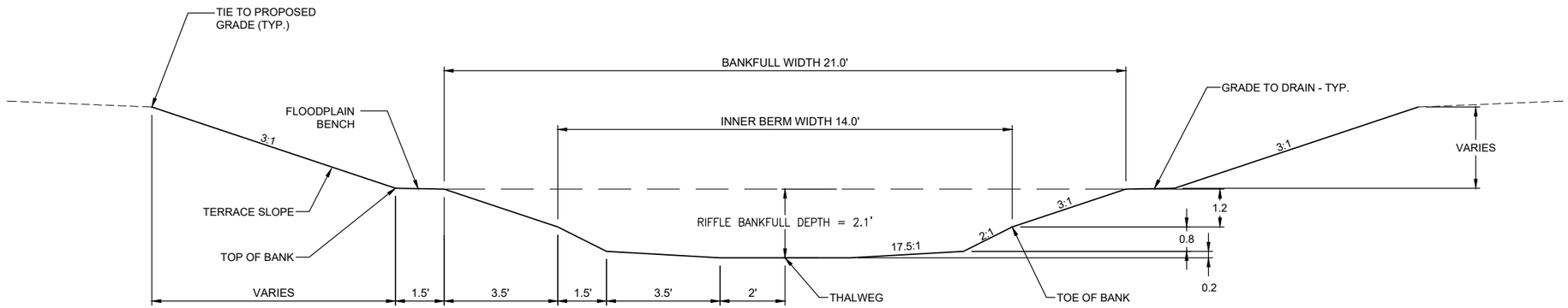


TYPICAL RIFFLE CROSS SECTION 1

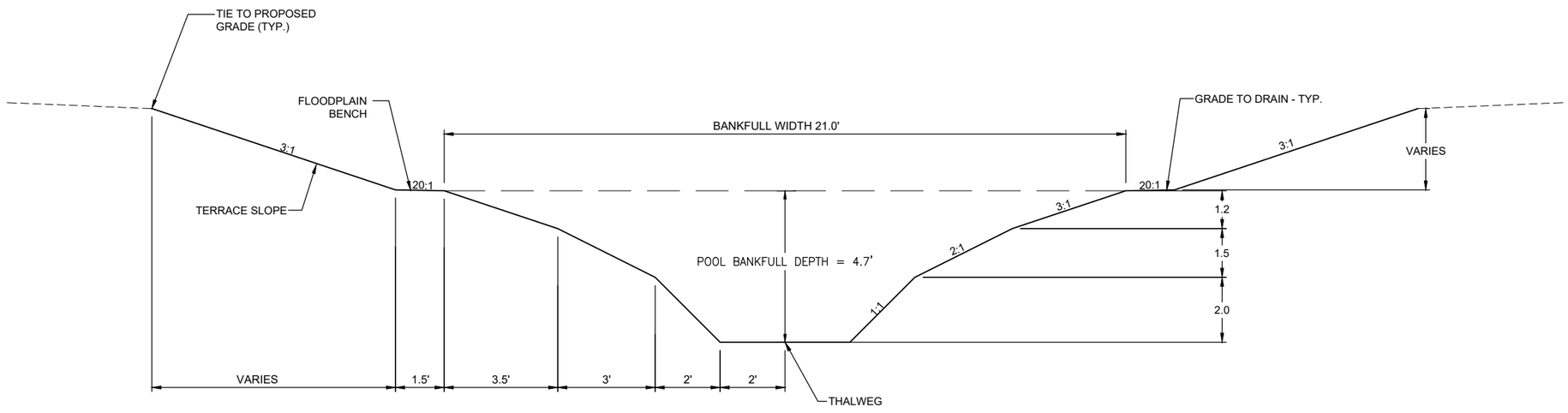
1" = 4'

CH-1
CH-3
CH-2

TYPICAL CROSS SECTION NOTES

1. TYPICAL SECTIONS ARE VIEWED FACING DOWNSTREAM.
2. TYPICAL SECTION VERTICAL CONTROL SHALL BE ABOUT THE THALWEG POINT PER PLAN AND PROFILE VIEWS.
3. REFER TO DWG. NO. CH-1 THROUGH CH-3 FOR SPECIFIC LOCATIONS OF TYPICAL SECTION APPLICATION.
4. TRANSITION BETWEEN RIFFLE AND POOL OR POOL AND RIFFLE TYPICAL CROSS SECTIONS SHALL BE EVENLY GRADED.
5. SLOPE TRANSITIONS BETWEEN TOP OF CHANNEL BANK, FLOODPLAIN BENCH, TERRACE SLOPE AND EXISTING SURROUNDING GROUND SHALL BE GRADED TO PROVIDE A SMOOTH AND ROUNDED TRANSITION. REFER TO PLANTING NOTES AND DETAILS FOR ADDITIONAL SLOPE TRANSITION GRADING/SURFACE PREPARATION.
6. CHANNEL DIMENSION TOLERANCES SHALL BE AS FOLLOWS:

   WIDTH: ± 0.5 FT
   DEPTH: ± 0.1 FT
   RIFFLE ELEVATIONS: ± 0.1 FT
   POOL ELEVATIONS: + 0.1 FT, - 0.5 FT
   STRUCTURE ELEVATIONS: ± 0.1 FT



TYPICAL POOL CROSS SECTION 2

1" = 4'

CH-1
CH-3
CH-2

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL TYPICAL SECTIONS

DRAWING NO.	CH-GD1
SHEET NO.	23
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-GD.dwg

Plot Date: 12/30/2025 - 8:22pm
Plot By: Brandon Bonsen
Xrefs: Bonsen 193806812_ANO 193806812_JSXT 193806812_JSNL

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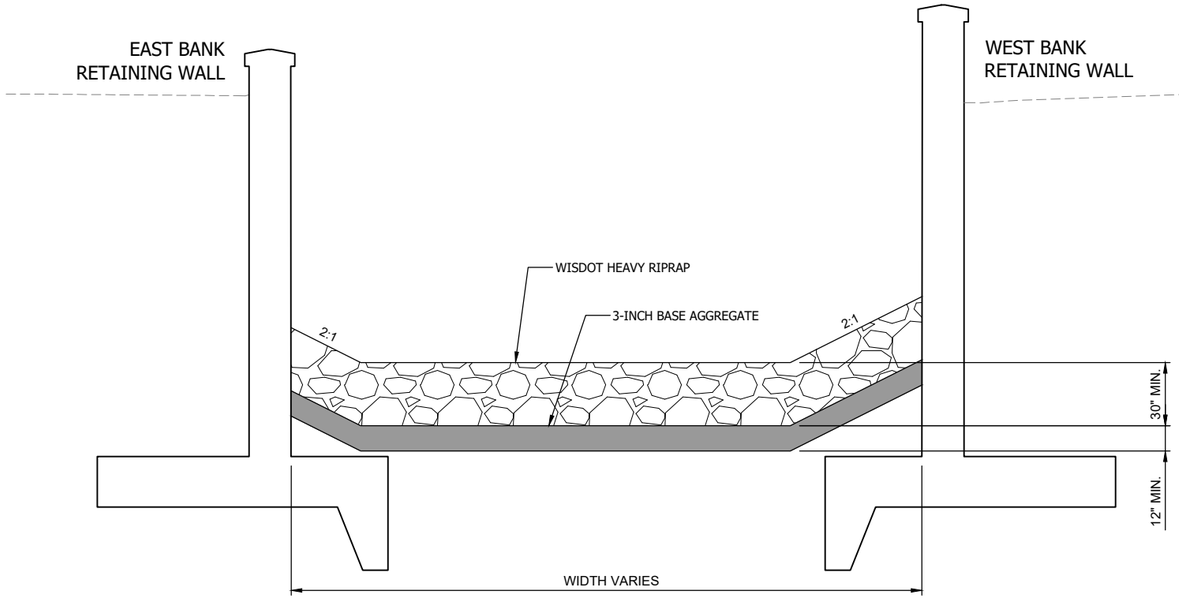
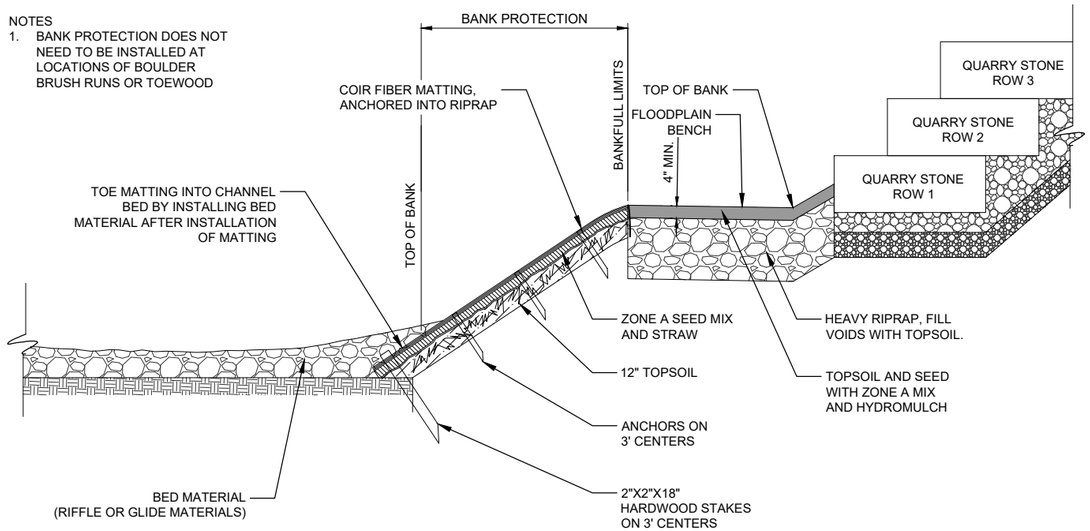


ENERGY DISSIPATOR

SCALE: NTS

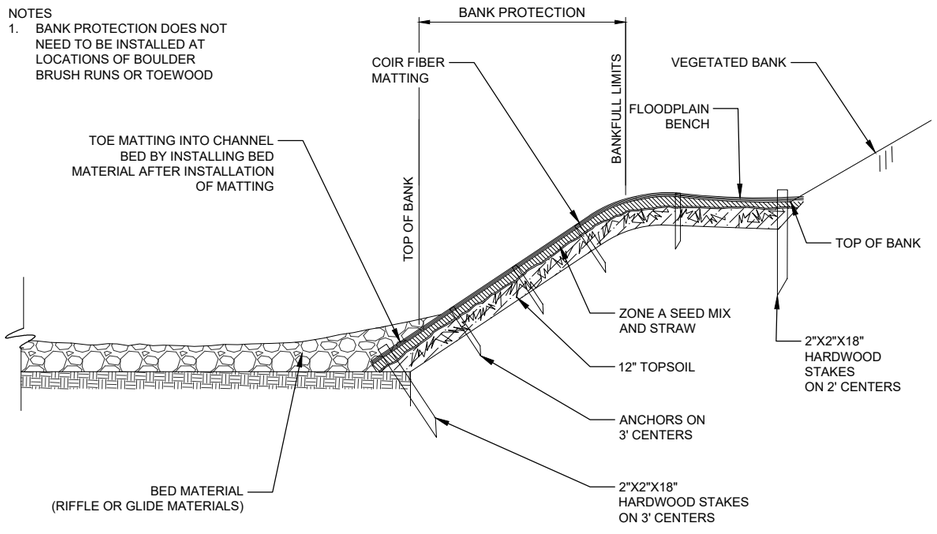
A
CH-1



BANK PROTECTION ADJACENT TO QUARRY STONE BANKS

NTS

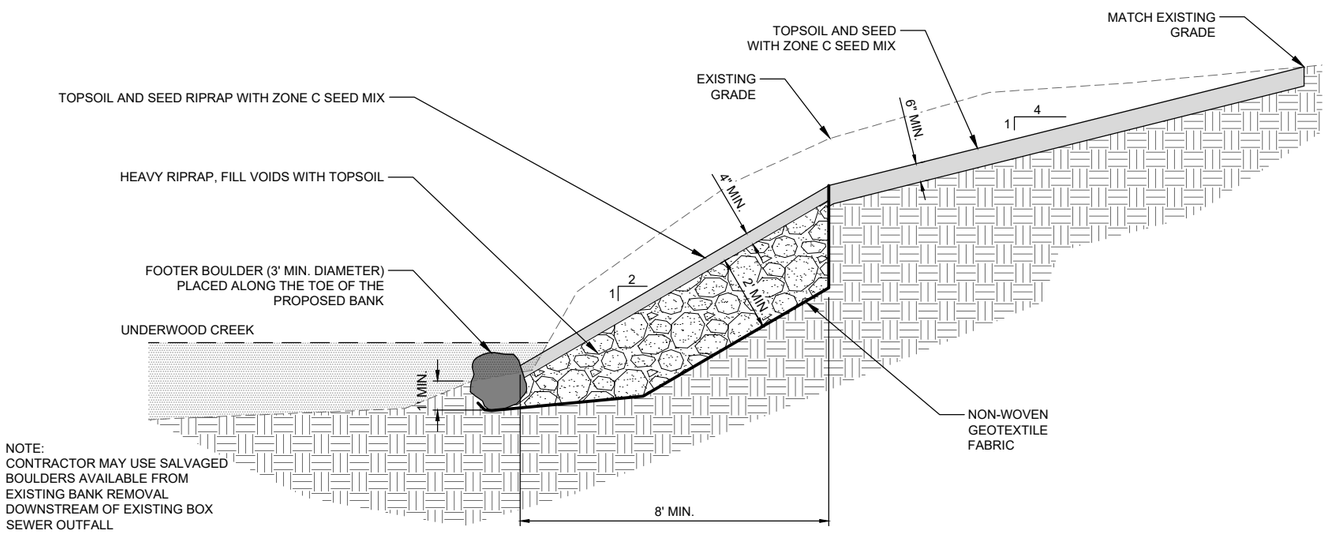
1
CH-GD4



BANK PROTECTION ADJACENT TO VEGETATED BANKS

NTS

2
CH-GD4



VEGETATED RIPRAP BANK AT CONFLUENCE

NTS

3
CH-3

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL DETAILS

DRAWING NO.	CH-GD2
SHEET NO.	24
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-GD.dwg

Plot Date: 12/30/2025 - 8:22pm
Plotted By: Bonsen Wilson
Xrefs: Bonsen 193806812_XNO, 193806812_XSIT, 193806812_XSNJ

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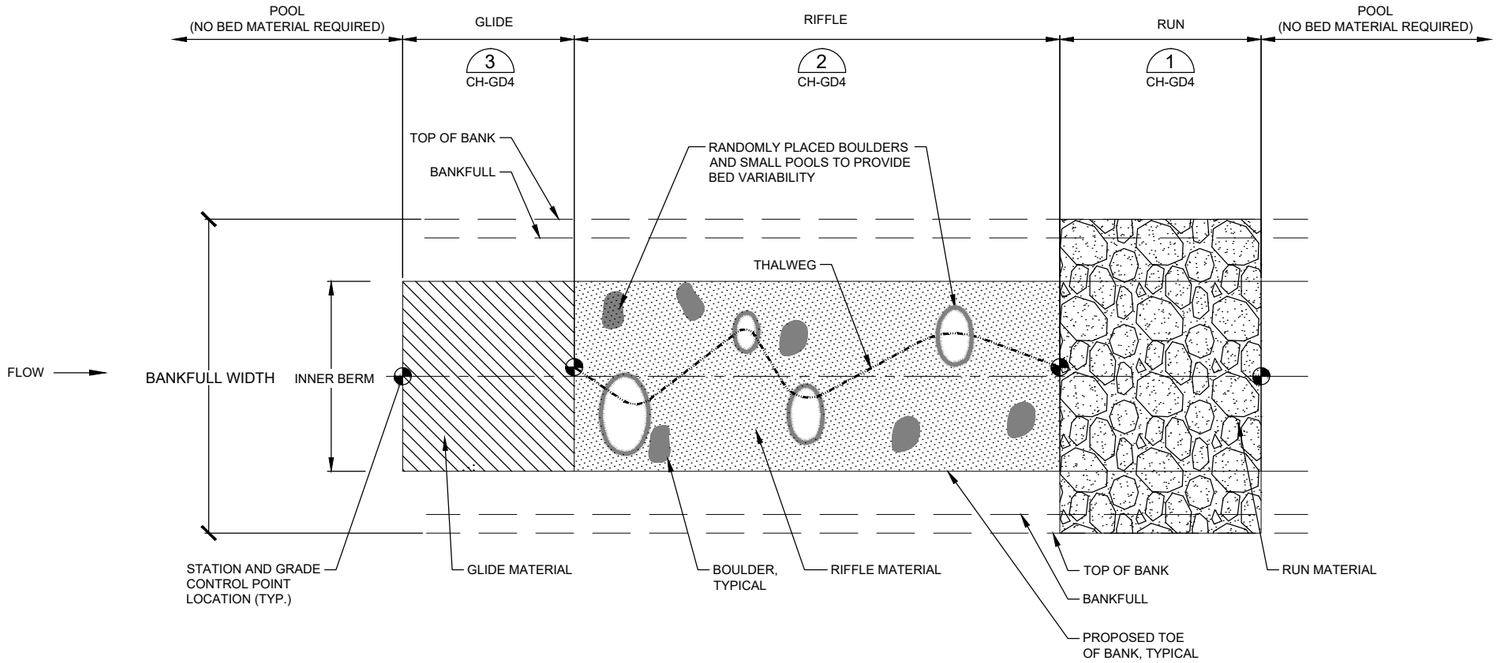
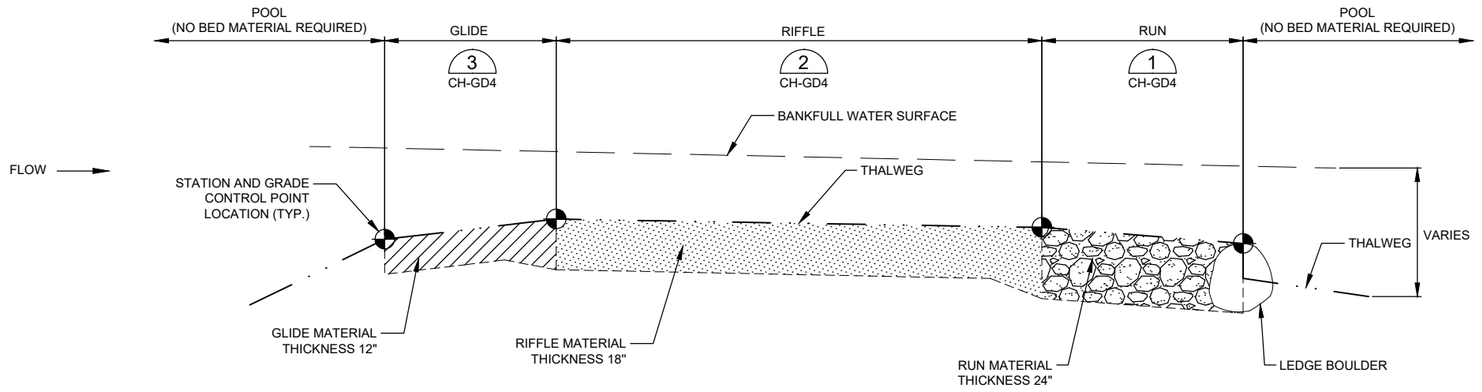


PLAN VIEW
NTS



PROFILE VIEW
NTS

DETAIL - CHANNEL SEQUENCE
NTS

#
CH-1
CH-2
CH-3

CHANNEL SEQUENCE NOTES:

1. GLIDES, RIFFLES, AND RUNS SHALL BE CONSTRUCTED IN NEWLY GRADED CHANNEL SECTIONS AND/OR IN EXISTING CHANNEL SECTIONS, AT THE LOCATIONS SHOWN ON THE PLANS, AND IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
2. THE CHANNEL SHALL BE CONSTRUCTED STARTING AT THE DOWNSTREAM END AND PROGRESSING UPSTREAM IN THE FOLLOWING GENERAL PROGRESSION;
   - 2.1. EXCAVATION OF CHANNEL AND BANKS TO FINISH GRADE
   - 2.2. EXCAVATION AND INSTALLATION OF TOE WOOD.
   - 2.3. OVER EXCAVATION OF CHANNEL BED AND SLOPES FOR INSTALLATION OF CHANNEL BED MATERIALS.
   - 2.4. INSTALLATION OF BANK PROTECTION
   - 2.5. INSTALLATION OF GLIDE, RIFFLE, OR RUN STRUCTURES.
3. GLIDES, RIFFLES, AND/OR RUNS MAY BE CONSTRUCTED INDEPENDENTLY WITH OR WITHOUT THE OTHER BED FEATURES.
4. CONTROL POINTS AT THE BEGINNING AND END OF EACH GLIDE, RIFFLE, AND RUN ARE SHOWN ON THE PLAN & PROFILE SHEETS (CH-1 THRU CH-3). THE FINISHED CROSS SECTION OF THE RIFFLE MATERIAL SHALL GENERALLY MATCH THE SHAPE AND DIMENSIONS SHOWN ON THE RIFFLE TYPICAL SECTION SHEET CH-GD1 WITH SOME VARIABILITY OF THE THALWEG LOCATION AS A RESULT OF THE SMALL POOLS AND BOULDERS.
5. GLIDE, RIFFLE, AND RUN MATERIAL SHALL BE FINISH GRADED IN A MANNER TO CREATE A SMOOTH CROSS SECTION AND PROFILE, WITH NO ABRUPT "JUMP" OR “DROP” (TRANSITIONS) BETWEEN THE CHANNEL BANKS AND BED OR THE UPSTREAM AND DOWNSTREAM CHANNEL BED.

CHANNEL STRUCTURE NOTES:

1. ALL RIFFLE AND RUN MATERIALS SHALL BE MIXED ON SITE BY THE CONTRACTOR. MIX ROCK MATERIALS TO CREATE A HOMOGENOUS STOCKPILE ACCORDING TO THE GRADATIONS LISTED BELOW. BRUSH MATERIAL, INCLUDED IN THE BOULDER BRUSH RUN, SHALL INCORPORATED INTO THE ROCK MIXTURE DURING INSTALLATION OF BOULDER BRUSH RUN STRUCTURE.
2. GLIDE MATERIAL SHALL BE COMPRISED OF CLEAN, WASHED, LOOSE, 3/8” TO ¾” DIAMETER ROUNDED STONE. GLIDE MATERIAL SHALL BE APPLIED IN A 12” THICK LAYER ACROSS THE STREAM BED. THE CHANNEL BED SHALL BE OVER-EXCAVATED, AS NEEDED, TO ALLOW FOR FULL DEPTH PLACEMENT OF THE GLIDE MATERIAL
3. RIFFLE MATERIAL SHALL BE PLACED IN AN 18” THICK LAYER ACROSS THE STREAM BED. RIFFLE MATERIAL SHALL BE MIXED ON-SITE AND COMPRISED OF CLEAN, HARD, QUARRIED ROCK MATERIAL MEETING THE FOLLOWING GRADATION:
   - a. BOULDERS (12”-24” DIA.) NOT TO EXCEED 5% MAX.
   - b. 25-35% SMALL BOULDERS/COBBLE (6-12" FIELDSTONE);
   - c. 35-45% COARSE GRAVEL (WISDOT 3-INCH BASE AGGREGATE);
   - d. 25-35% FINE GRAVEL (WISDOT 3/4" BASE AGGREGATE);
4. RUN MATERIAL SHALL BE APPLIED IN A 24” THICK LAYER ACROSS THE STREAM BED. LARGER ROCKS AND BRUSH MAY PROJECT RANDOMLY ABOVE THE STREAM BED PROPOSED GRADE. ALL BRUSH MATERIAL SHALL BE ORIENTED DOWNSTREAM AND BURIED A MINIMUM OF 75% TO PREVENT MOVEMENT DURING HIGH FLOW EVENTS. RUN MATERIAL SHALL BE MIXED ON-SITE AND COMPRISED OF CLEAN, HARD, QUARRIED ROCK MATERIAL MEETING THE FOLLOWING GRADATION:
   - a. 10-15% BOULDERS (LEDGE AND GAP BOULDERS - 24” DIA. MIN);
   - b. 40-50% SMALL BOULDERS/COBBLE (6-12" FIELDSTONE);
   - c. 15-25% COARSE GRAVEL (WISDOT 3-INCH BASE AGGREGATE);
   - d. 20-30% BRUSH (1-6" DIA.)
5. BRUSH SHALL CONSIST OF A COMBINATION OF HARDWOOD AND CONIFER BRANCHES, LIMBS, AND TOPS MEETING THE SPECIFICATION SIZE REQUIREMENTS. BRUSH SHOULD BE HARD, DENSE, AND FREE OF ROT.
6. GAP BOULDERS SHALL BE PLACED AT LOCATIONS WHERE THERE ARE VOID SPACED BETWEEN THE LEDGE BOULDER. VOID SPACES GREATER THAN 2" REQUIRE PLACEMENT OF A GAP BOULDER .
7. OVER EXCAVATION OF CHANNEL BED IS REQUIRED FOR ALL AREAS WITH UNSUITABLE FOUNDATION, AS DIRECTED BY THE ENGINEER. BACKFILL MATERIAL SHALL BE FOUNDATION STABILIZATION MATERIAL (3" DENSE GRADED BASE AGGREGATE) PER SPECIFICATIONS.
8. REFER TO DWG. NO CH-GD1 FOR DIMENSIONS TOLERANCES.

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL SEQUENCE

DRAWING NO.	CH-GD3
SHEET NO.	25
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-GD.dwg

Plot Date: 12/30/2025 - 8:23am
User Name: Brian.Borsen
Xrefs: Borsen 193806812_IGND, 193806812_IGVI, 193806812_IGVT, 193806812_IGNU

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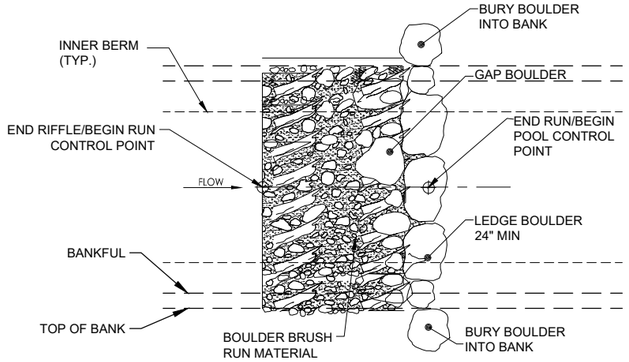
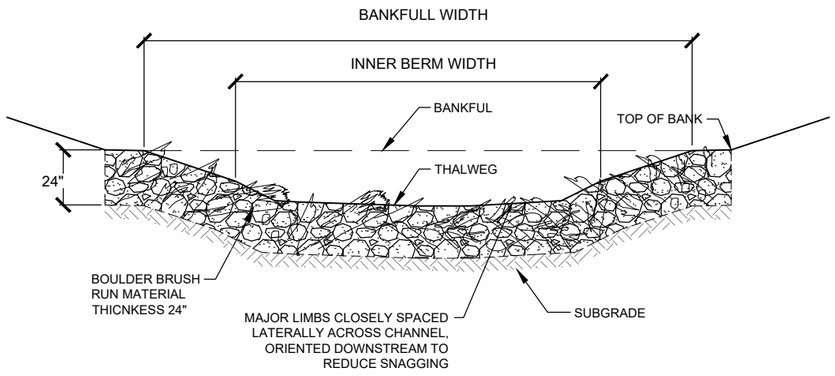
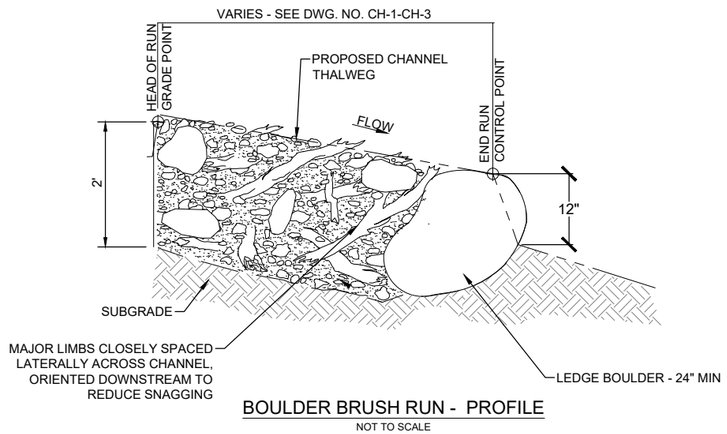


BOULDER BRUSH RUN - PLAN VIEW
NOT TO SCALE



BOULDER BRUSH RUN - TYPICAL SECTION
NOT TO SCALE

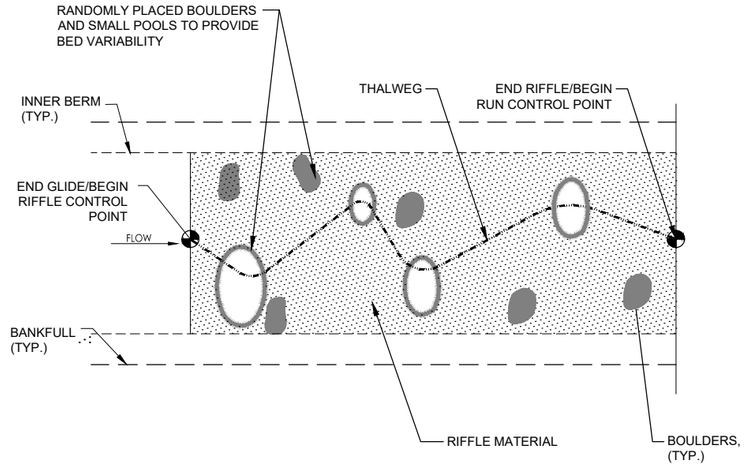


BOULDER BRUSH RUN - PROFILE
NOT TO SCALE

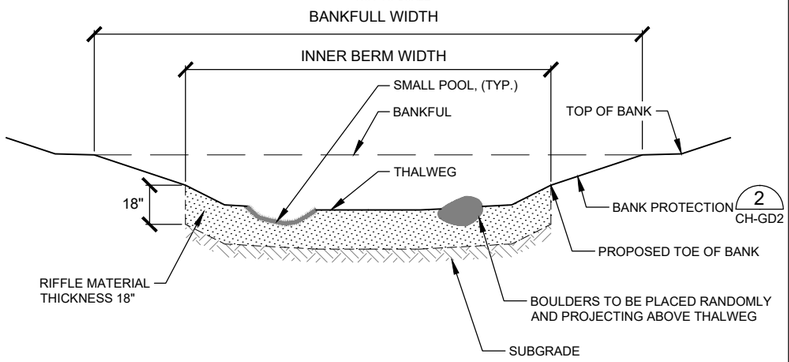
DETAIL - BOULDER BRUSH RUN 1

NTS

CH-1
CH-2
CH-3



RIFFLE - PLAN VIEW
NOT TO SCALE

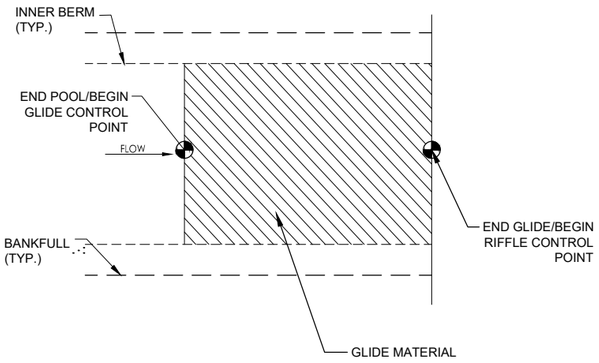


RIFFLE - TYPICAL SECTION
NOT TO SCALE

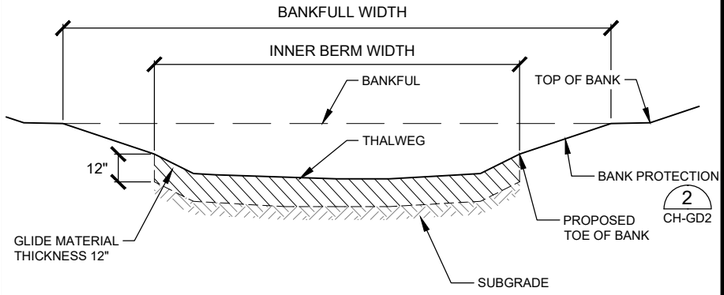
DETAIL - RIFFLE 2

NTS

CH-1
CH-2
CH-3



GLIDE - PLAN VIEW
NOT TO SCALE



GLIDE - TYPICAL SECTION
NOT TO SCALE

DETAIL - GLIDE 3

NTS

CH-1
CH-2
CH-3

NOTES:

1. REFER TO SHEET CH-GD3 FOR NOTES REGARDING CHANNEL STRUCTURE MATERIALS AND CONSTRUCTION PROCESS.

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL STRUCTURE DETAILS

DRAWING NO.	CH-GD4
SHEET NO.	26
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-GD.dwg

Plot Date: 12/30/2025 - 8:23pm
Plot By: Aaron Rock
Xrefs: Borders 193806812_XNO, 193806812_JSXT, 193806812_JSNL

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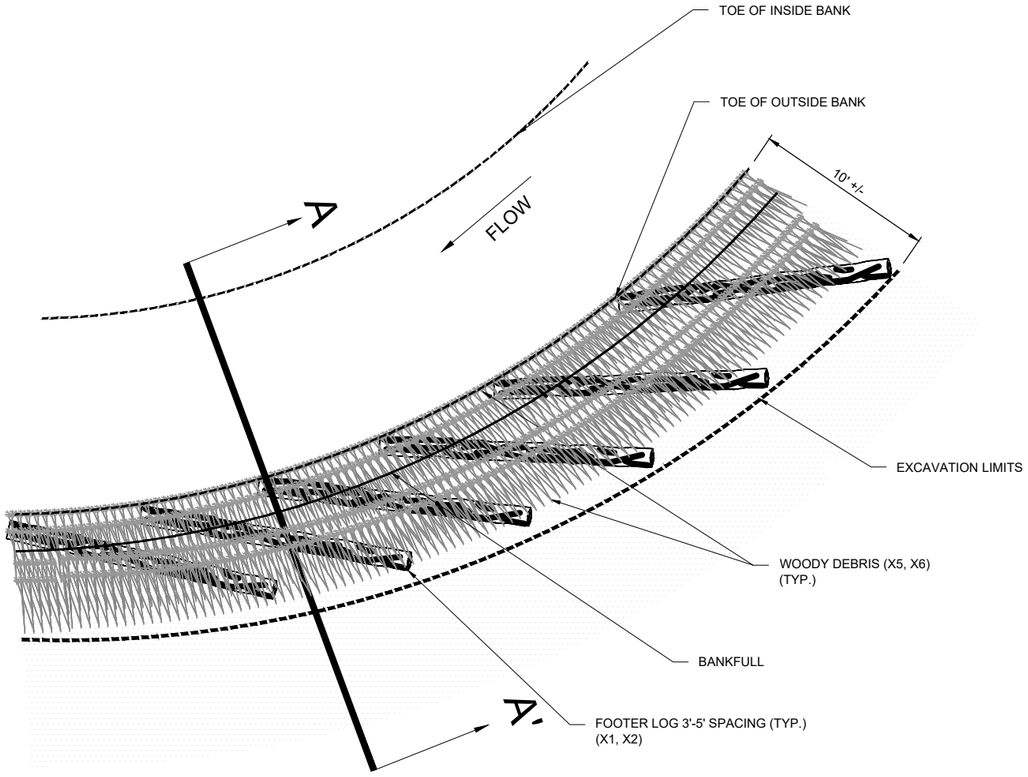
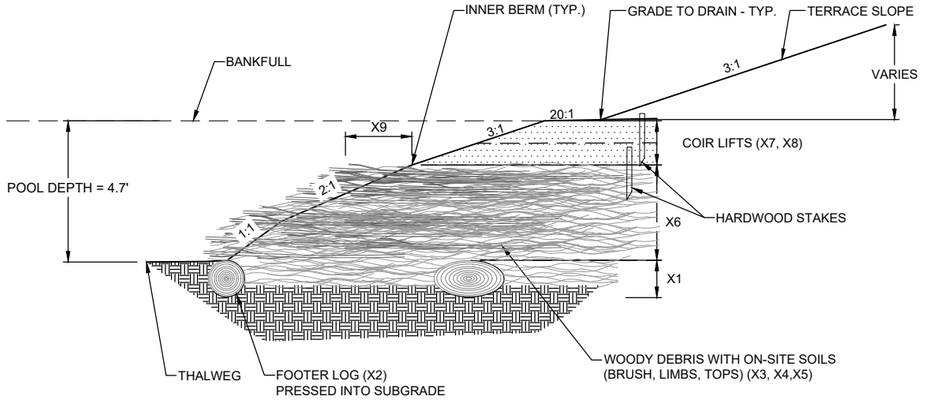


DETAIL - TOE WOOD PLAN VIEW

NTS

CH-2, CH-3

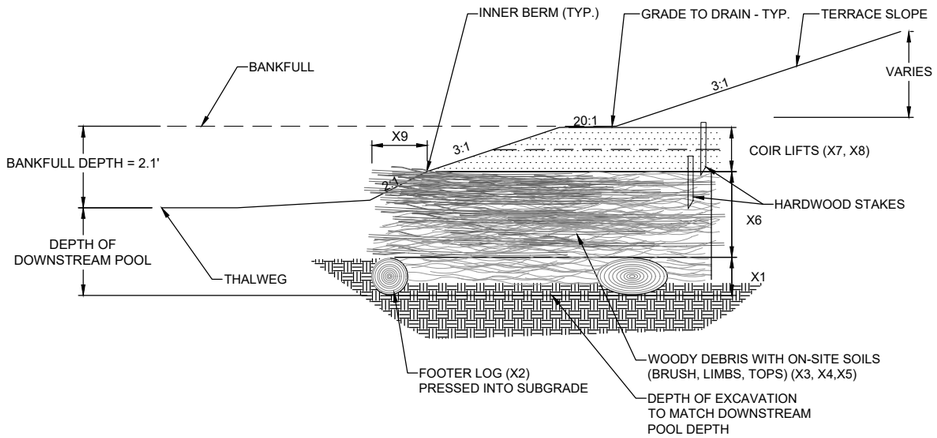
TOE WOOD DIMENSIONS			
VARIABLE	REQUIRED	TYPICAL UNIT	DESCRIPTION
X1	10 - 15	IN.	FOOTER LOG - DIAMETER
X2	10 - 15	FT.	FOOTER LOG - LENGTH
X3	1 - 5	IN.	WOODY DEBRIS - DIAMETER
X4	8 - 12	FT.	WOODY DEBRIS - LENGTH
X5	-	-	ON-SITE GRAVEL/SANDY SOILS
X6	3.5	FT.	TOE WOOD - THICKNESS
X7	2	EA.	# OF COIR LIFTS
X8	6	IN.	COIR LIFT - THICKNESS (EA)
X9	6 - 12	IN.	TOE WOOD PROJECTION BEYOND BANK SURFACE



SECTION A-A - TOE WOOD (POOL SECTION)

NTS

CH-2, CH-3



SECTION A-A - TOE WOOD (GLIDE/RIFFLE/RUN SECTIONS)

NTS

CH-2, CH-3

NOTES:

1. FOOTER LOGS OF APPROPRIATE SIZE SHALL CONSIST OF GREEN OR RELATIVELY GREEN CUT LOGS FREE OF ROOT BALLS. ON-SITE SALVAGED MATERIAL IS PREFERRED.
2. WOODY DEBRIS SHALL BE GREEN OR RELATIVELY GREEN CONSISTING OF APPROPRIATE SIZE LOGS, TRUNKS, LIMBS, BRANCHES, AND SMALLER WOODY DEBRIS INCLUDING TOPS OR SLASH. ON-SITE WOODY MATERIAL IS PREFERRED.
3. WOODY DEBRIS AND ON-SITE SOILS SHALL BE PLACED IN LIFTS AND COMPACTED USING AN EXCAVATOR BUCKET IN EFFORT TO MINIMIZE VOID SPACE.
   a. FINAL STRUCTURE CONSISTENCY:
      - 80% WOODY DEBRIS
      - 20% ON-SITE SOILS
   b. LAYERS SHALL BE PLACED AT A THICKNESS OF ONE TO TWO FEET OR AS NECESSARY TO COMPACT THE STRUCTURE TO THE REQUIRED CONSISTENCY.
4. THE FINISHED EXPOSED SURFACE OF THE TOE WOOD AND CHANNEL BANK SHALL GENERALLY MATCH THE PROPOSED CHANNEL CROSS SECTIONS AND SLOPES. WOODY DEBRIS WILL PROJECT RANDOMLY FROM THE BANK SURFACE BELOW THE WATER LINE. THE CONTRACTOR SHALL TRANSITION THE PROPOSED TOE WOOD TO THE PROPOSED CHANNEL FEATURES (BED, BANKS, AND CHANNEL BOTTOM) SMOOTHLY AND EVENLY WITHOUT ABRUPT CHANGES IN GRADE.

FOR BIDDING AND CONSTRUCTION

DESIGNER M. SIERACKI
DRAWN BY A. ROCK
CHECKER D. AMUNDSEN
APPROVED R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

TOE WOOD DETAIL

DRAWING NO.	CH-GD5
SHEET NO.	27
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-GD.dwg

Plot Date: 12/30/2025 - 8:23am
Drawing Path: C:\Users\mike.sieracki\Desktop\SHARED_PROJECTS\193806812\C-CAD\Dwg\Sheets\193806812_CH-GD.dwg
Xrefs: Border: 193806812_ISNO, 193806812_ISXT, 193806812_ISXT

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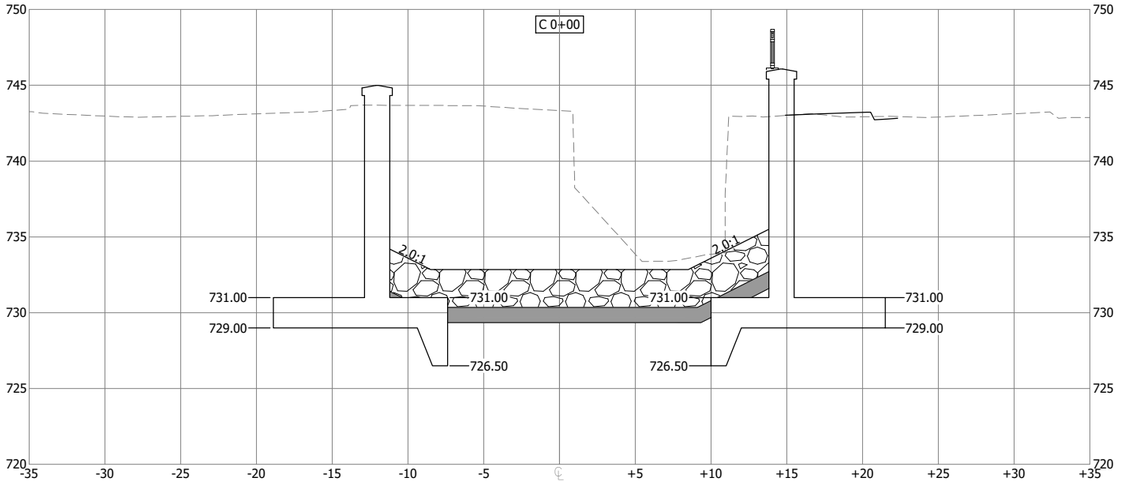

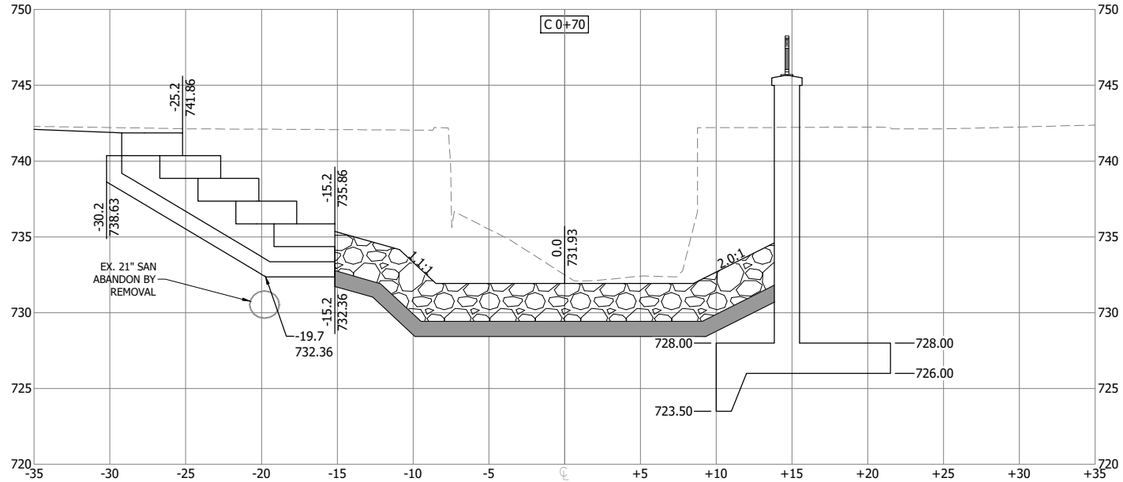

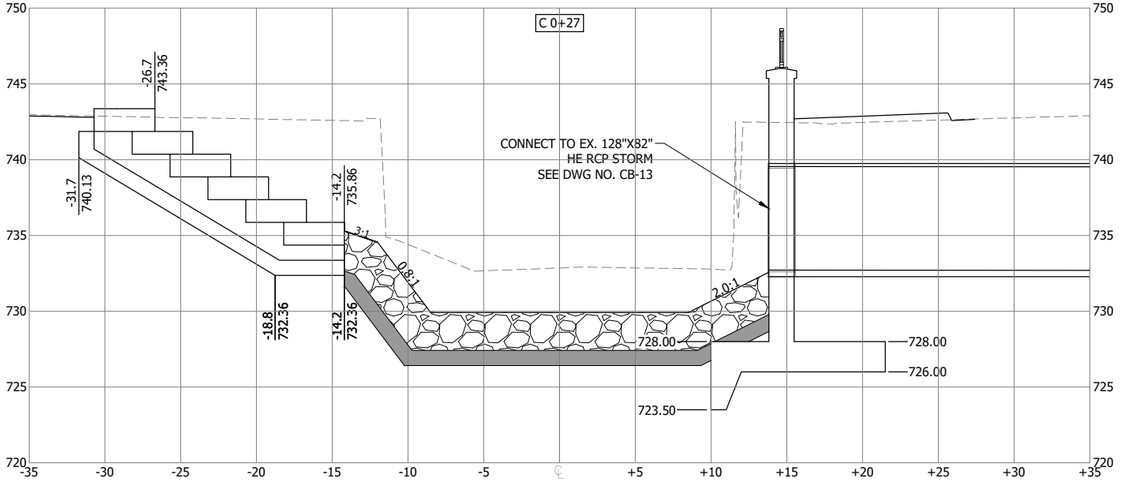

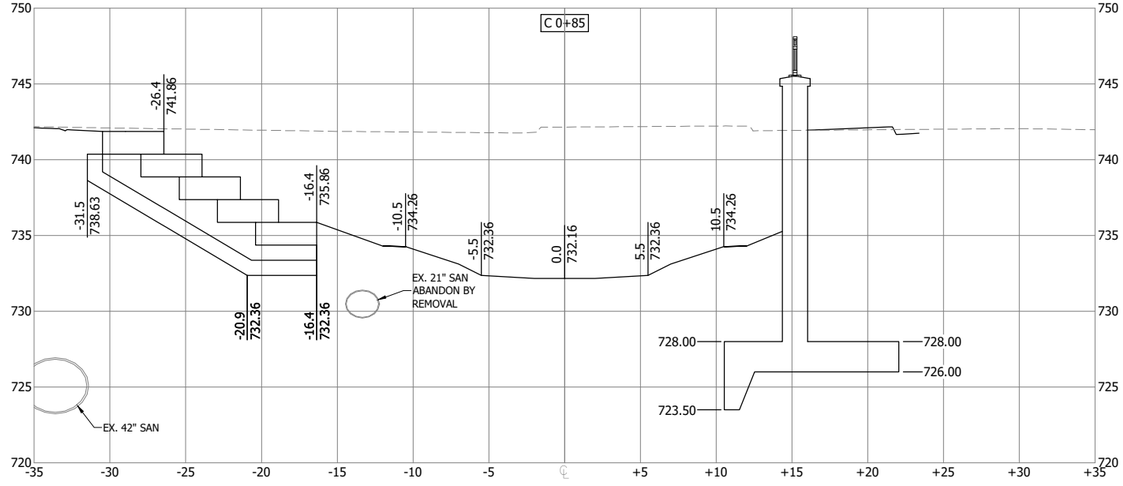

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS1
SHEET NO.	28
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:23pm
Plot By: Mieracki, Matthew
Xrefs: 193806812_XSP1, 193806812_AXT, 193806812_ASNO, 193806812_CH-CS-BID, Border

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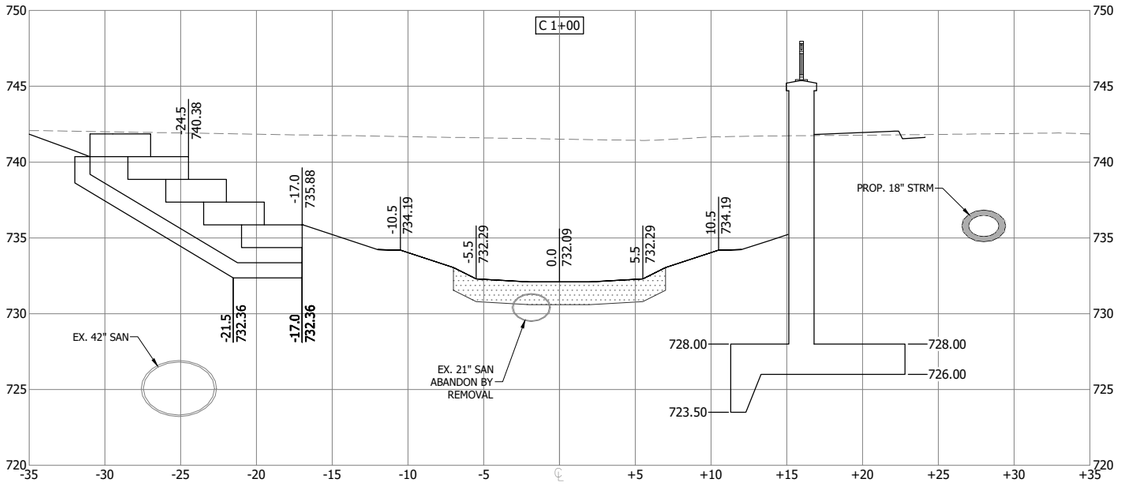

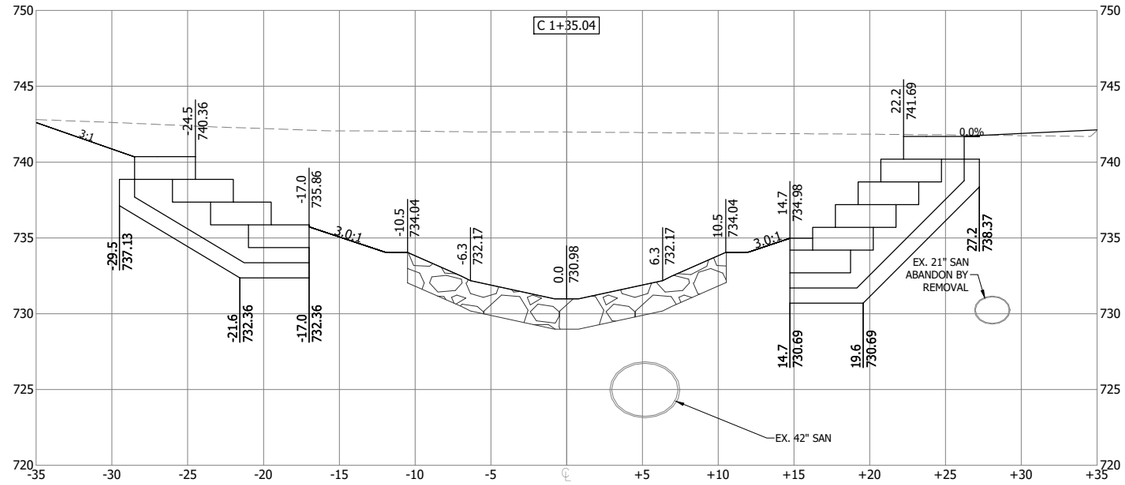

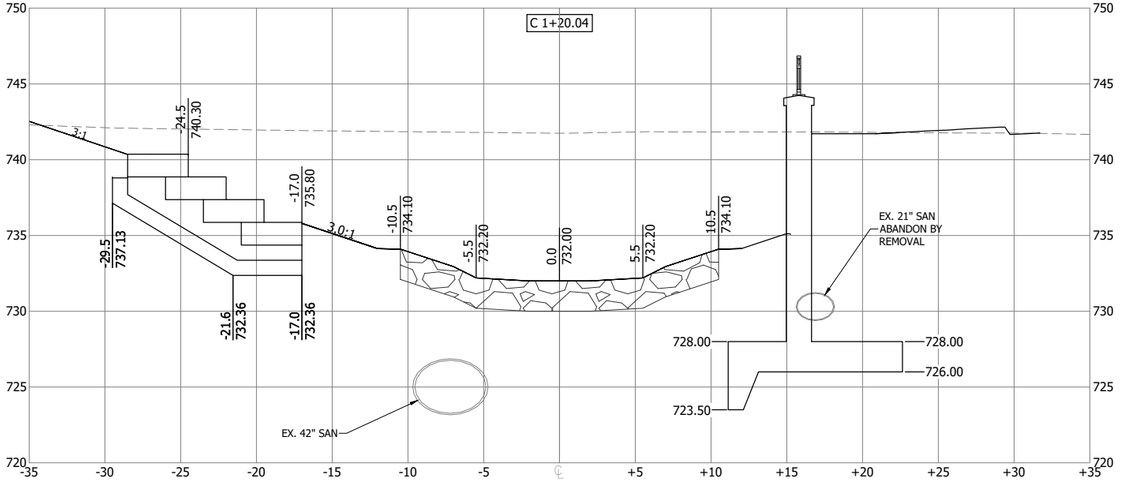

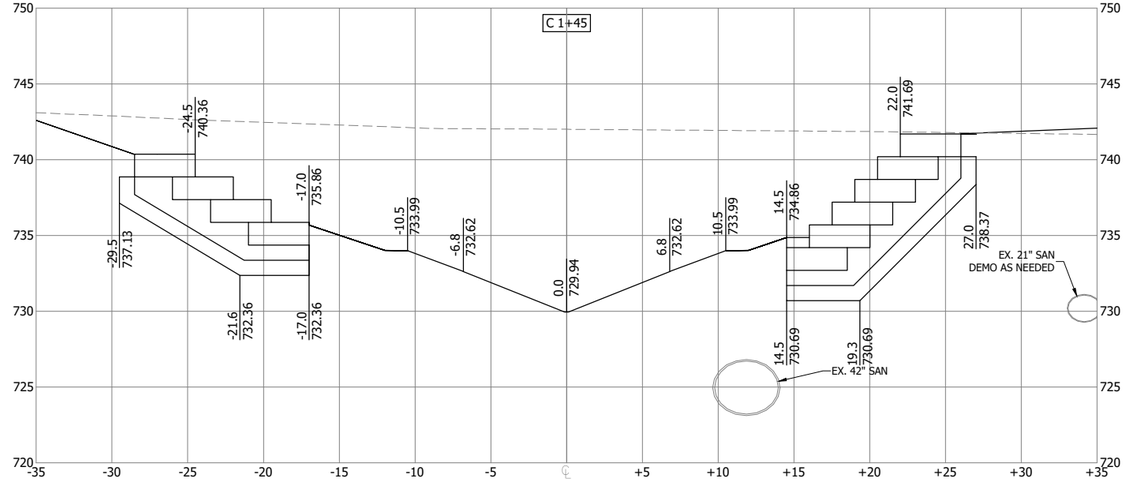

0 5' 10' VERTICAL
0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS2
SHEET NO.	29
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:23am
Drawing Name: C:\Users\mike.sieracki\Documents\ACCDocs\Stantec\193806812\Project Files\CAD\Civil\Sheets\193806812_CH-CS.dwg
Xrefs: 193806812_XPS_193806812_AXT_193806812_KNO_193806812_CH-CS-BD, Border

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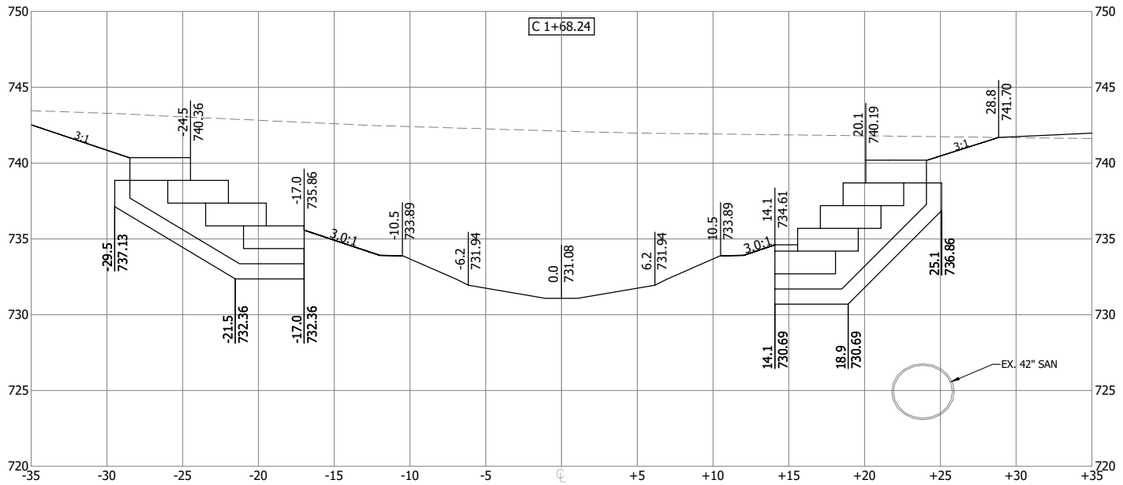

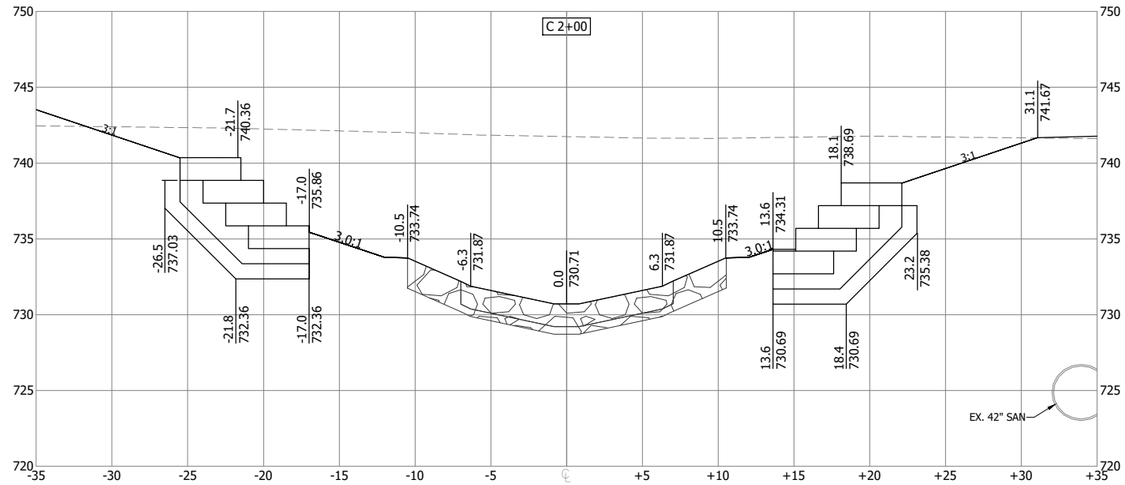

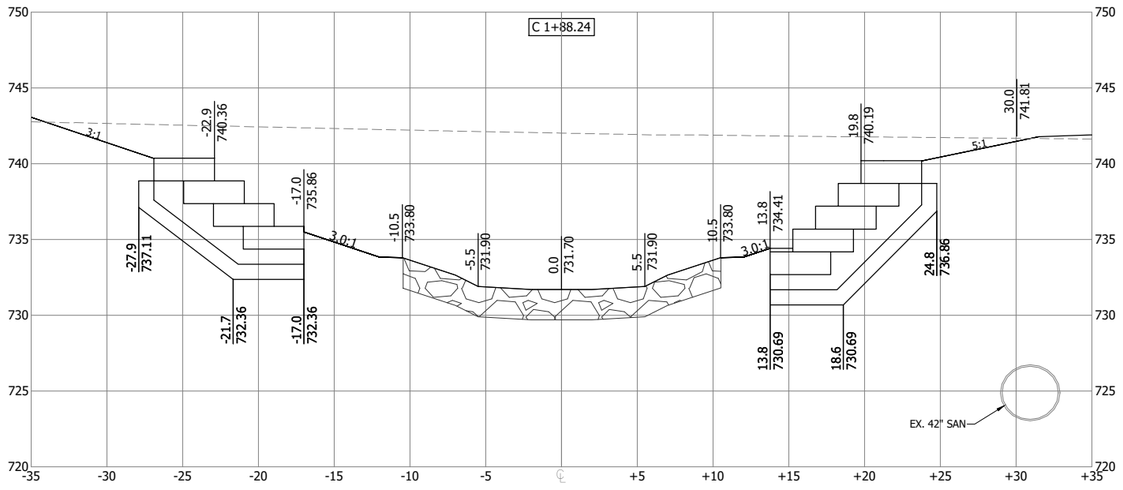

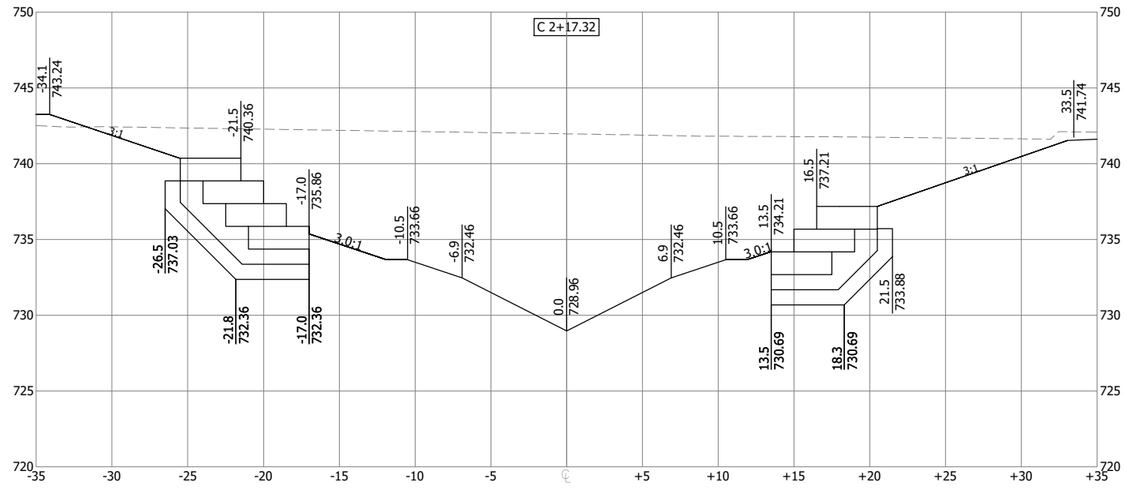

0 5' 10' VERTICAL
0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS3
SHEET NO.	30
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:23pm
Drawing Name: C:\Users\mike.rock\Documents\ACCDocs\Stantec\193806812\Project Files\CAD\Dwg\Sheets\193806812_CH-CS.dwg
Xrefs: 193806812_XSPL 193806812_JOIT, 193806812_ASNO, 193806812_CH-CS-BD, Border

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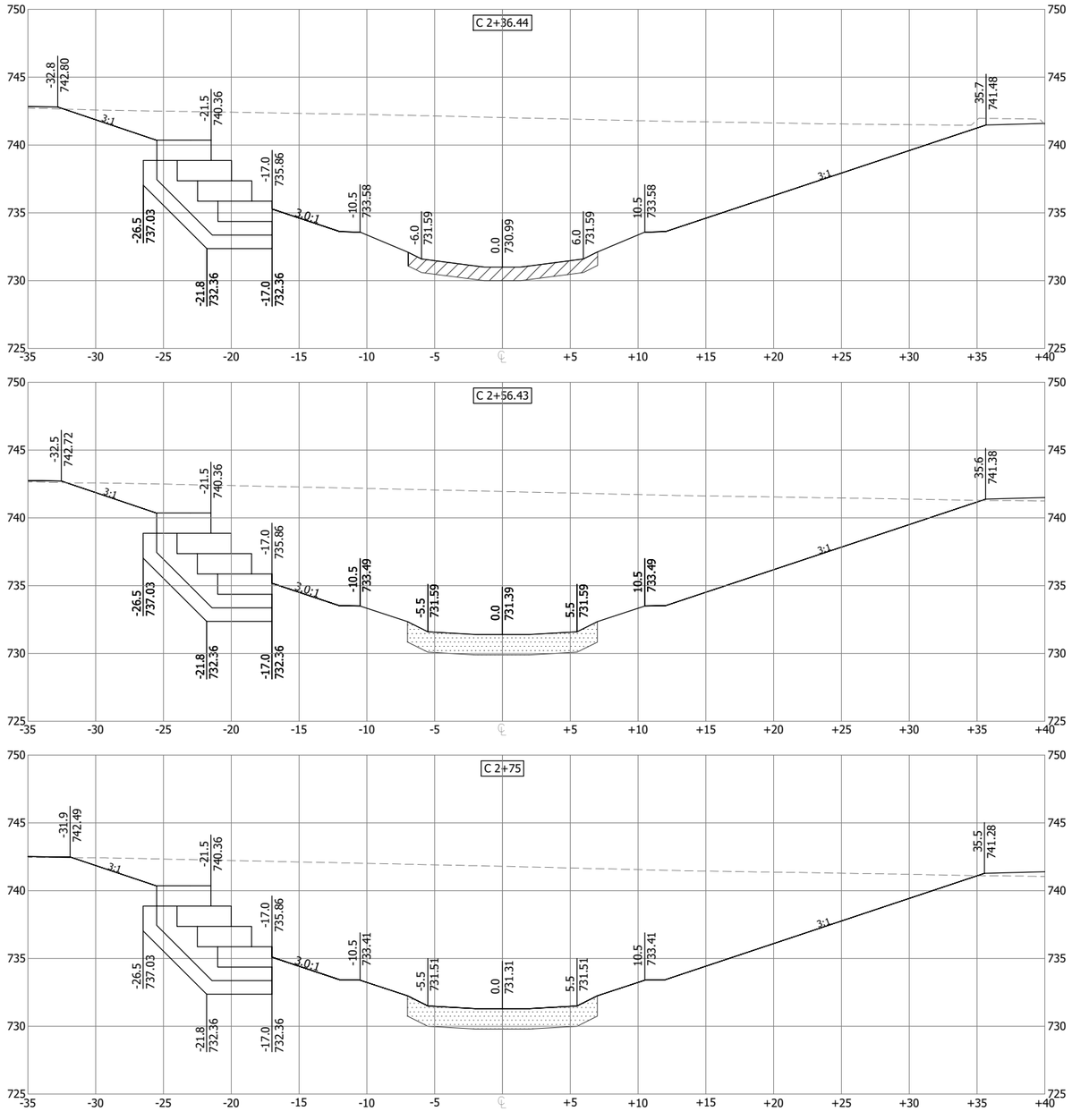

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS4
SHEET NO.	31
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:23pm
Plotted by: Dan Amundsen
Xrefs: 193806812_XSTL, 193806812_XSTT, 193806812_XSNO, 193806812_CH-CS-BID_Border

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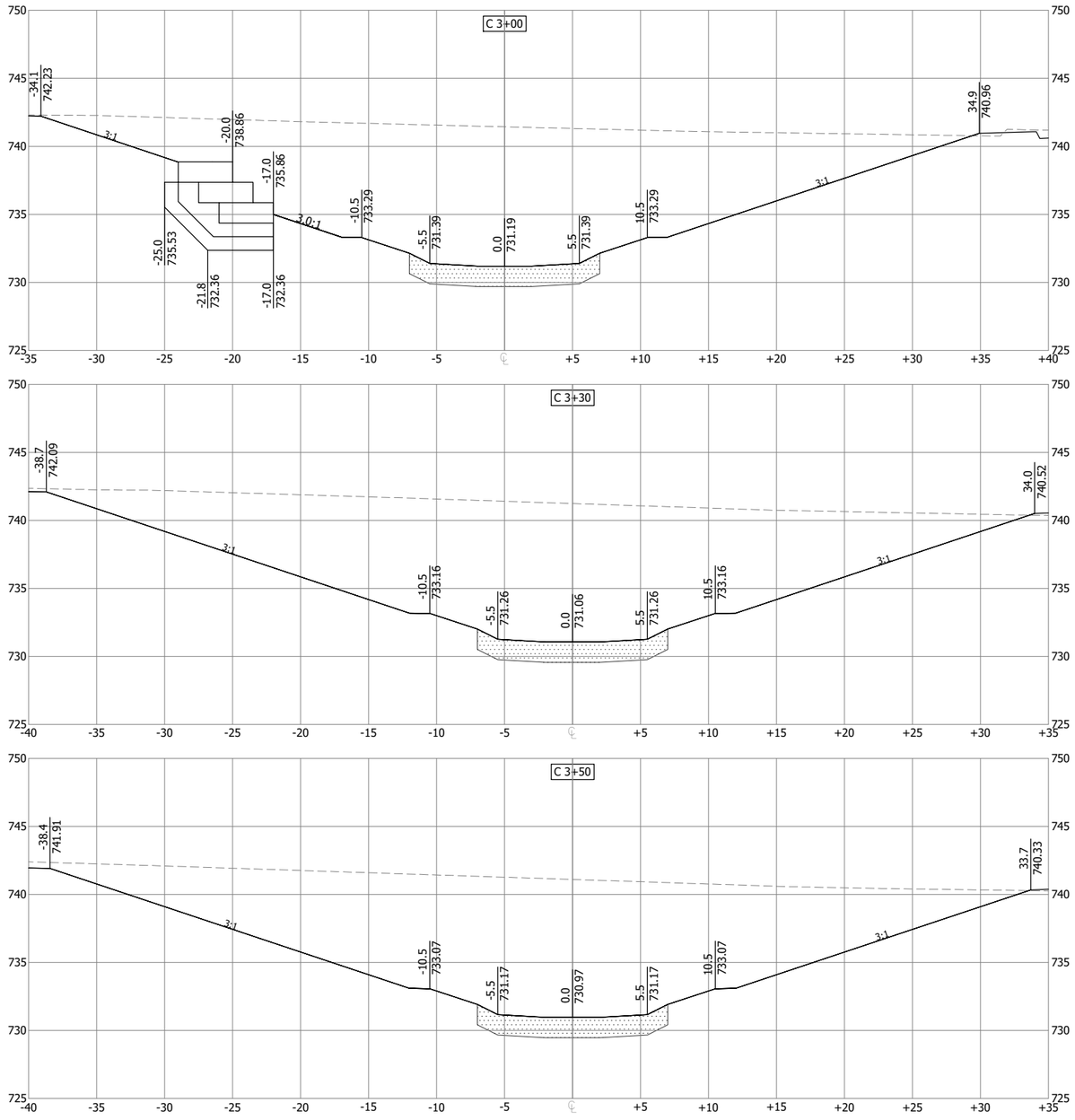

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS5
SHEET NO.	32
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:23pm
Plot By: Andrew Rock
Xrefs: 193806812_XSR, 193806812_JUST, 193806812_ANO, 193806812_CH-CS-BD_Border

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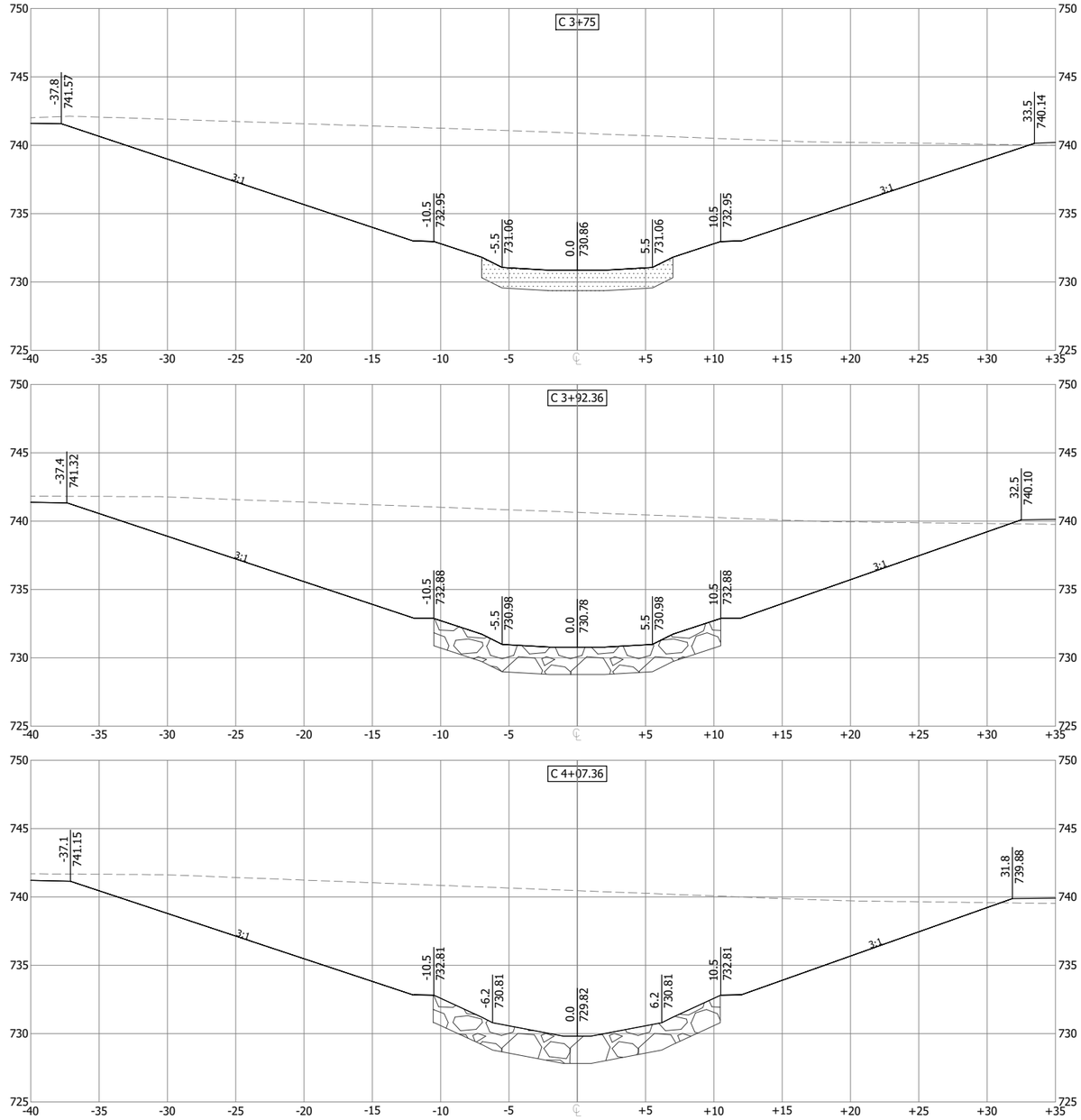

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS6
SHEET NO.	33
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24am
Plotted by: Amundsen, Dan
Xrefs: 193806812_XDR, 193806812_XMT, 193806812_XNO, 193806812_CH-CS-BID Border

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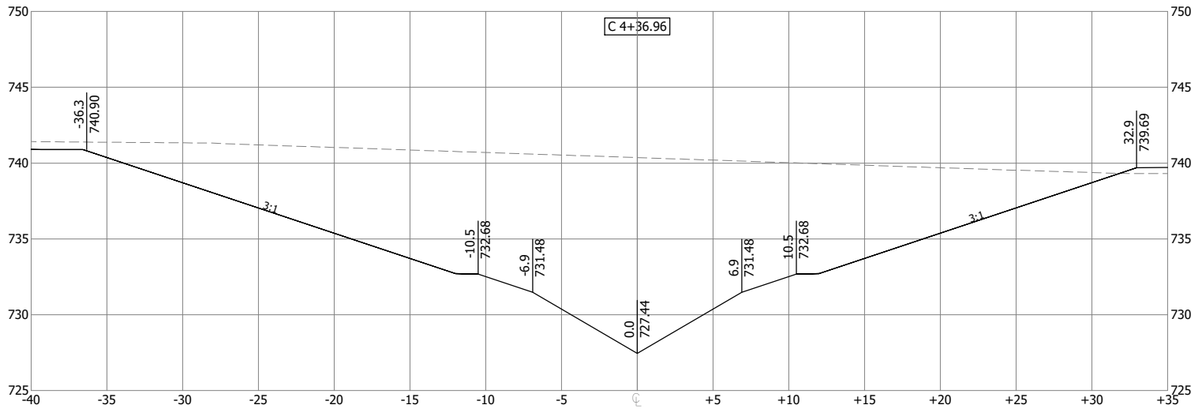

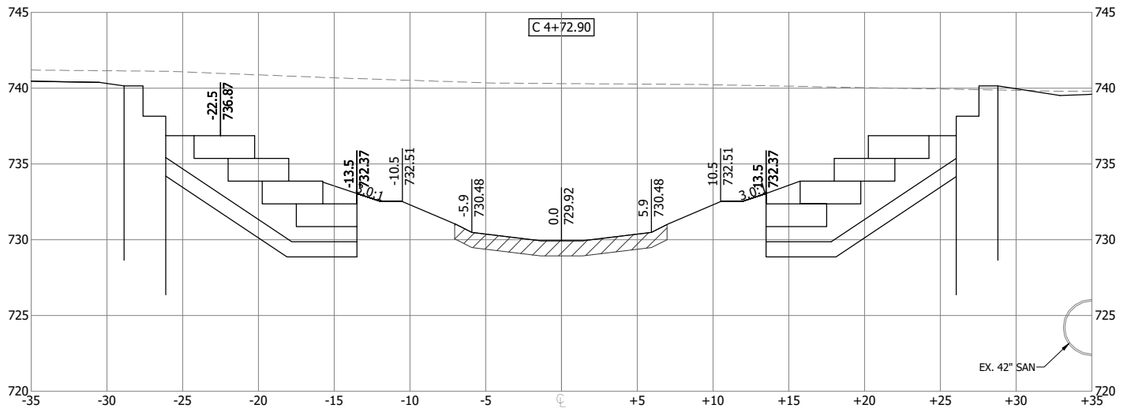

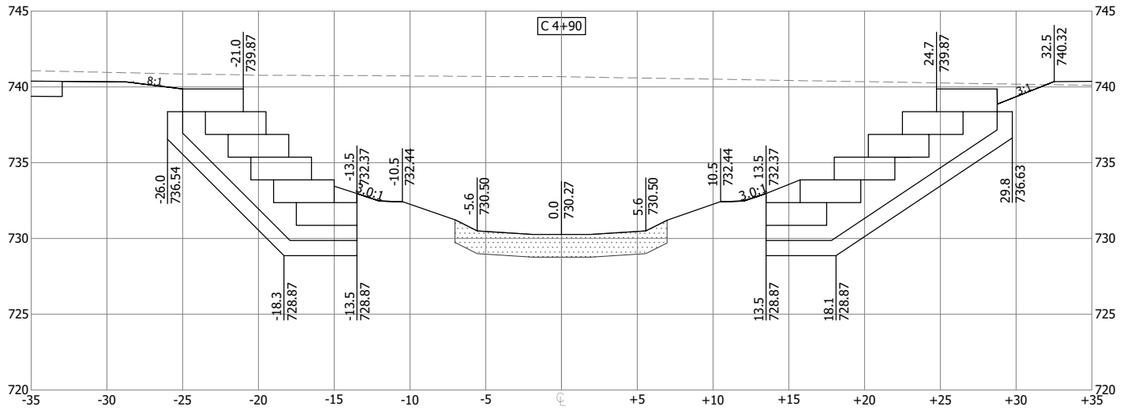

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS7
SHEET NO.	34
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24pm
Plot By: Andrew Rock
Xrefs: 193806812_XER_193806812_JUNT_193806812_JUNO_193806812_CH-CS-HD_Border

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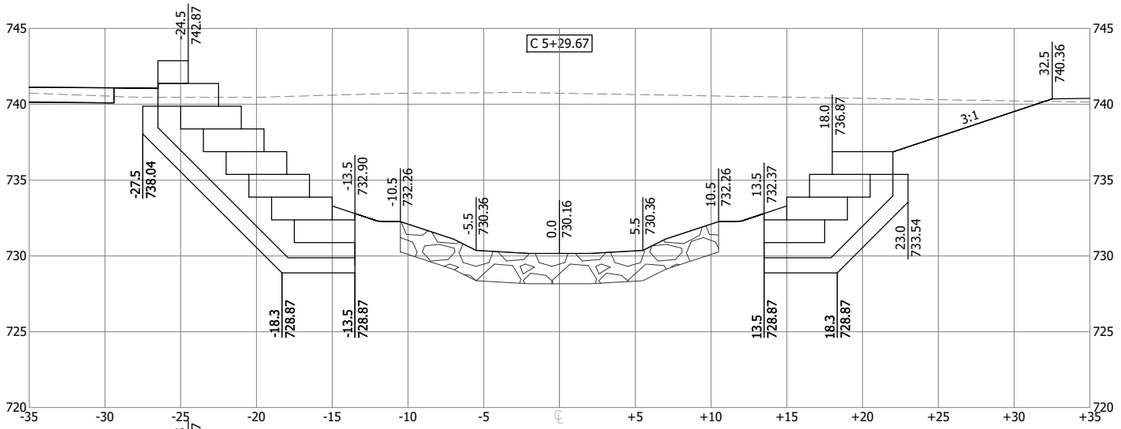

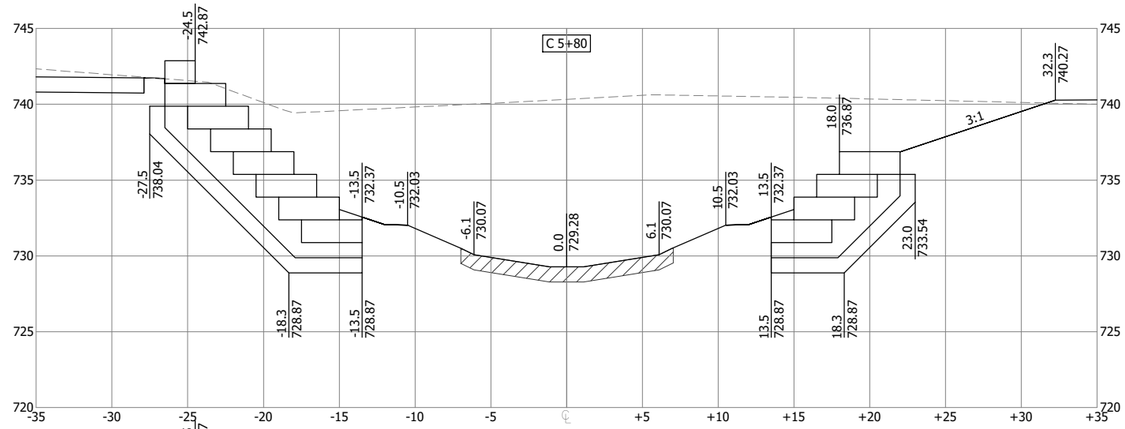

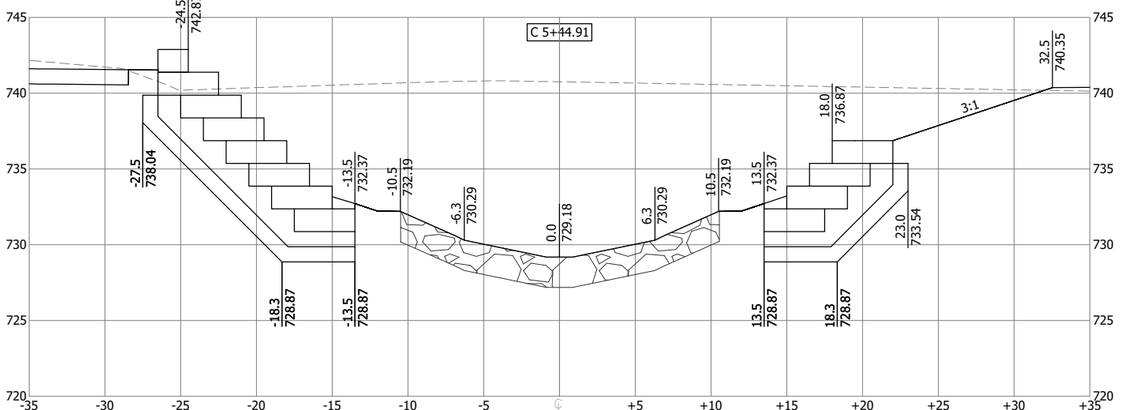

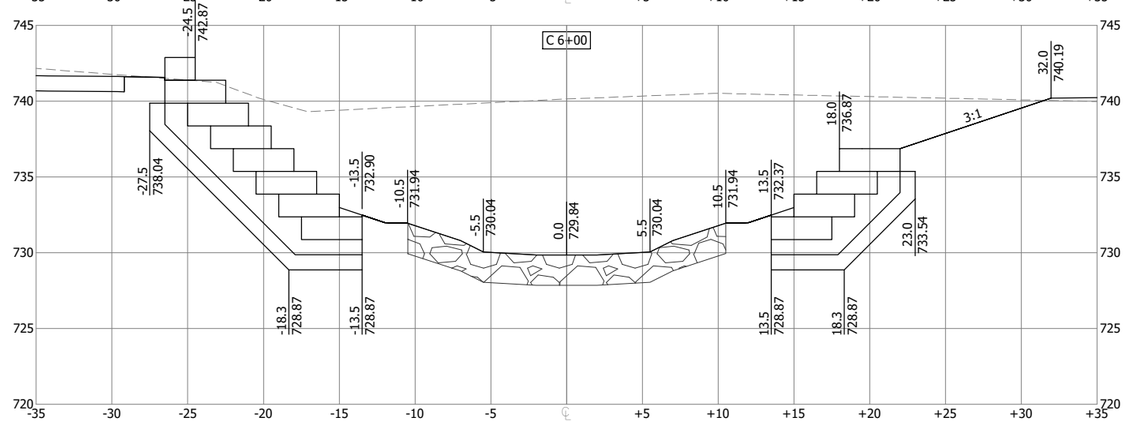

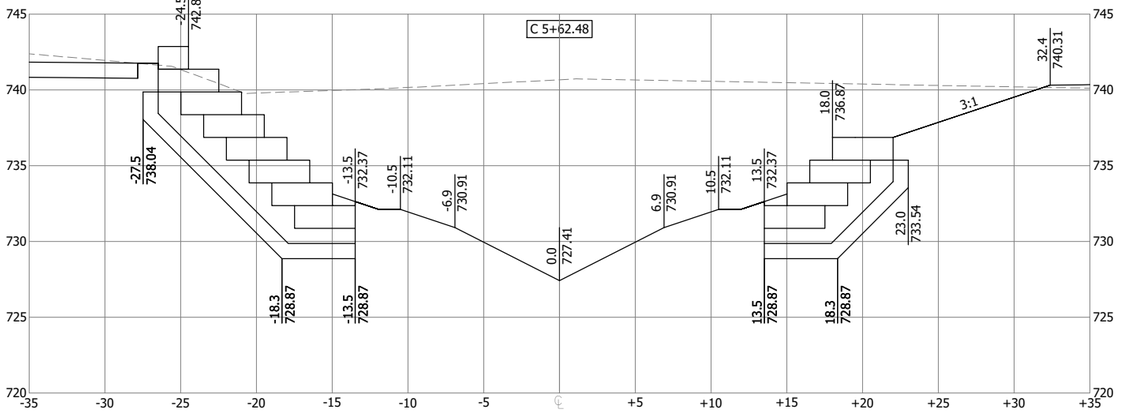

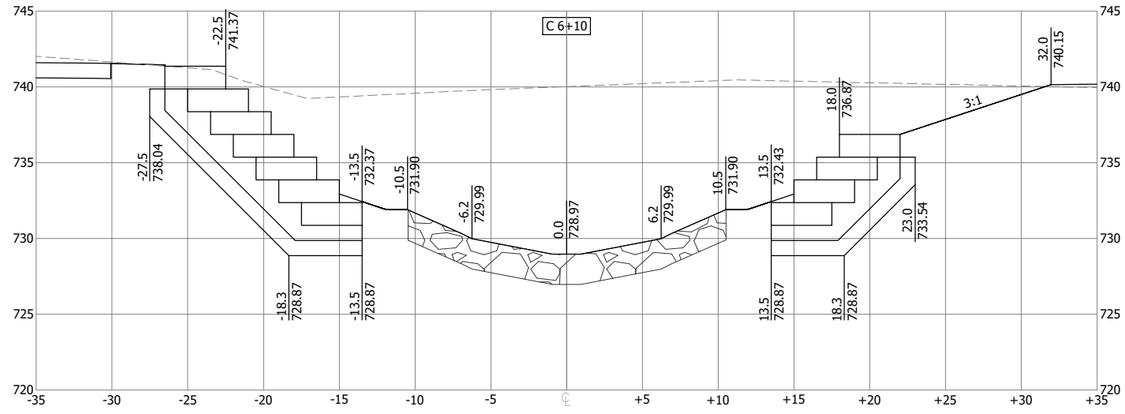

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS8
SHEET NO.	35
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24am
Plotted By: Amundsen, Dan
Xrefs: 193806812_XDR, 193806812_XVT, 193806812_XNO, 193806812_CH-CS-BD_Border

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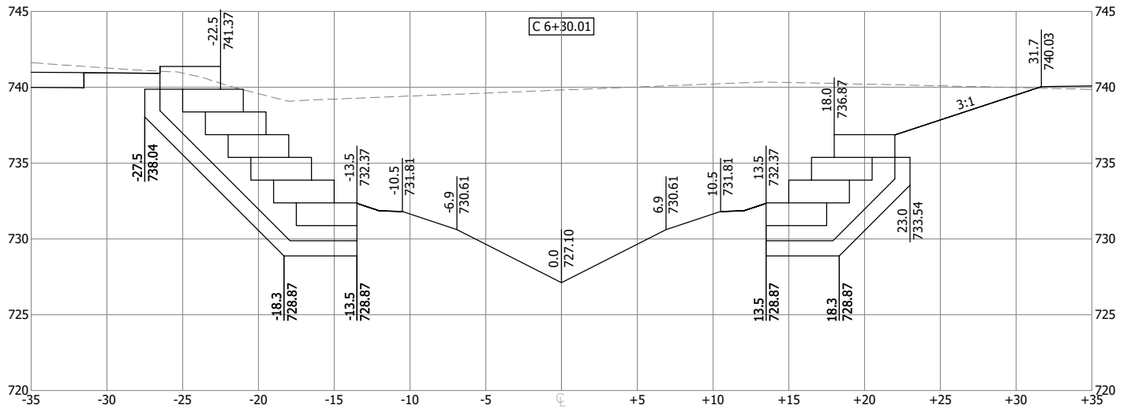

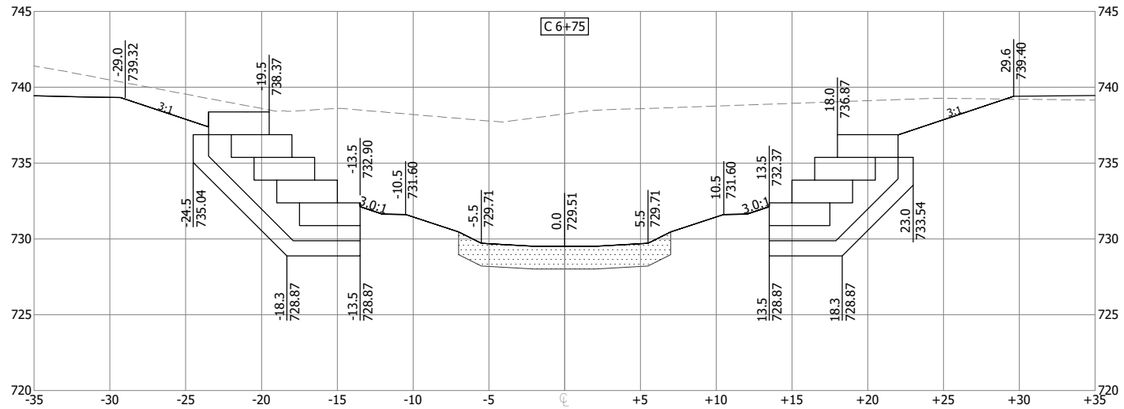

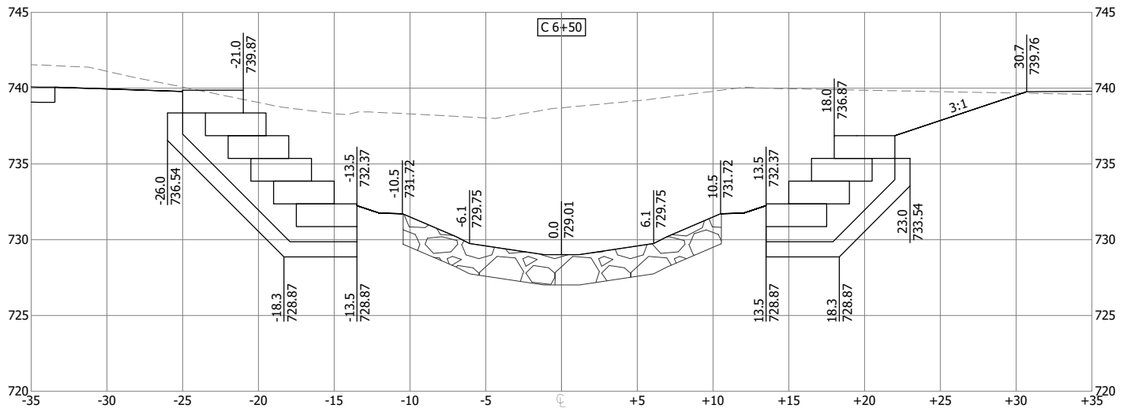

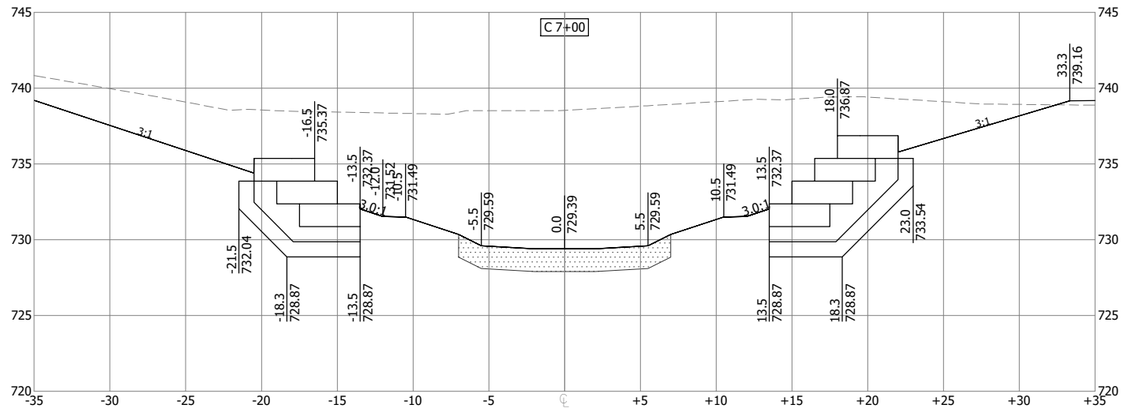

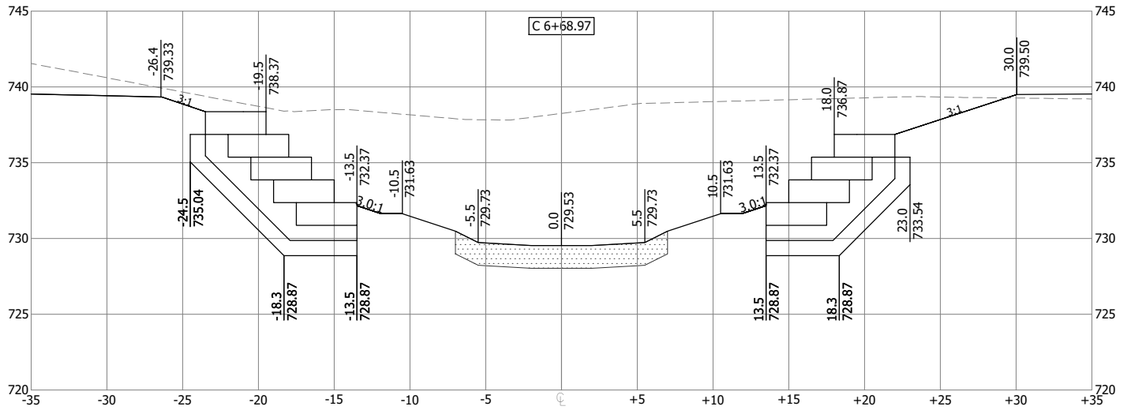

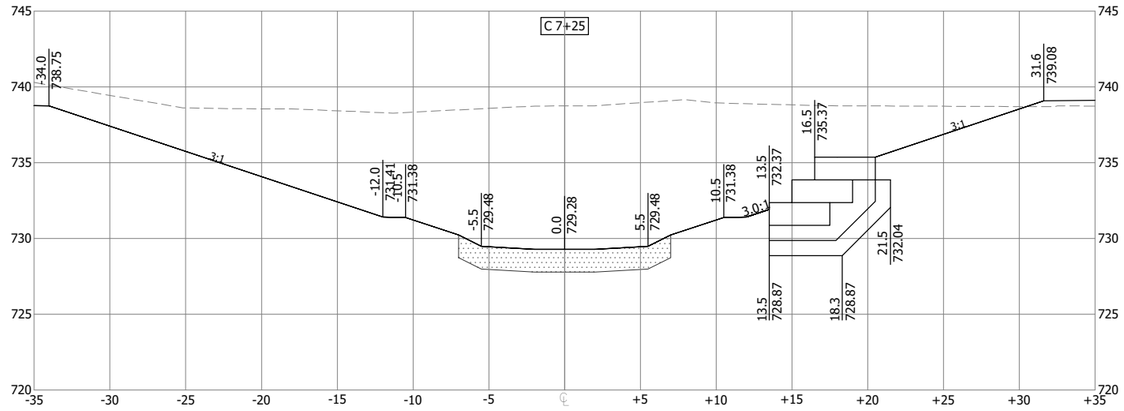

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS9
SHEET NO.	36
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24am
Plotted by: Andrew.Rock
Xrefs: 193806812_XDR, 193806812_XVT, 193806812_XNO, 193806812_CH-CS-BD_Border

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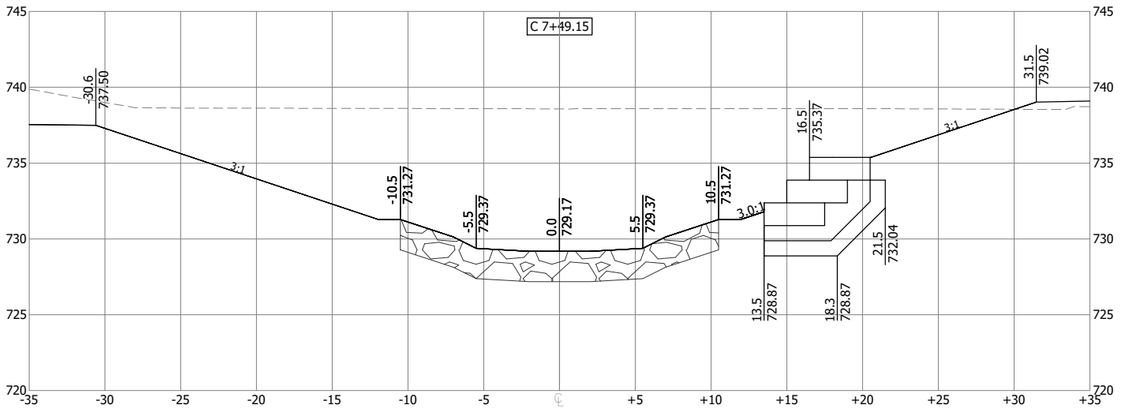

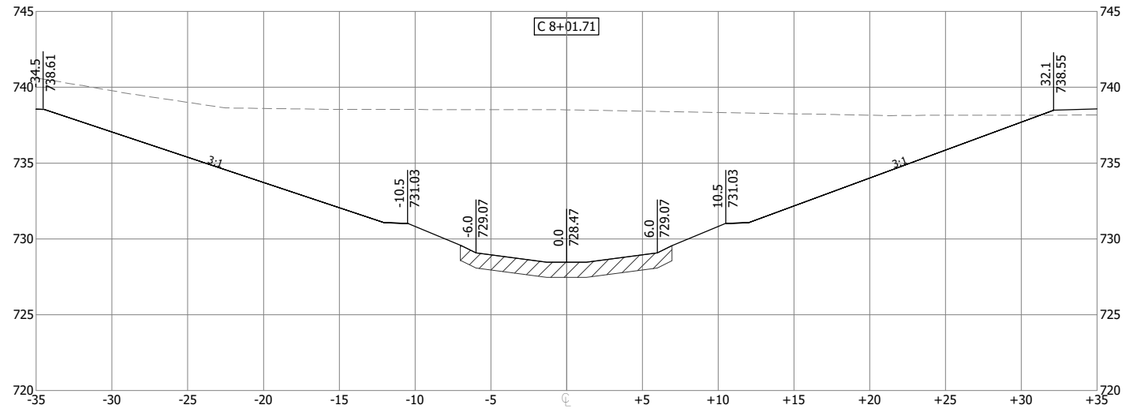

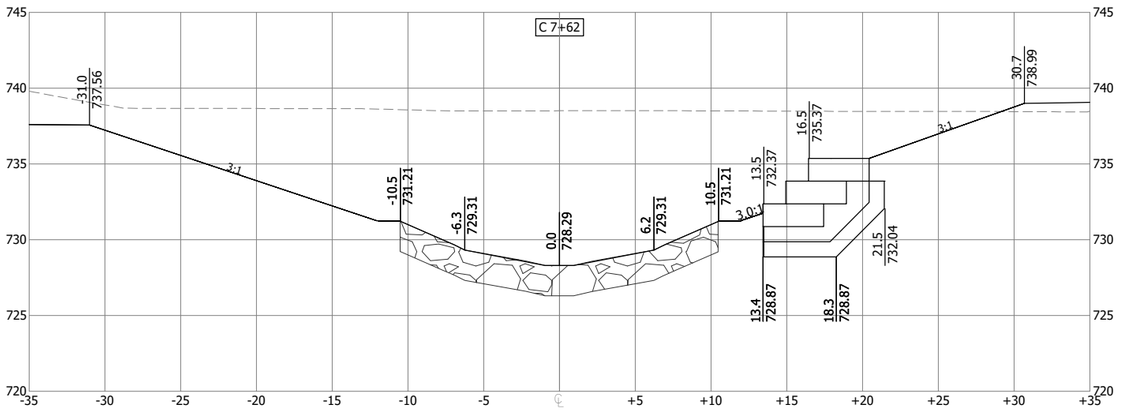

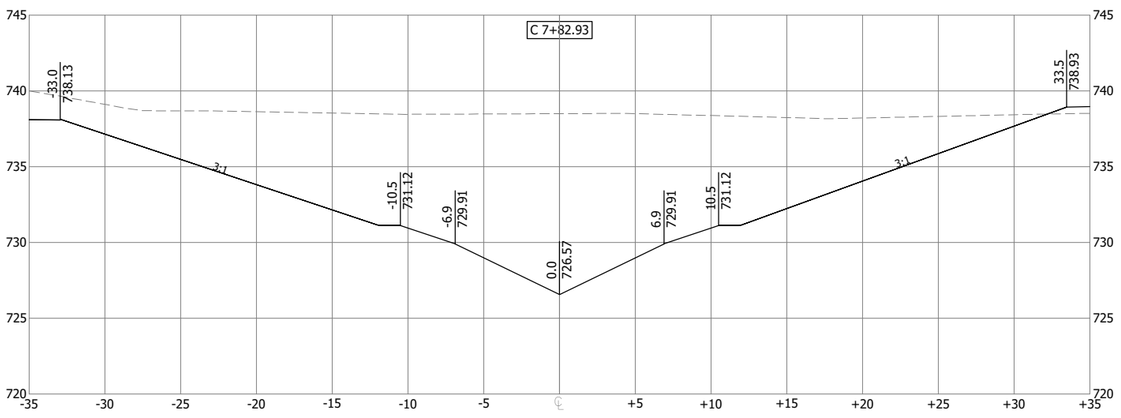

0 5' 10' VERTICAL
0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS10
SHEET NO.	37
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24am
Plotted by: Tim Hoffman
Xrefs: 193806812_XDR, 193806812_XVT, 193806812_XNO, 193806812_CH-CS-BD, Border

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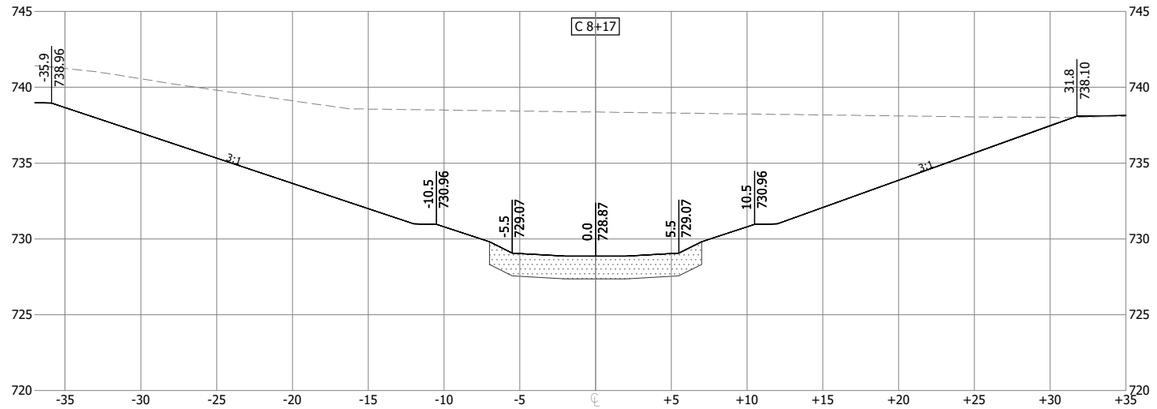

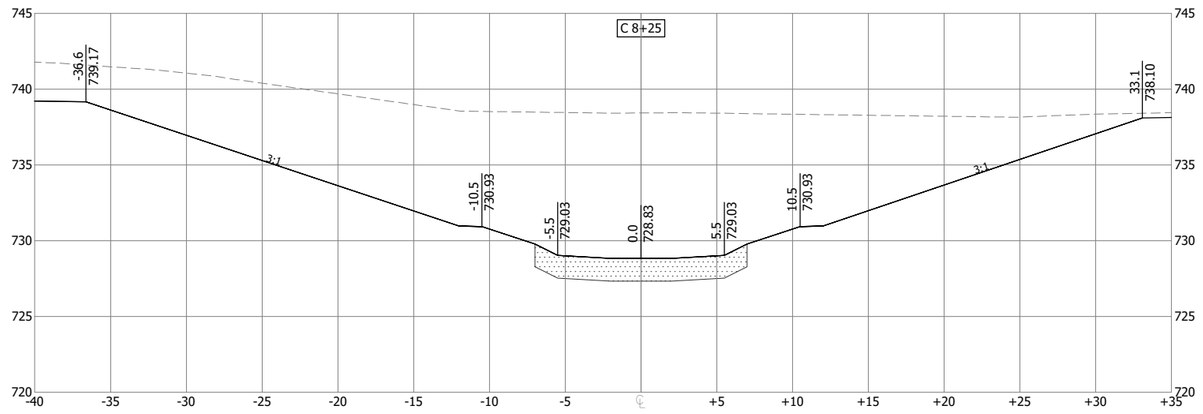

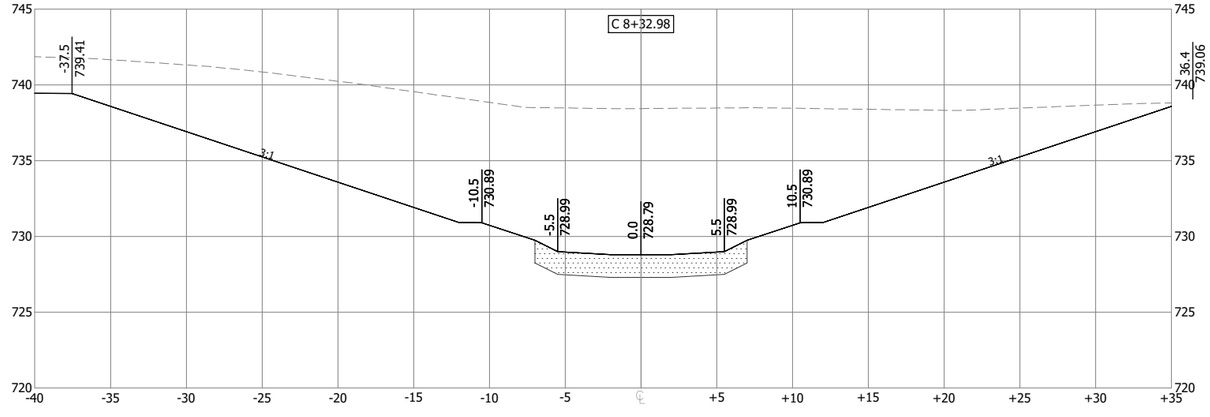

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS11
SHEET NO.	38
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24am
Plotted by: Amundsen, Dan
Xrefs: 193806812_XSPL; 193806812_XSAT; 193806812_ASNO; 193806812_CH-CS-IBD; Border

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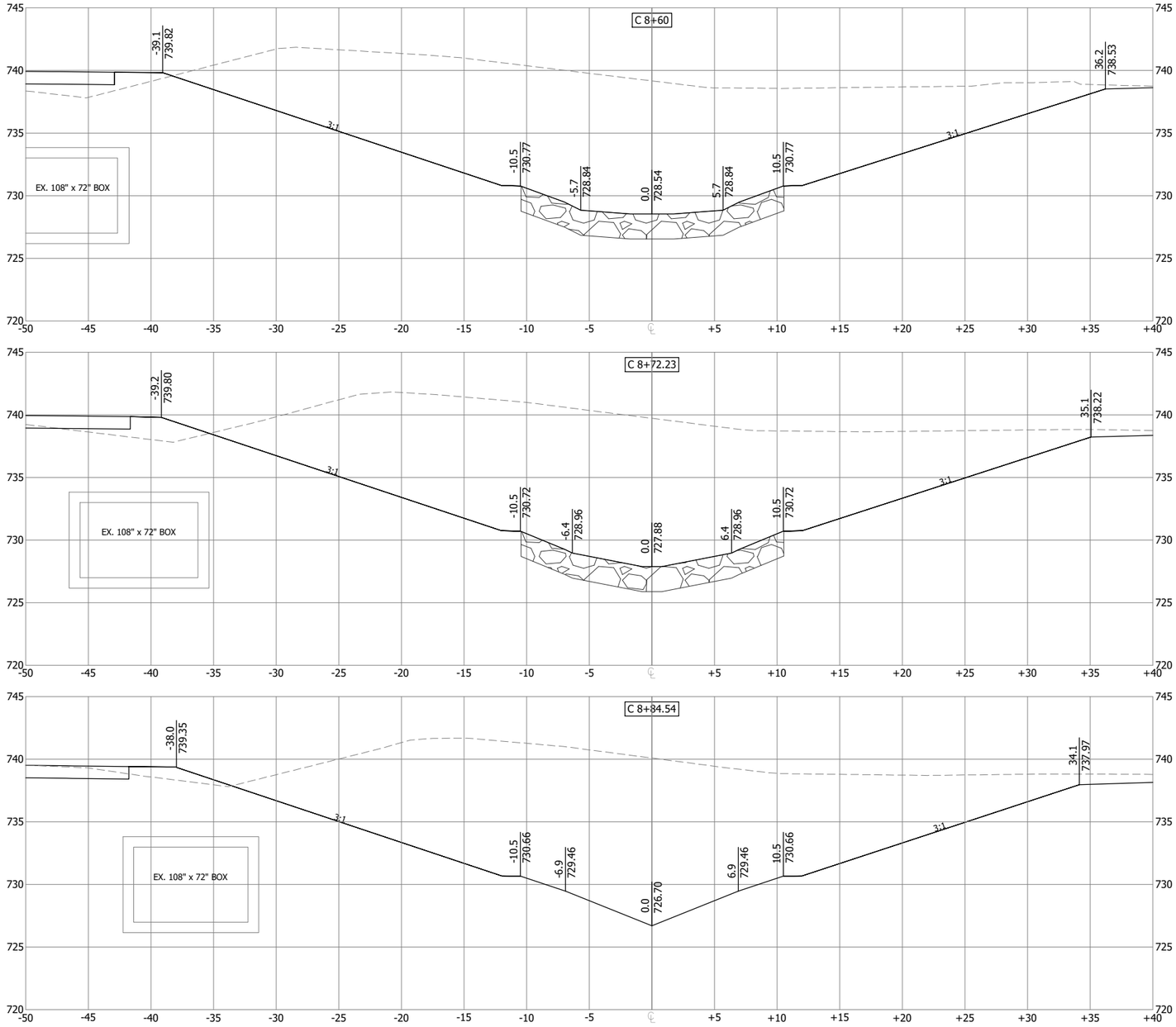

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS12
SHEET NO.	39
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24am
Drawing Name: C:\Users\mike.rock\Documents\ACADDocs\Sheets\193806812_CH-CS.dwg
Xrefs: 193806812_SITE_193806812_AST_193806812_ASNO_193806812_CH-CS-BID_Border

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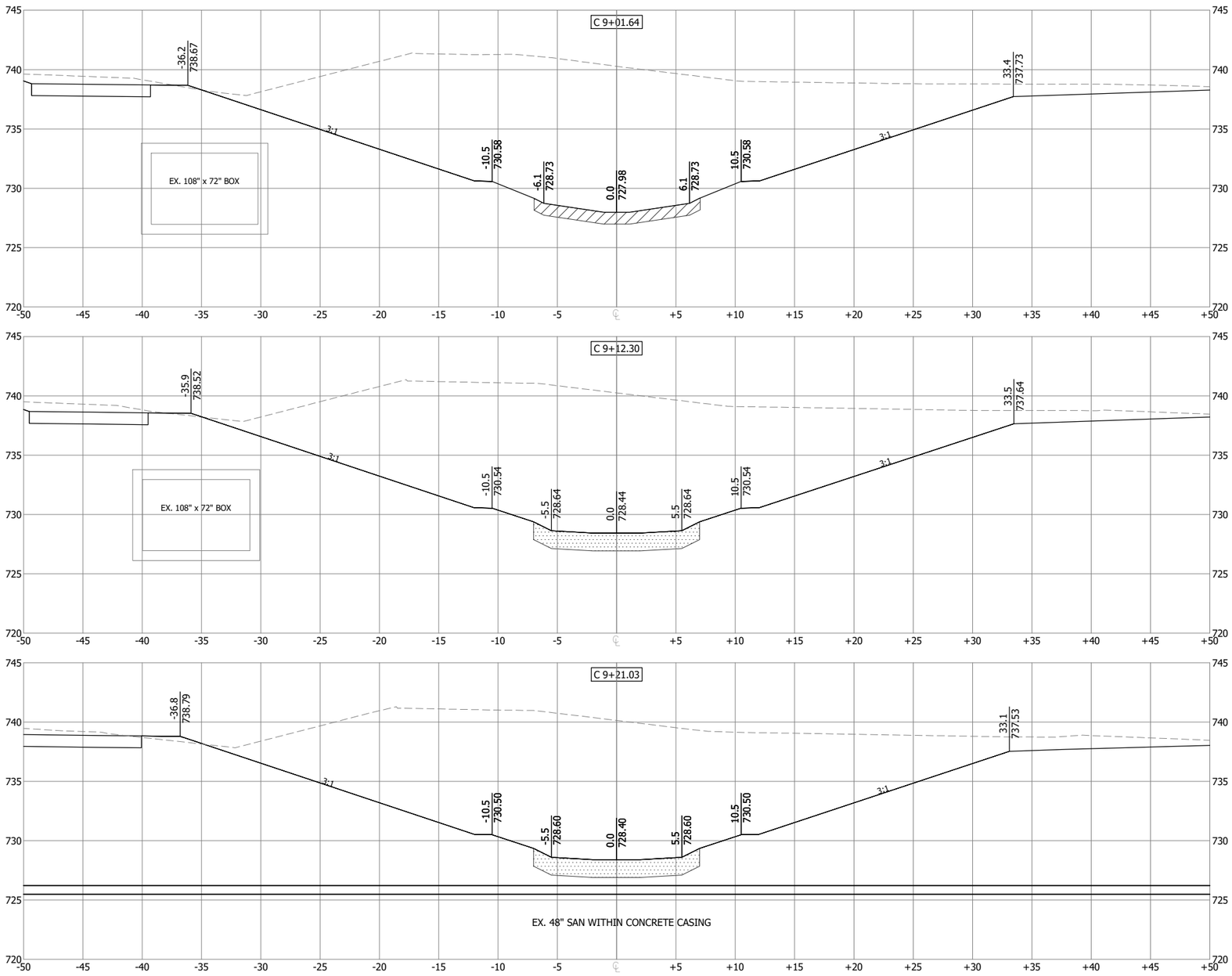

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS13
SHEET NO.	40
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/29/2025 - 8:24am
Plotted by: Nicholas.Hoffman
Xrefs: 193806812_XP1_193806812_AXT_193806812_KNO_193806812_CH-CS-BD_Border

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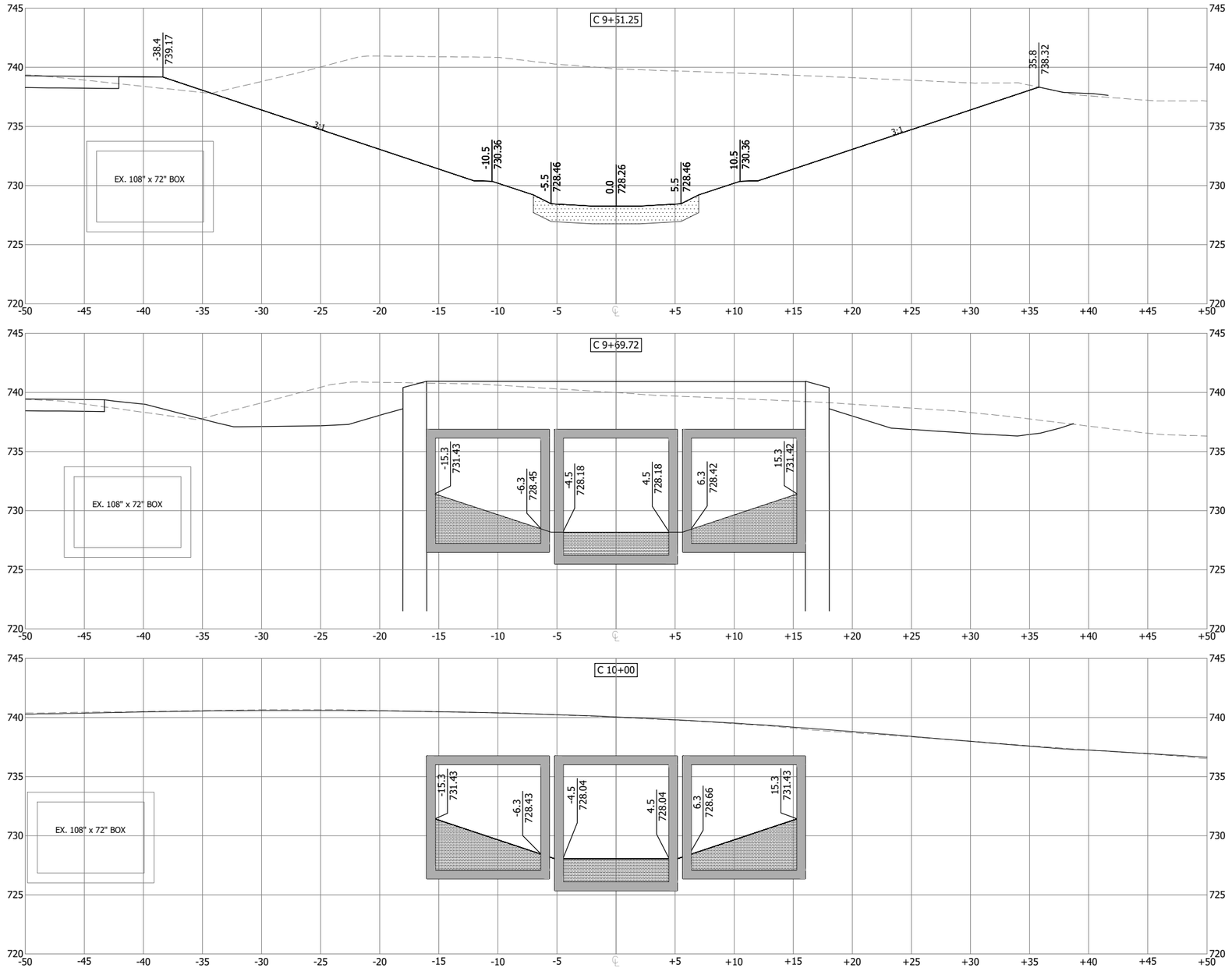

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS14
SHEET NO.	41
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24pm
Plotted By: Mieracki, Matthew
Xrefs: 193806812_XSR, 193806812_JUXT, 193806812_JUNO, 193806812_CH-CS-dID, Border

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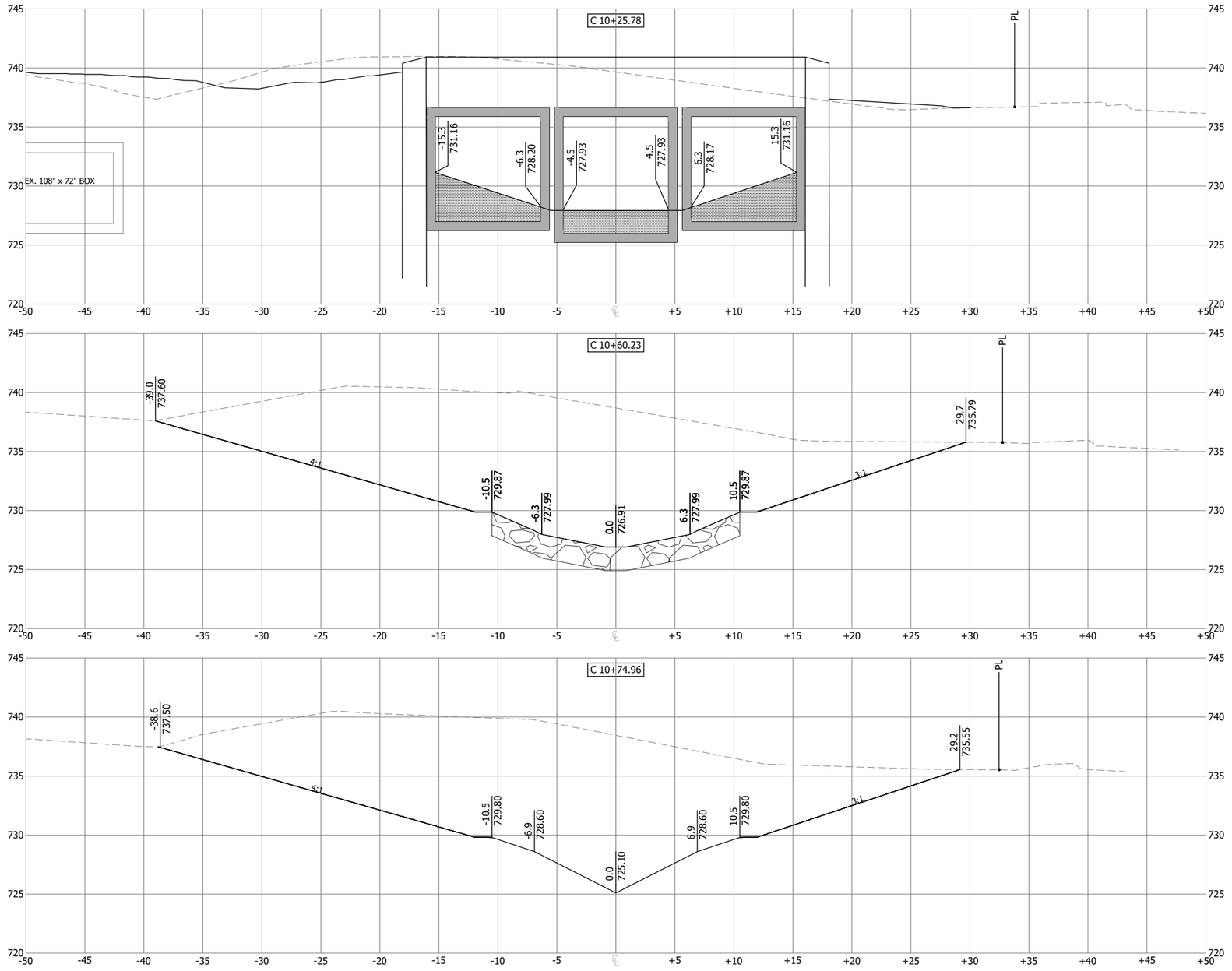

0 5' 10' VERTICAL
0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS15
SHEET NO.	42
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24am
Plot By: Dominic.Jones@stantec.com
Xrefs: 193806812_XSPL; 193806812_XSXT; 193806812_XNO; 193806812_CH-CS-BD; Border

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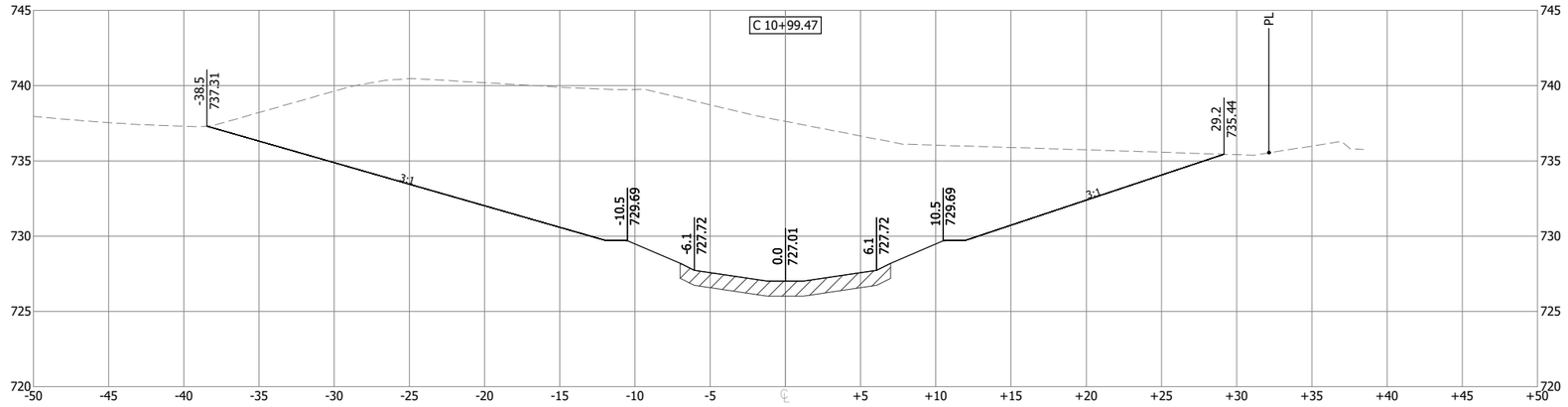

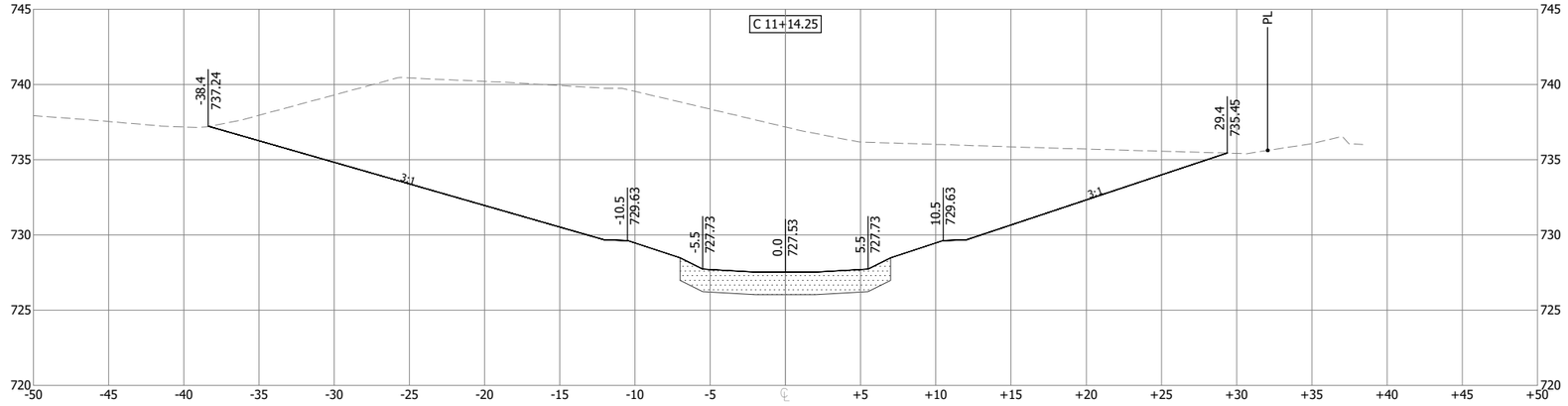

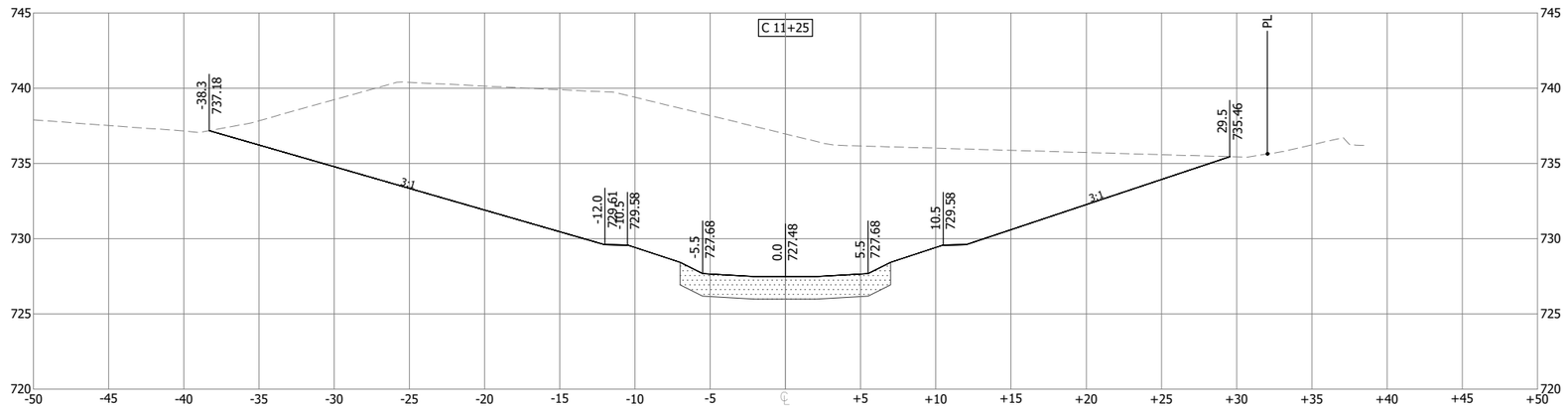

0 5' 10' VERTICAL
0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS16
SHEET NO.	43
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24am
Drawing Path: C:\Users\mike.rock\Documents\CAD\Sheets\193806812_CH-CS.dwg
Xrefs: 193806812_XSPs, 193806812_AXAT, 193806812_ASNO, 193806812_CH-CS-BD, Border

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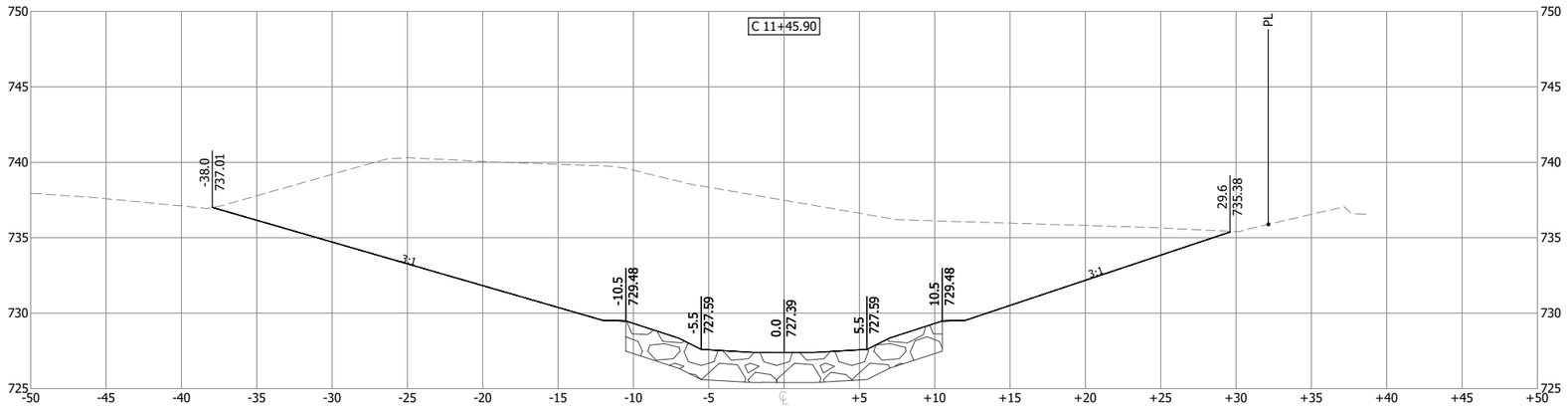

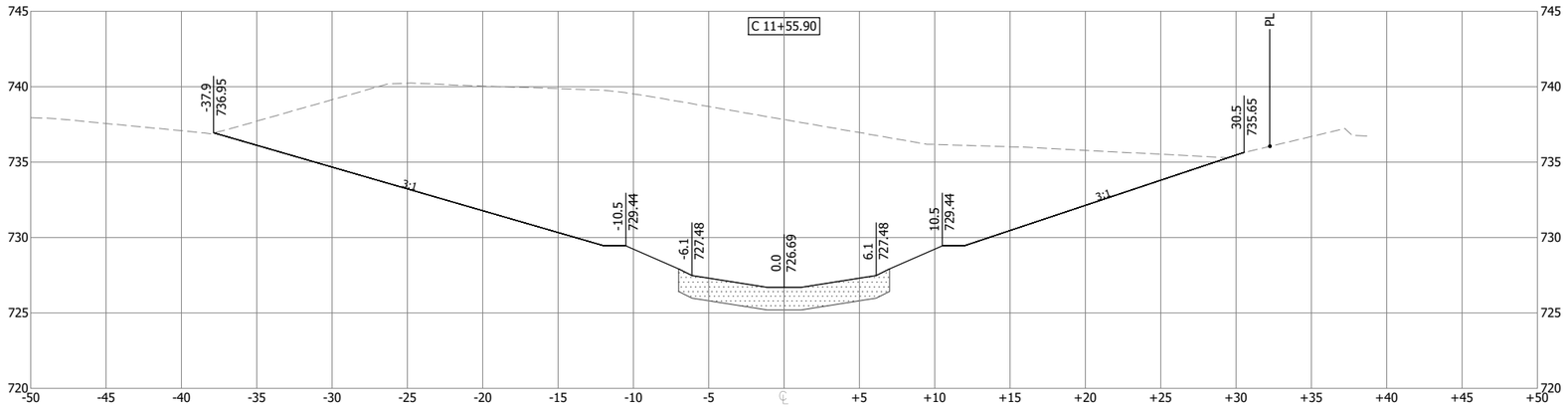

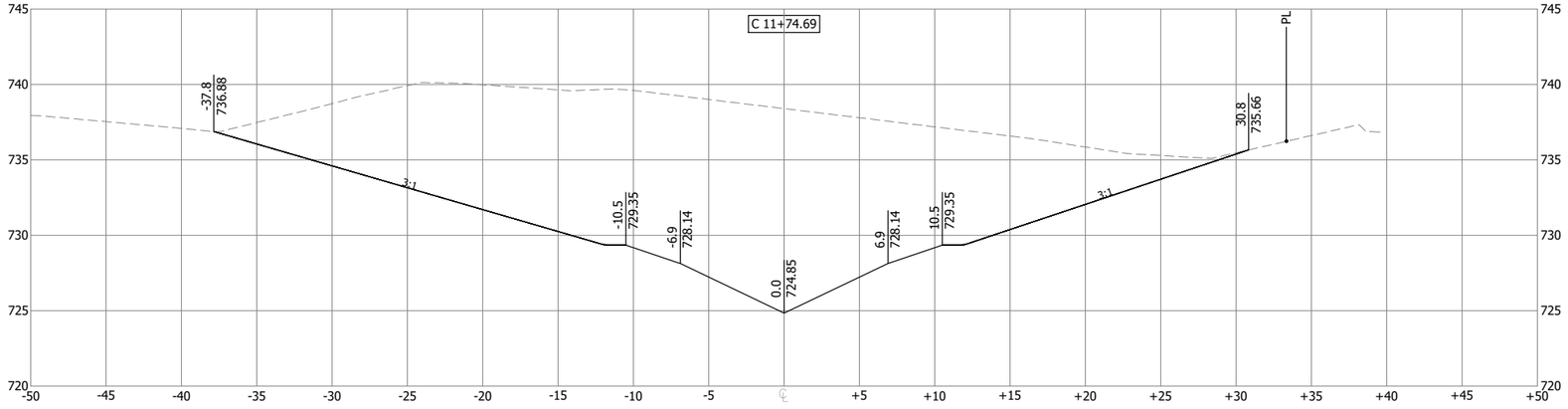

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS17
SHEET NO.	44
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:24am
Plotted by: mmeyer
Xrefs: 193806812_XSPL; 193806812_XSXT; 193806812_XNO; 193806812_CH-CS-BD; Border

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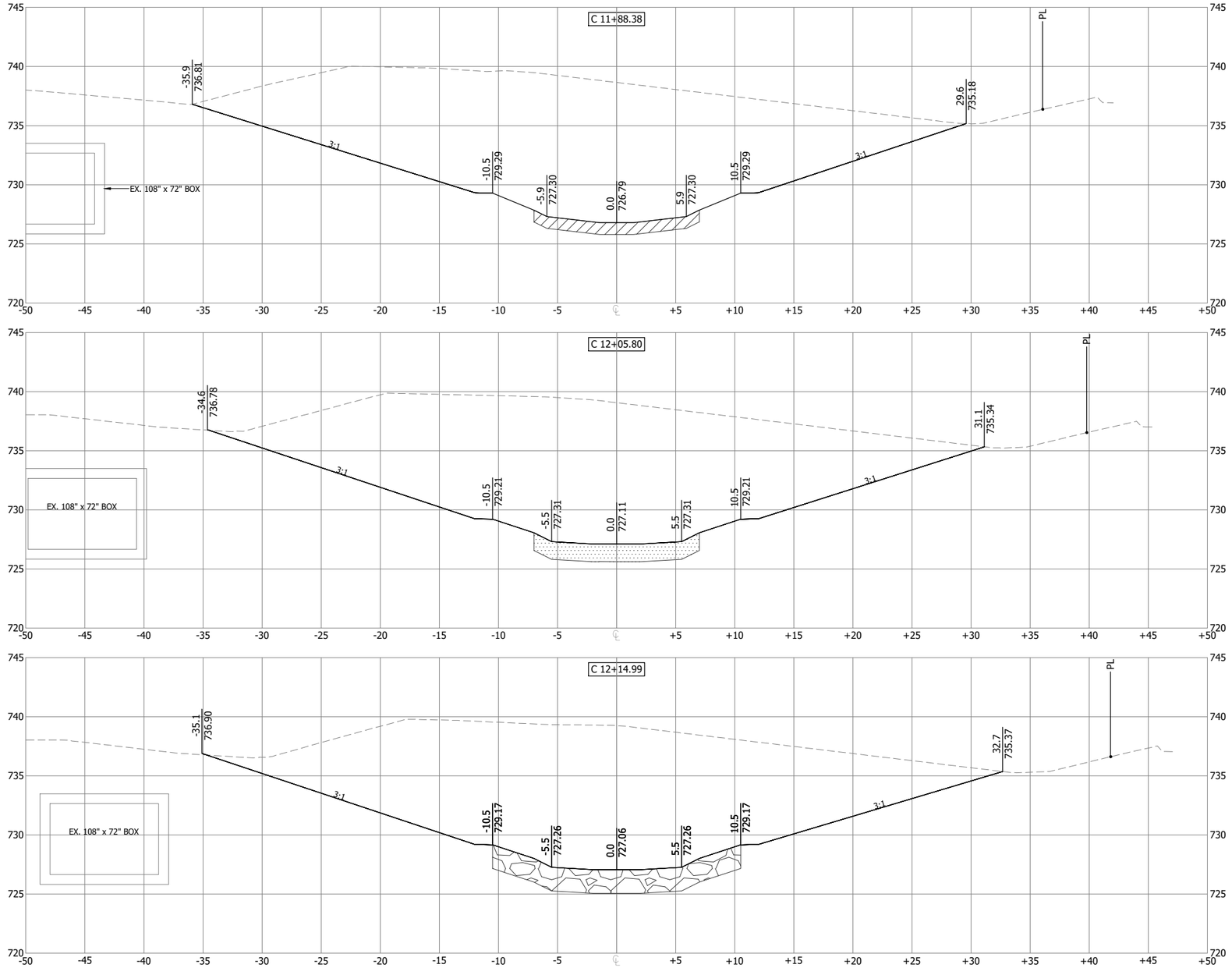

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS18
SHEET NO.	45
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:25am
Drawing Name: n:\active\193806812\cad\dwg\sheets\193806812_CH-CS.dwg
Xrefs: 193806812_XSR_193806812_JOB_193806812_JUNO_193806812_CH-CS-BID Border

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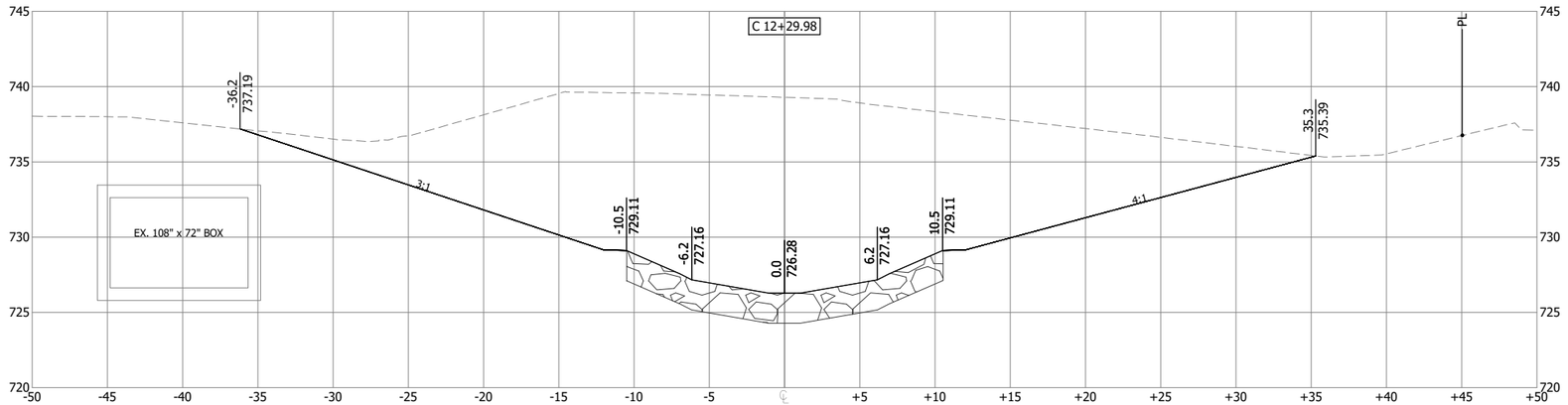

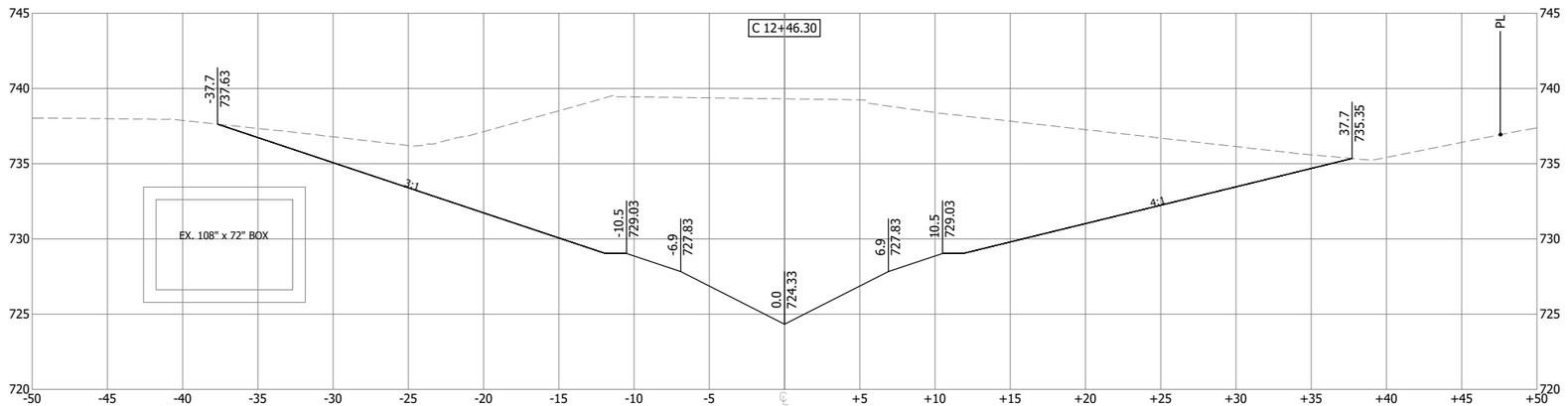

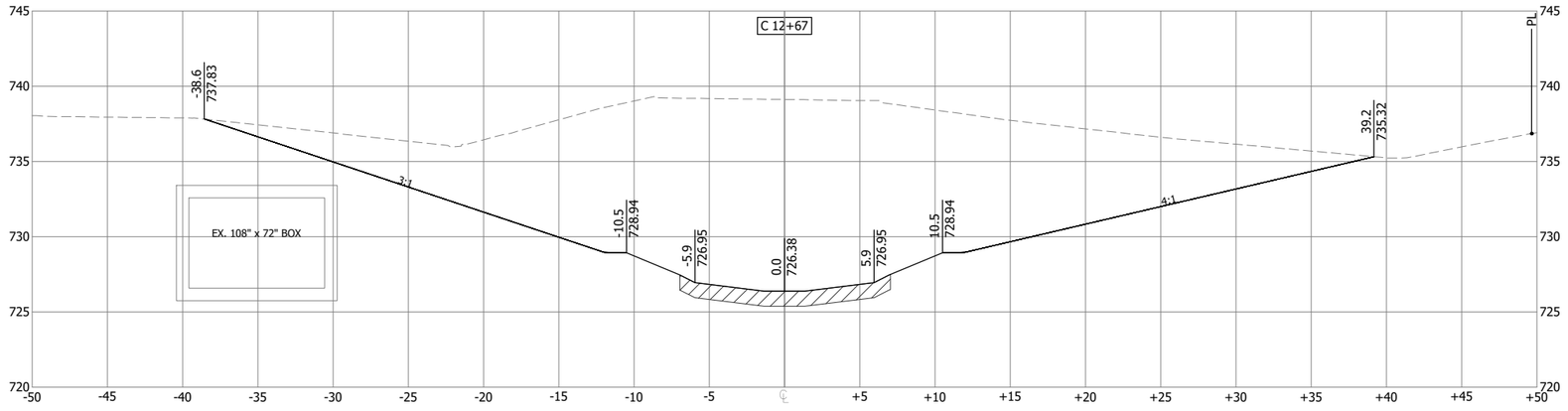

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS19
SHEET NO.	46
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:23pm
Plotted by: Andrew.Rock
Xrefs: 193806812_XSTL_193806812_ASM_193806812_ASNO_193806812_CH-CS-BD_Border

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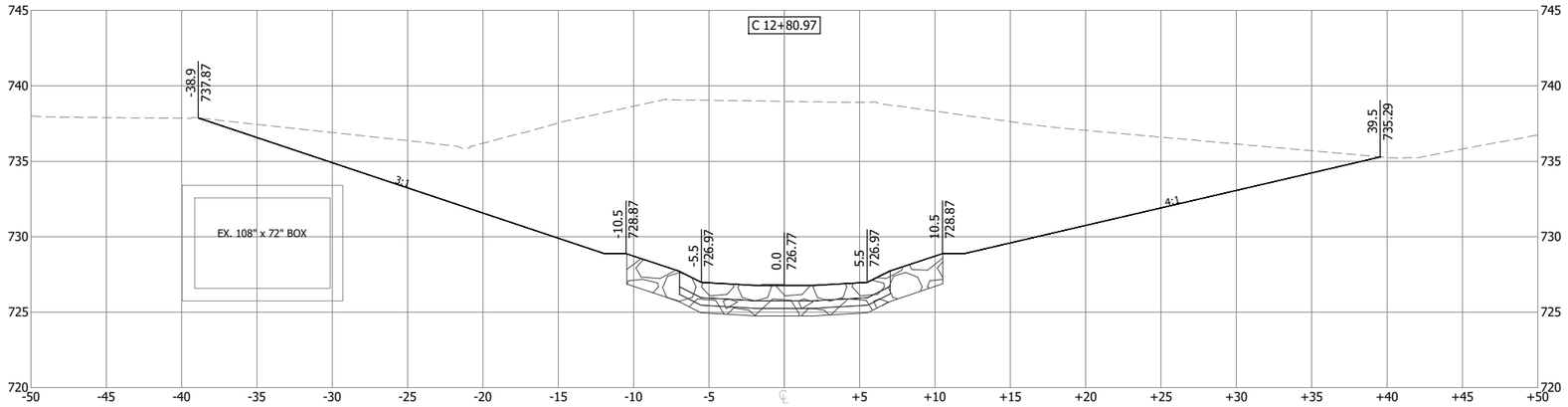

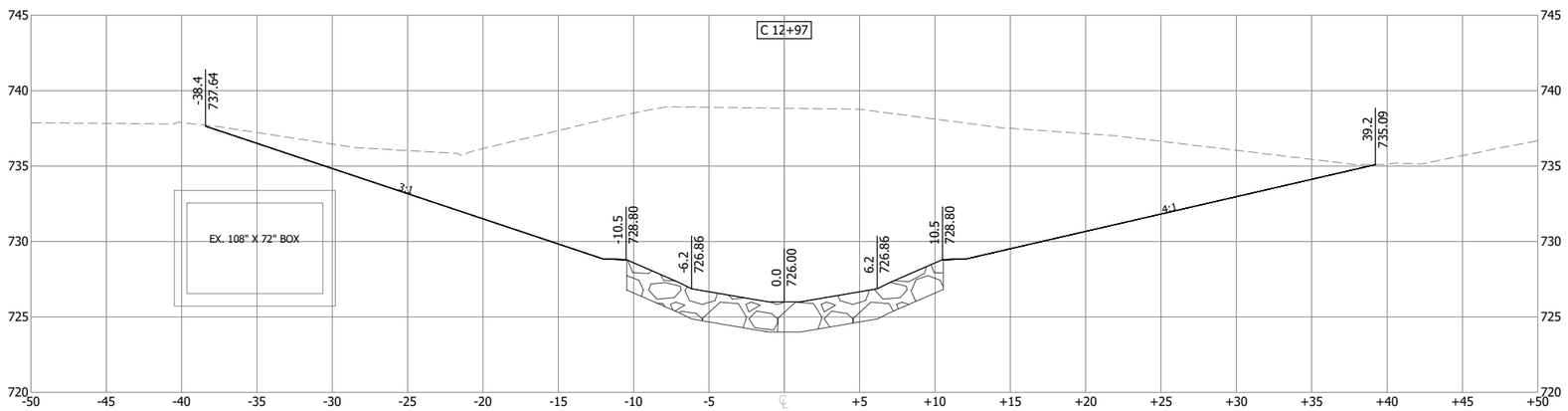

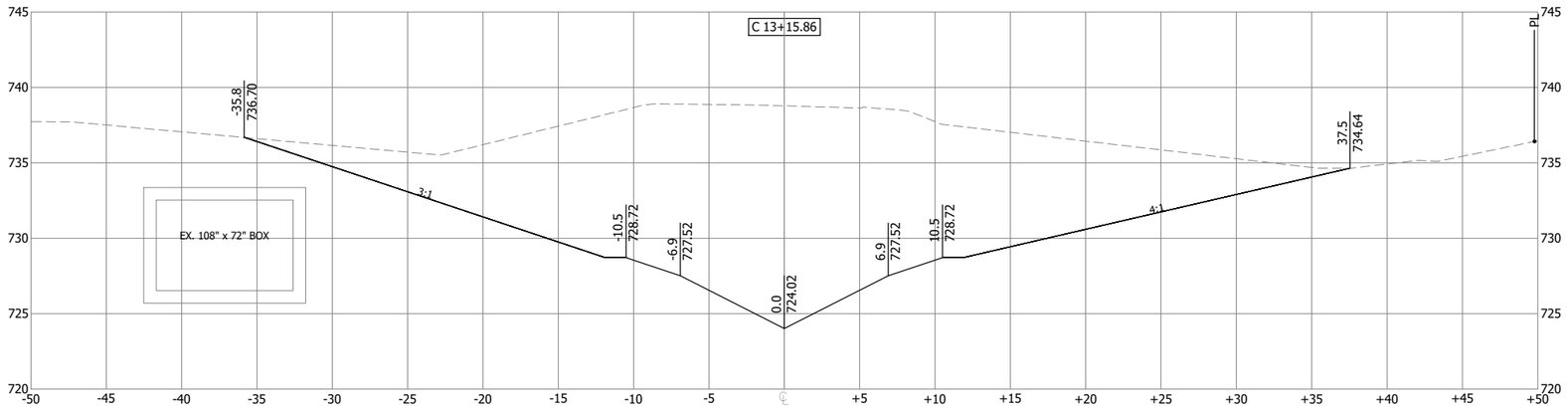

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS20
SHEET NO.	47
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:25am
Drawing Name: C:\Users\mike.rock\Documents\ACAD Drwg's\Sheets\193806812_CH-CS.dwg
Xrefs: 193806812_DTM_193806812_AST_193806812_ANO_193806812_CH-CS-IMD, Border

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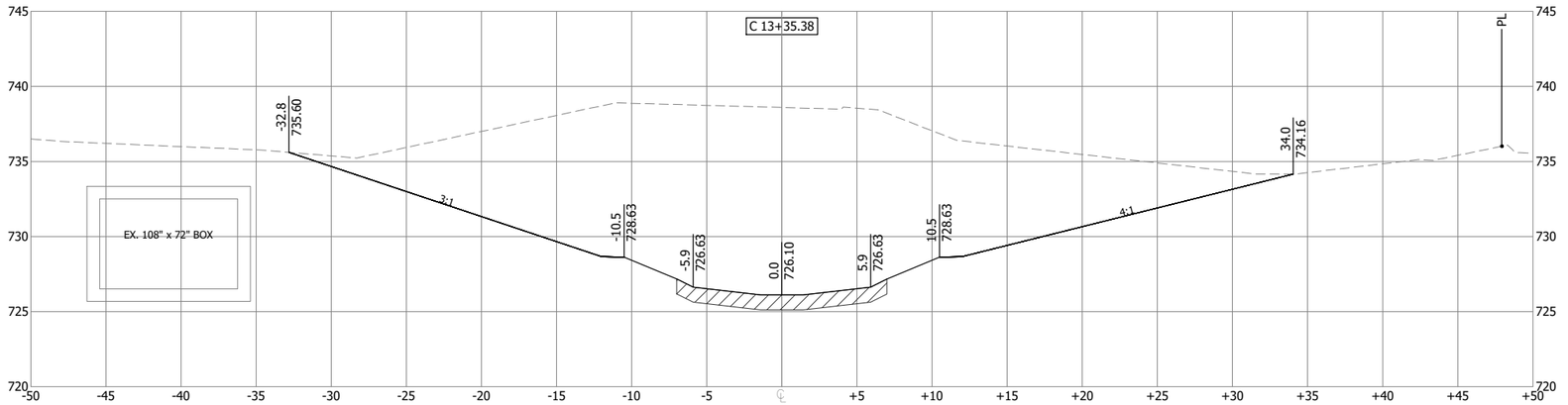

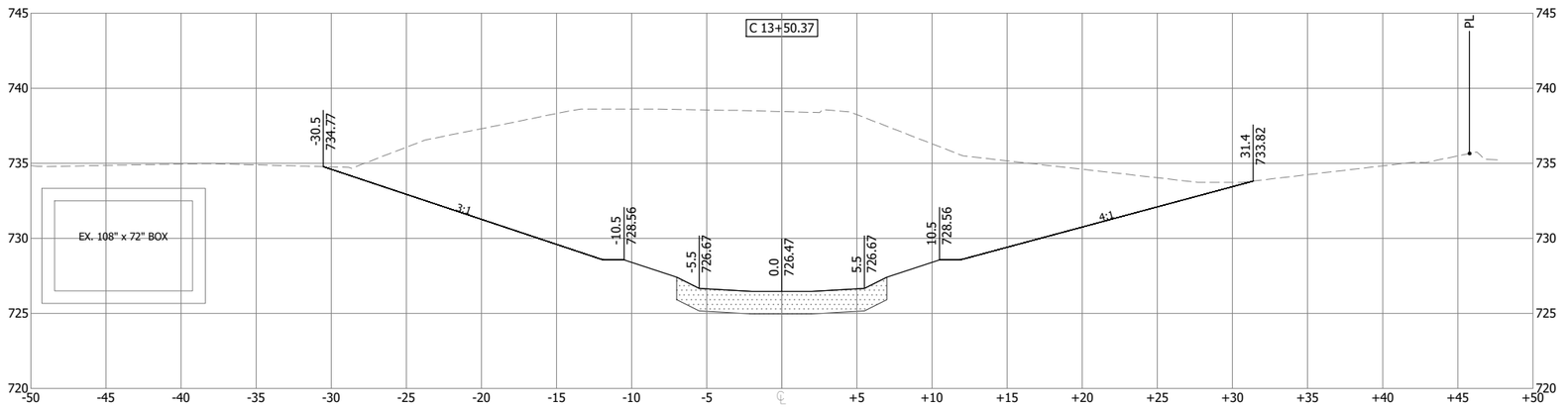

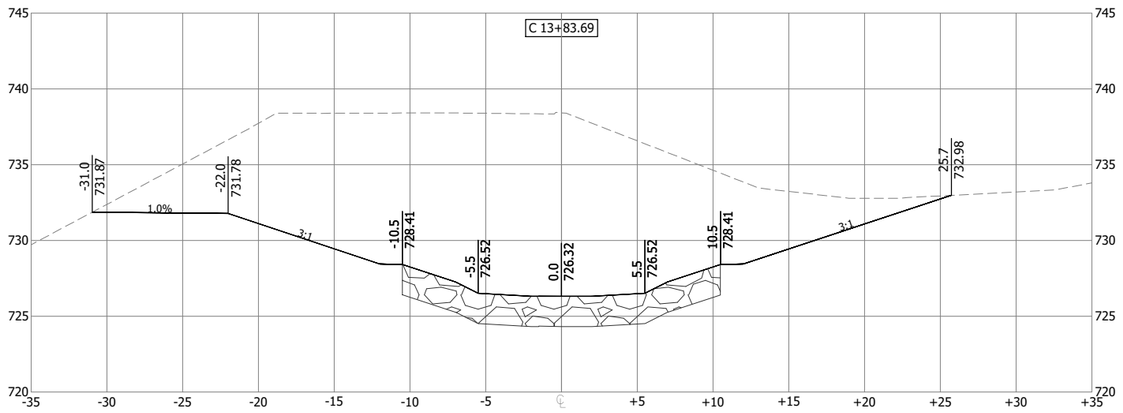

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS21
SHEET NO.	48
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:25am
Plotted by: Amundsen, Dave
Xrefs: 193806812_ASPL; 193806812_ASXT; 193806812_ASNO; 193806812_CH-CS-BID_Border

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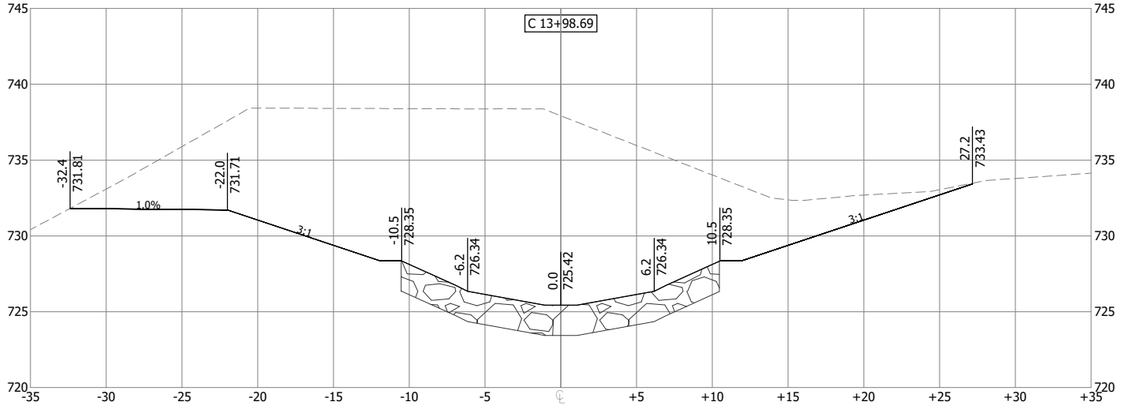

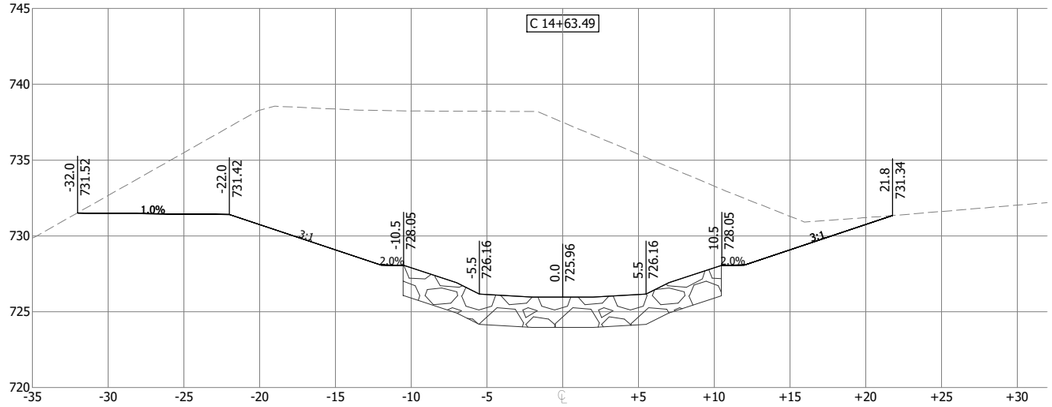

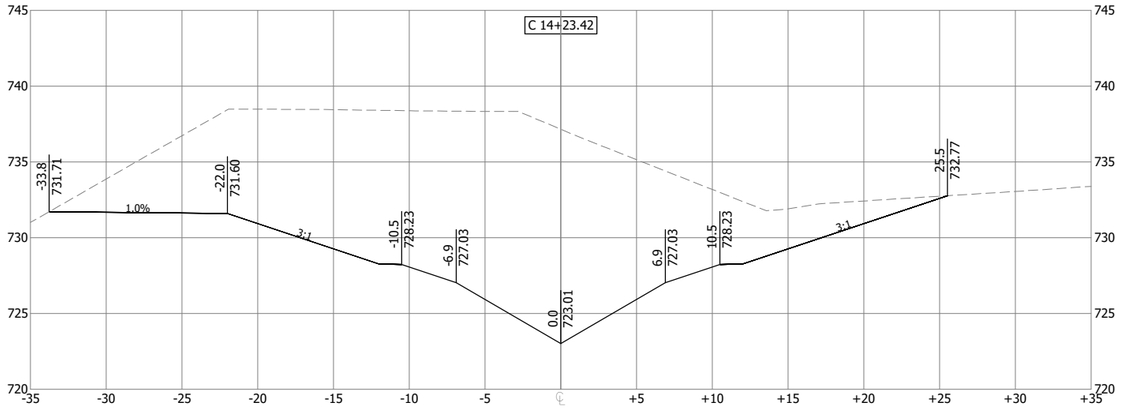

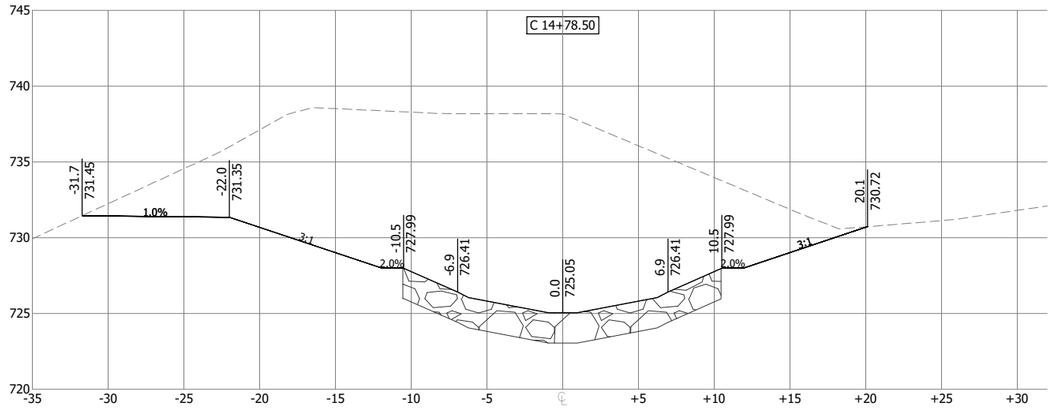

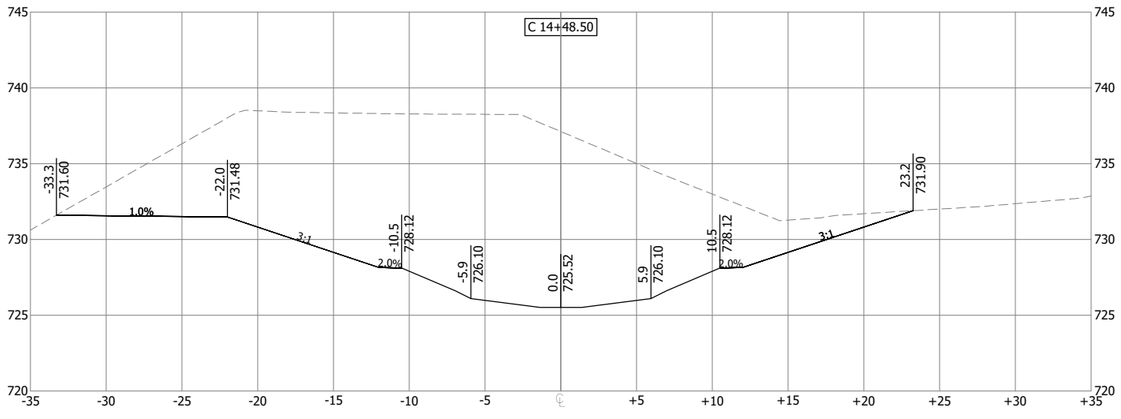

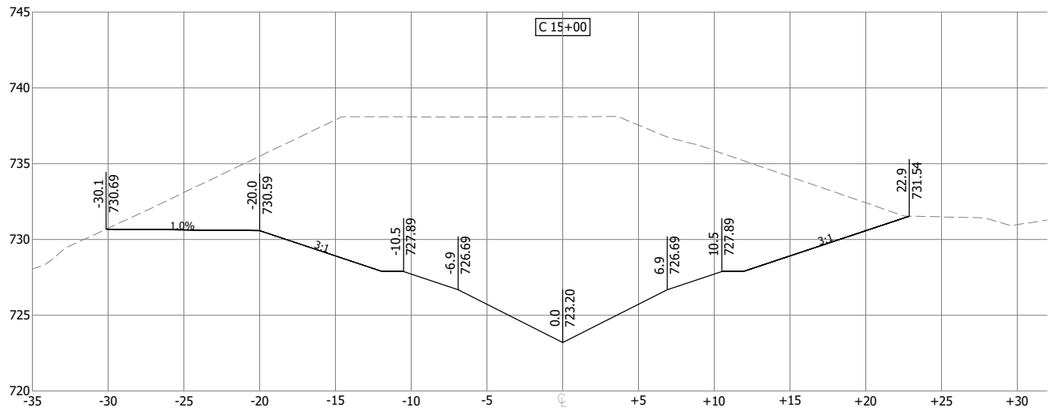

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS22
SHEET NO.	49
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:25am
Plot By: Amundsen, Dave
Xrefs: 193806812_XPL, 193806812_XST, 193806812_XNO, 193806812_CH-CS-BD, Border

THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING.
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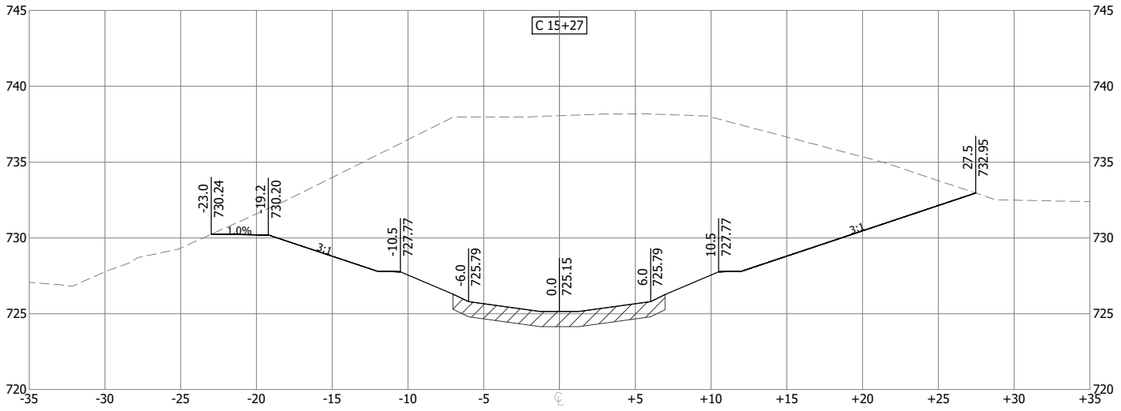

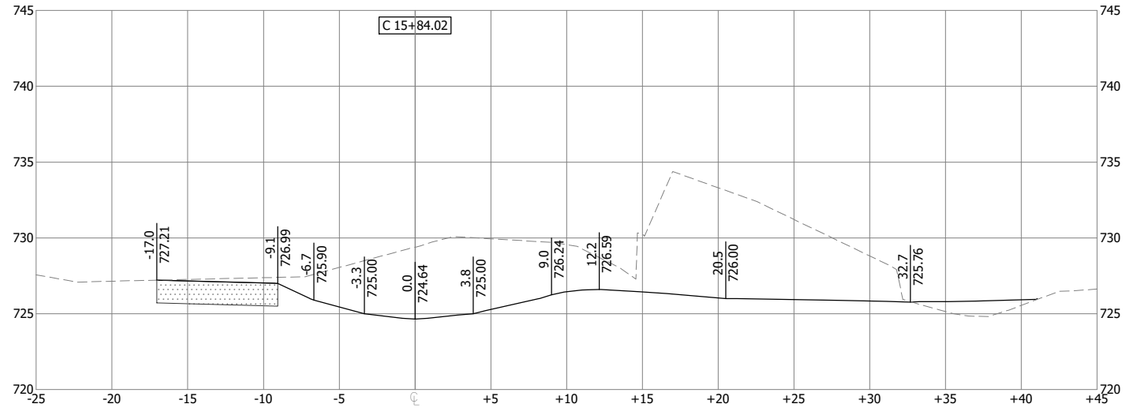

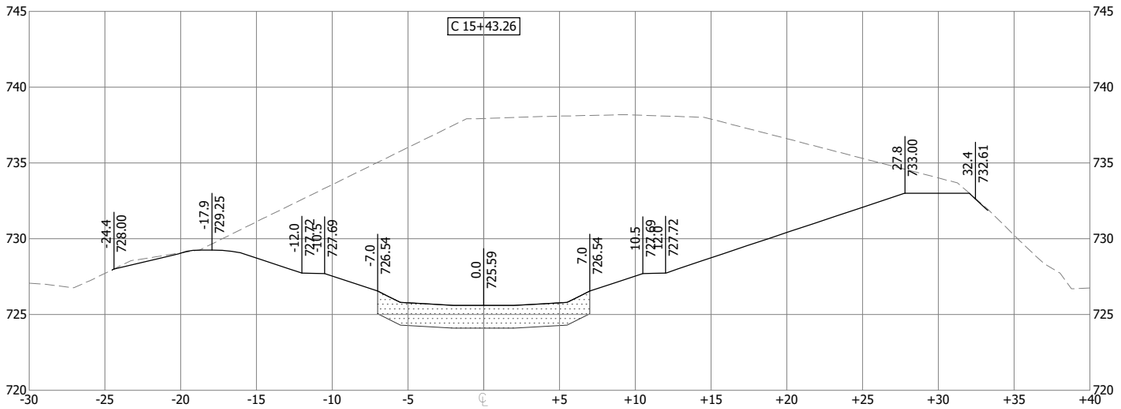

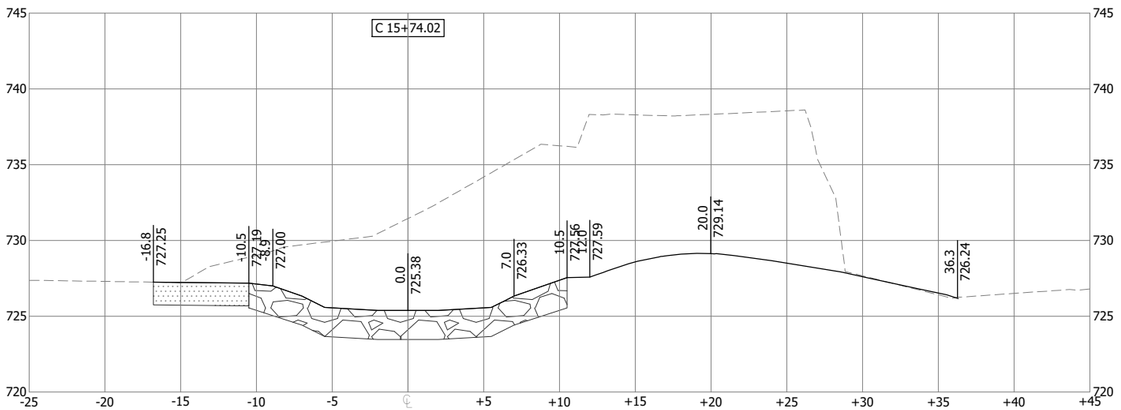

0 5' 10' VERTICAL
0 10' 20' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS23
SHEET NO.	50
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:25pm
Drawing Name: C:\Users\mike.rock\Documents\ACCD Docs\Sheets\193806812_CH-CS.dwg
Xrefs: 193806812_XSP=..\193806812_XSP.dwg, 193806812_AXT=..\193806812_AXT.dwg, 193806812_ASNO=..\193806812_ASNO.dwg, 193806812_CH-CS-BID_Border

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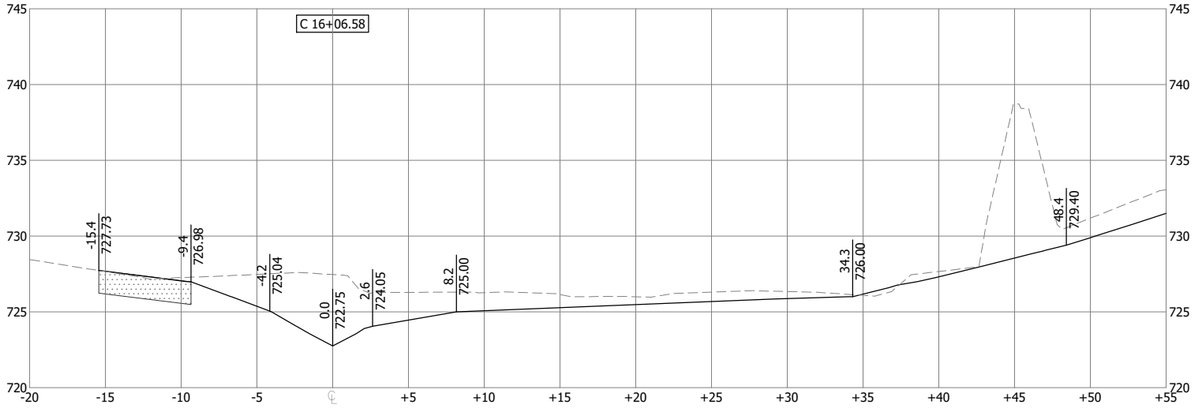

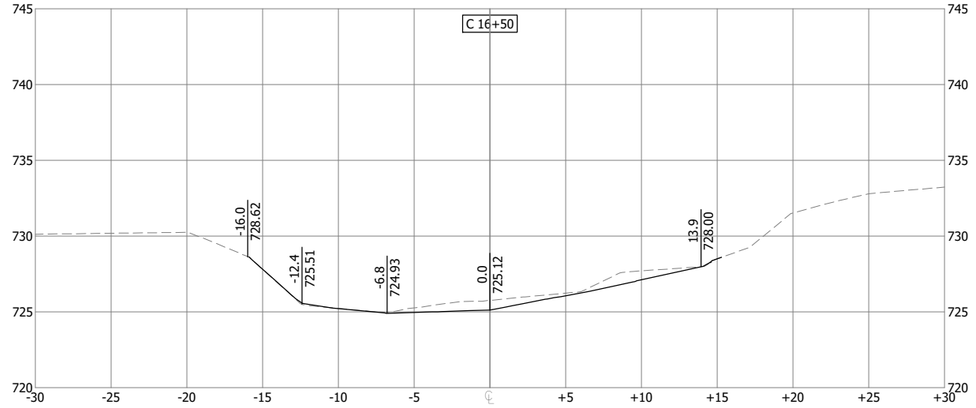

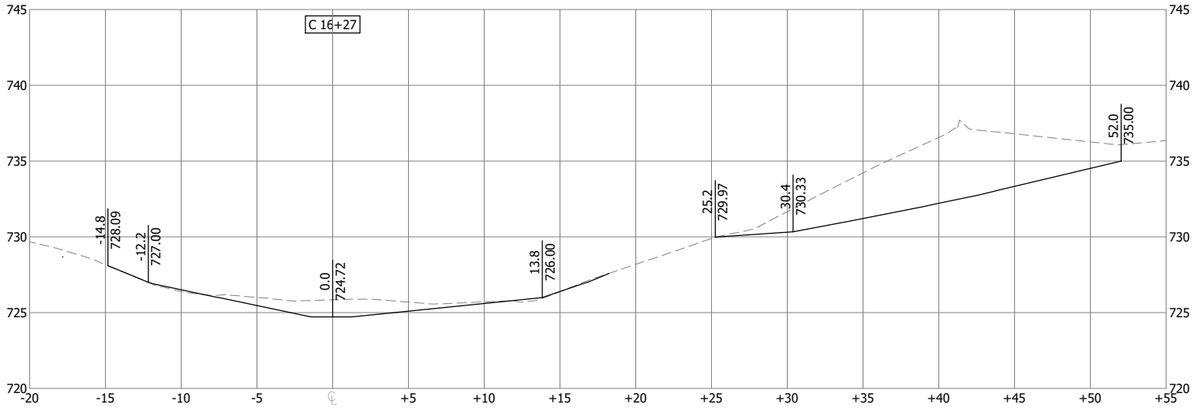

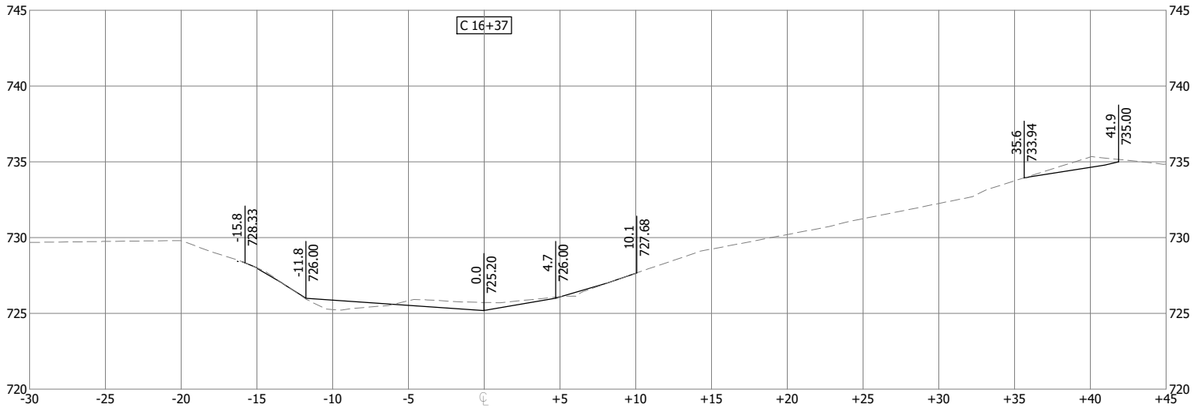

0 5' 10' VERTICAL
0 10' 20' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL CROSS SECTIONS

DRAWING NO.	CH-CS24
SHEET NO.	51
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CH-CS.dwg

Plot Date: 12/30/2025 - 8:23am
Drawing Path: C:\Users\mike.rock\Documents\ACCDocs\Stantec\193806812_CH-CS\Project Files\Civil\Sheets\193806812_CH-CS.dwg
Xrefs: 193806812_XDR, 193806812_XEX, 193806812_XNO, 193806812_CH-CS-BD, Border

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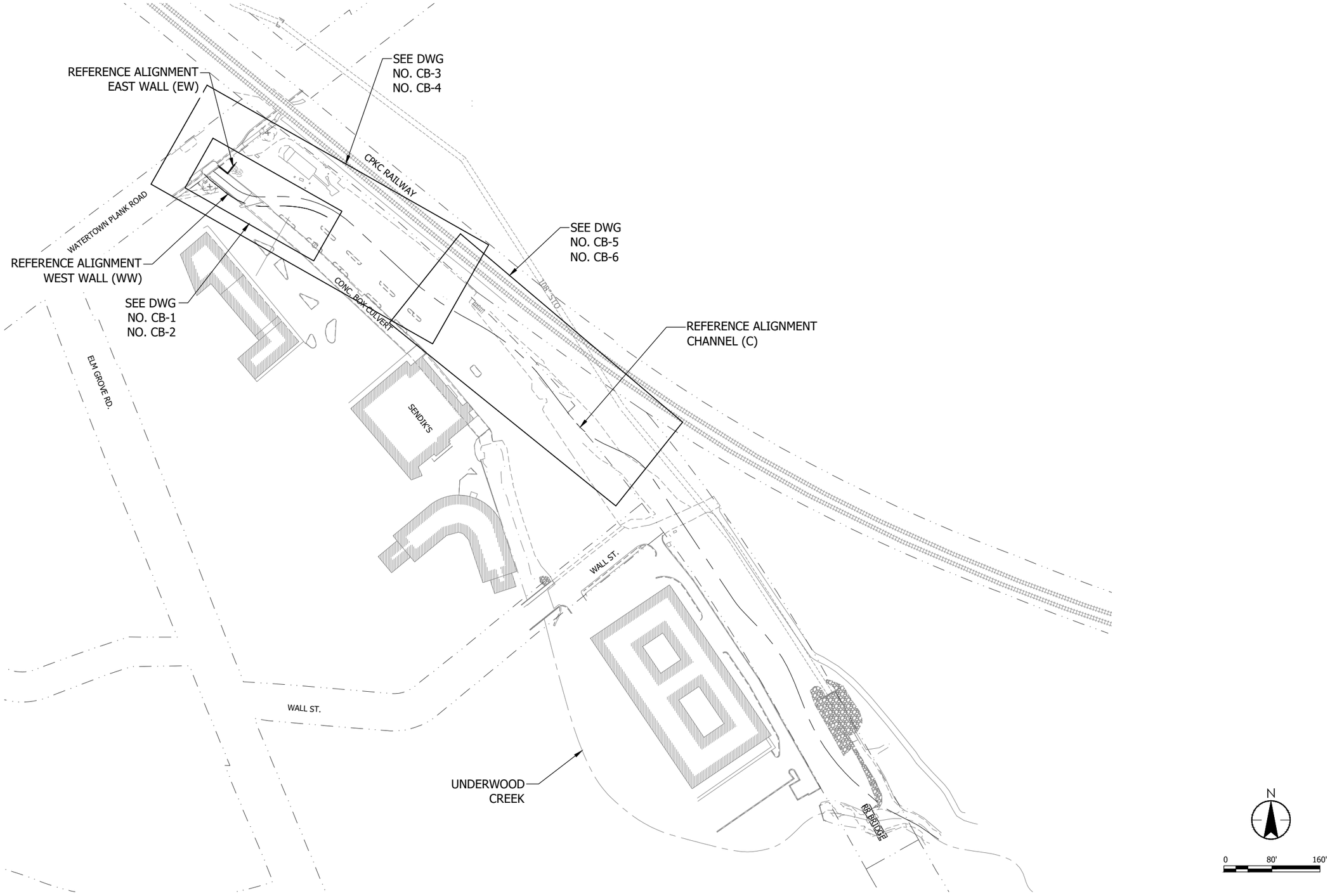
Plot Date: 12/30/2025 - 8:26pm
Plot By: Dylan Schmidt
Xrefs: Border: 193806812_XSIT; 193806812_XSNU; 193806812_XSPE; 193806812_XSNO, Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Waterstop, HE Storm Connect, Wall Expansion Joint, Wall Construction Joint, Wall Isoz Construction Joint, 193806812_CB.dwg
Layouts: CB-0
Layout Name: CB-0
Project: 193806812
Project Name: UNDERWOOD CREEK DAYLIGHTING
Project Manager: M. SIERACKI
Author: A. ROCK
Drawing Path: C:\Dyn\Sheets\193806812_CB.dwg



FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

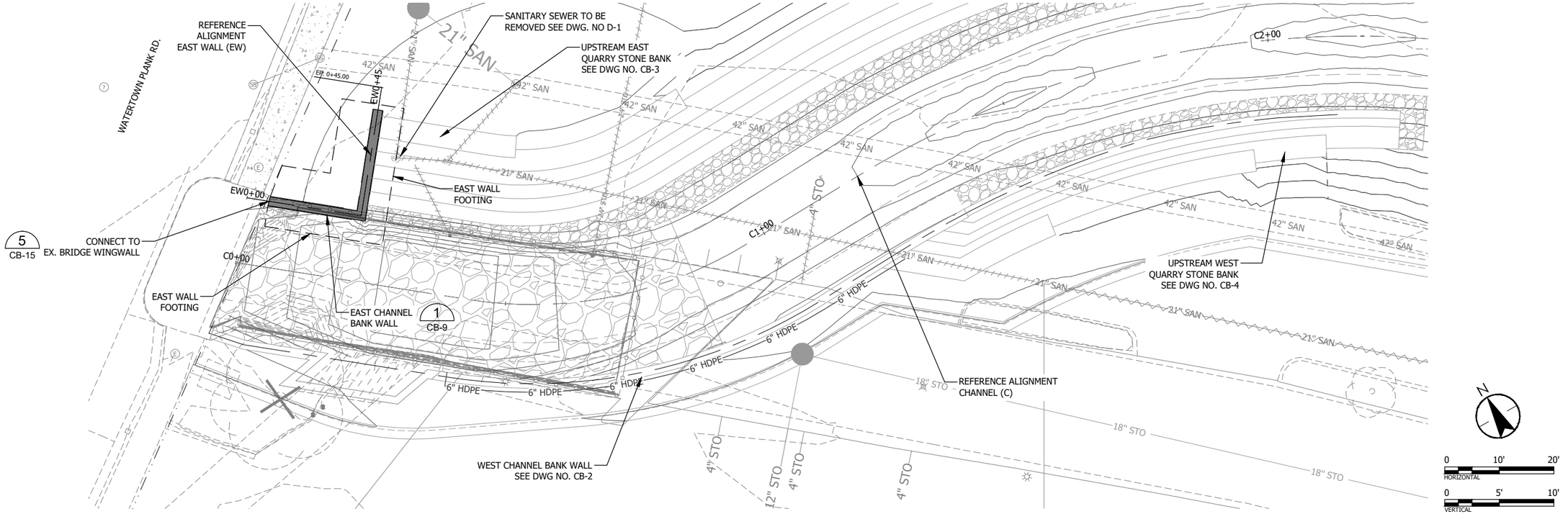
UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL BANK SHEET INDEX

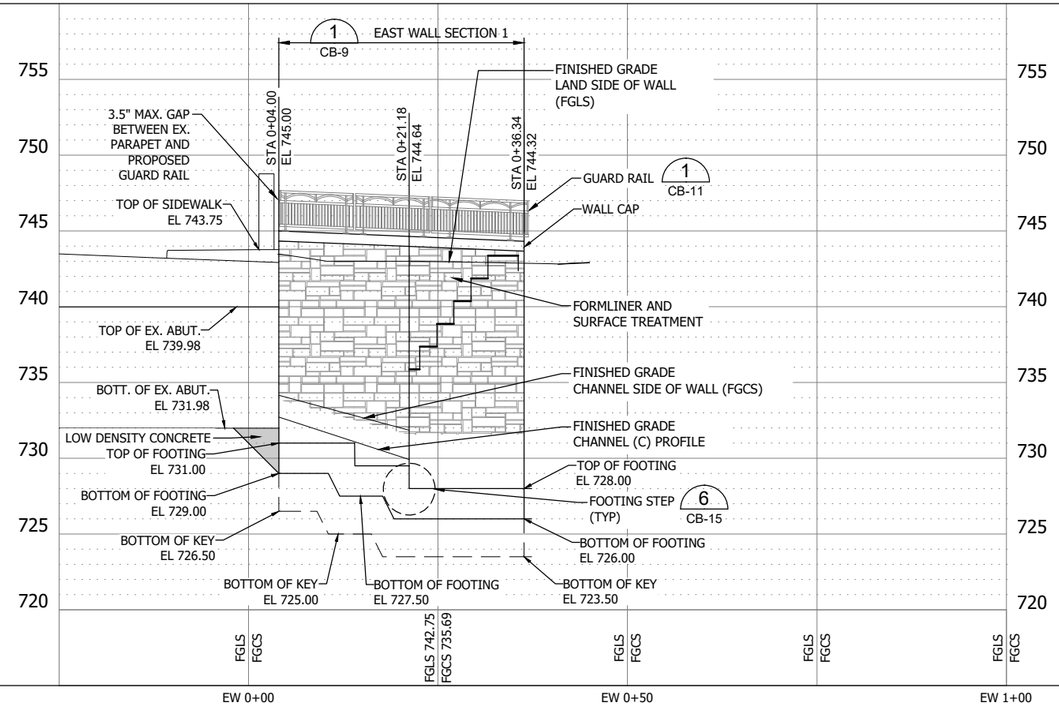
DRAWING NO.	CB-0
SHEET NO.	52
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING - ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. ALL REPORTED DISCREPANCIES SHALL BE RESOLVED BY THE COMPROMISE TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF STANTEC. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY STANTEC IS FORBIDDEN.

Plot Date: 12/30/2025 - 8:24am
Data: ...\Project Files\CAD\Sheets\193806812_CB.dwg
Xrefs: Border: 193806812_XAT, 193806812_XNU, 193806812_XQR, 193806812_XSNO, Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Waterstop, HE Storm Connect, Wall Expansion Joint, Wall Construction Joint, Wall Insoz Construction Joint, 193806812_XSNO



NOTE:
CHANNEL BANK WALL CROSS SECTIONS REFER TO REFERENCE ALIGNMENT CHANNEL (C)



FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST CHANNEL BANK WALL

DRAWING NO.	CB-1
SHEET NO.	53
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

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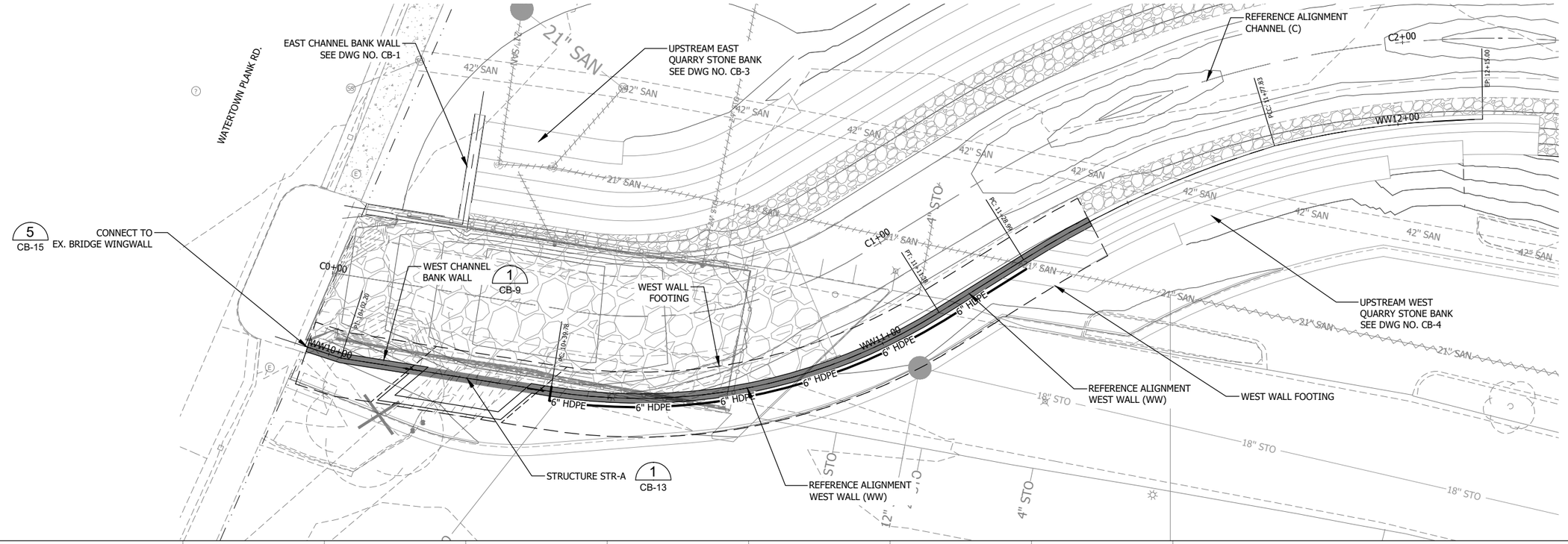
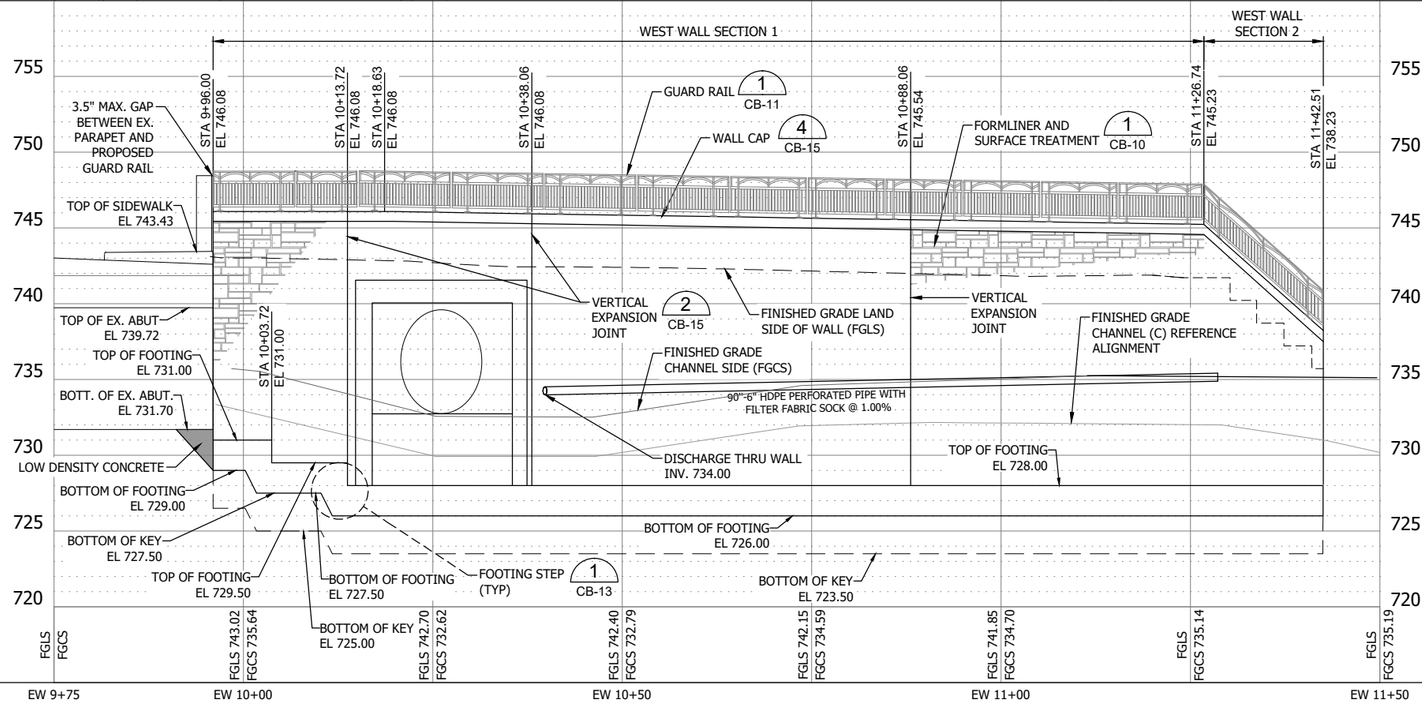


NOTE:
CHANNEL BANK WALL CROSS SECTIONS REFER TO REFERENCE ALIGNMENT CHANNEL (C)



FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WEST CHANNEL BANK WALL

DRAWING NO.	CB-2
SHEET NO.	54
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

Plot Date: 12/30/2025 - 8:20am
Drawing Name: J:\193806812-CAD-Dyn\Sheets\193806812_CB.dwg
Xrefs Bonded: 193806812_XSTR: 193806812_XSNJ: 193806812_XSNO: 193806812_XPE: 193806812_XSNO_Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Wichertop, HE Storm Connect, Wall Expansion Joint, Wall Construction Joint, Wall Horz Construction Joint, 193806812_XSNO

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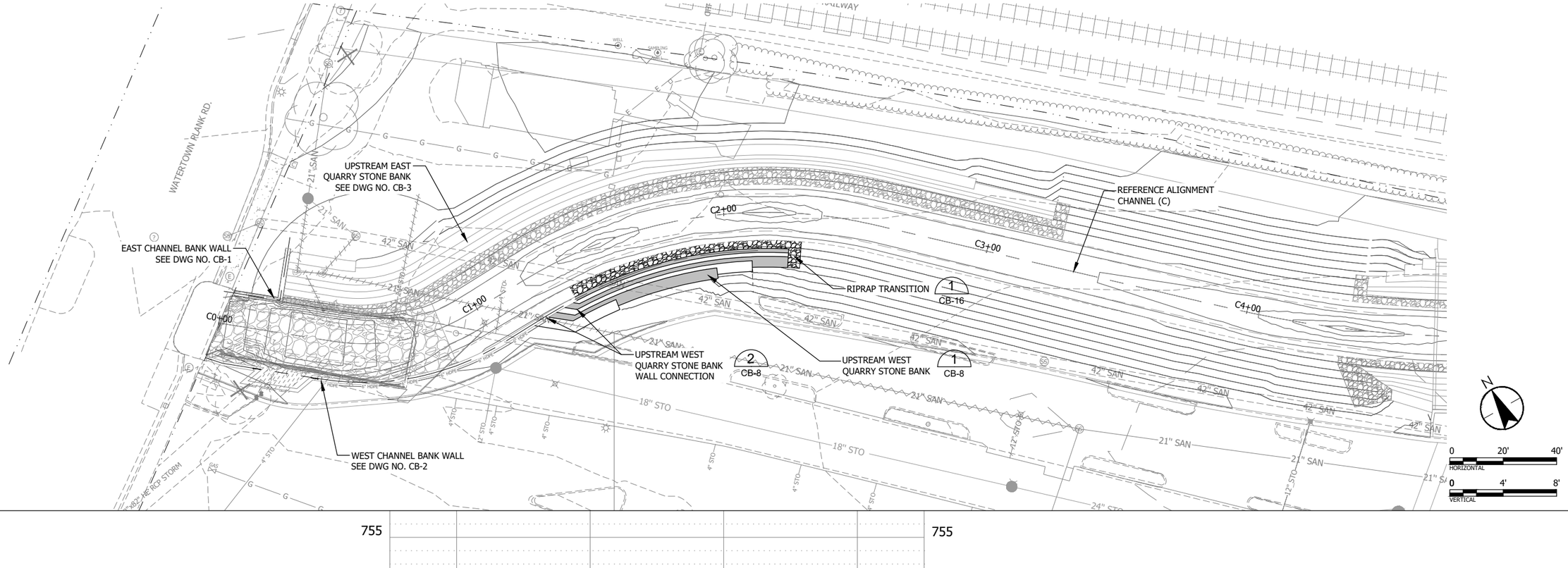
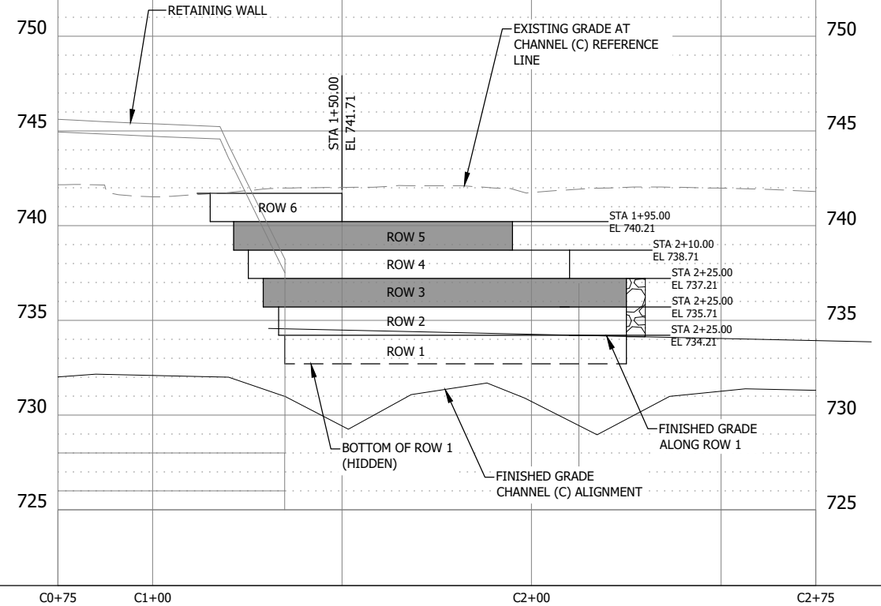
Plot Date: 12/30/2025 - 8:24am
User Name: Brandon.Bonser
Xrefs: Bonser_193806812_XSH1, 193806812_XSN1, 193806812_XSN2, 193806812_XSN3, 193806812_XSN4, 193806812_XSN5, 193806812_XSN6, 193806812_XSN7, 193806812_XSN8, 193806812_XSN9, 193806812_XSN10, 193806812_XSN11, 193806812_XSN12, 193806812_XSN13, 193806812_XSN14, 193806812_XSN15, 193806812_XSN16, 193806812_XSN17, 193806812_XSN18, 193806812_XSN19, 193806812_XSN20, 193806812_XSN21, 193806812_XSN22, 193806812_XSN23, 193806812_XSN24, 193806812_XSN25, 193806812_XSN26, 193806812_XSN27, 193806812_XSN28, 193806812_XSN29, 193806812_XSN30, 193806812_XSN31, 193806812_XSN32, 193806812_XSN33, 193806812_XSN34, 193806812_XSN35, 193806812_XSN36, 193806812_XSN37, 193806812_XSN38, 193806812_XSN39, 193806812_XSN40,

THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING. ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO STANTEC IMMEDIATELY. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES. THE COPYRIGHTS TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF STANTEC. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY STANTEC IS FORBIDDEN.

Plot Date: 12/30/2025 - 8:24am
Name: C:\Users\mike.rock\Documents\Projects\193806812_CB.rvm
Xrefs: Border: 193806812_XAT, 193806812_XNU, 193806812_XPL, 193806812_XNO, Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Waterstop, HE Storm Connect, Wall Expansion Joint, Wall Construction Joint, Wall Insoz Construction Joint, 193806812_XNO





FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

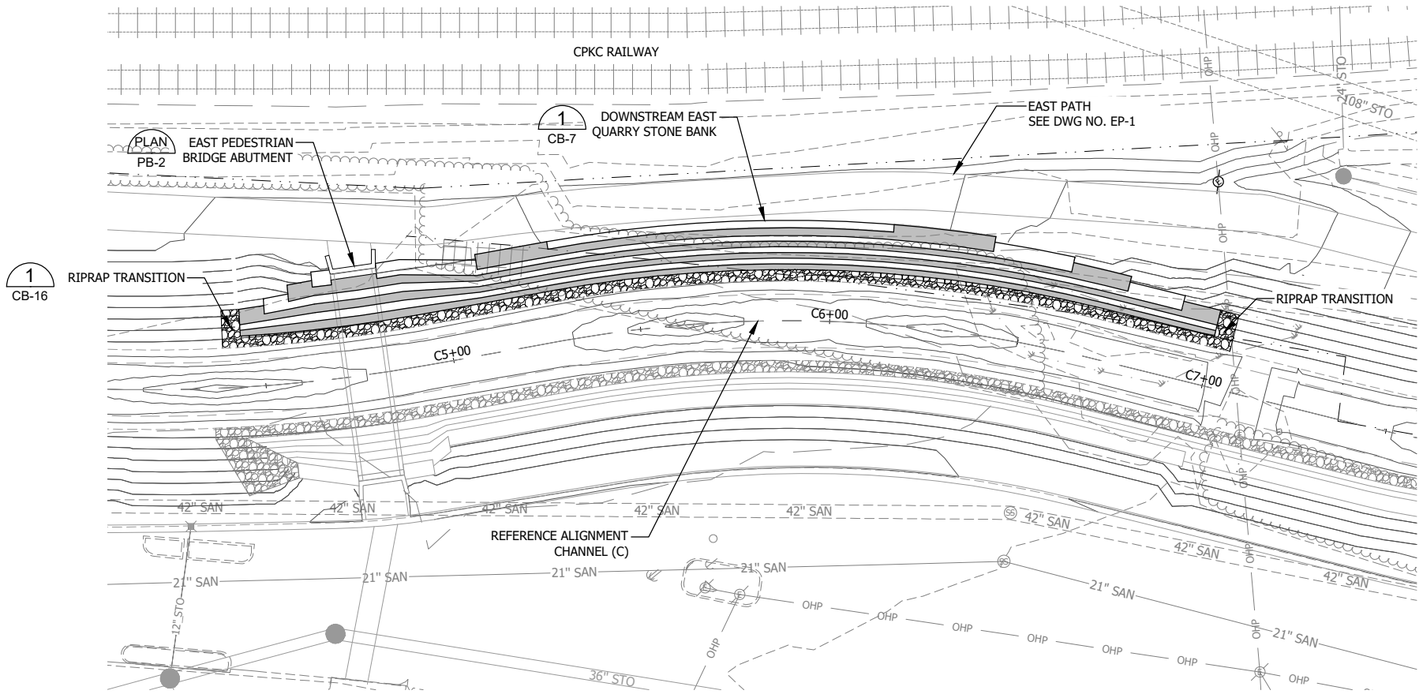
VILLAGE OF ELM GROVE

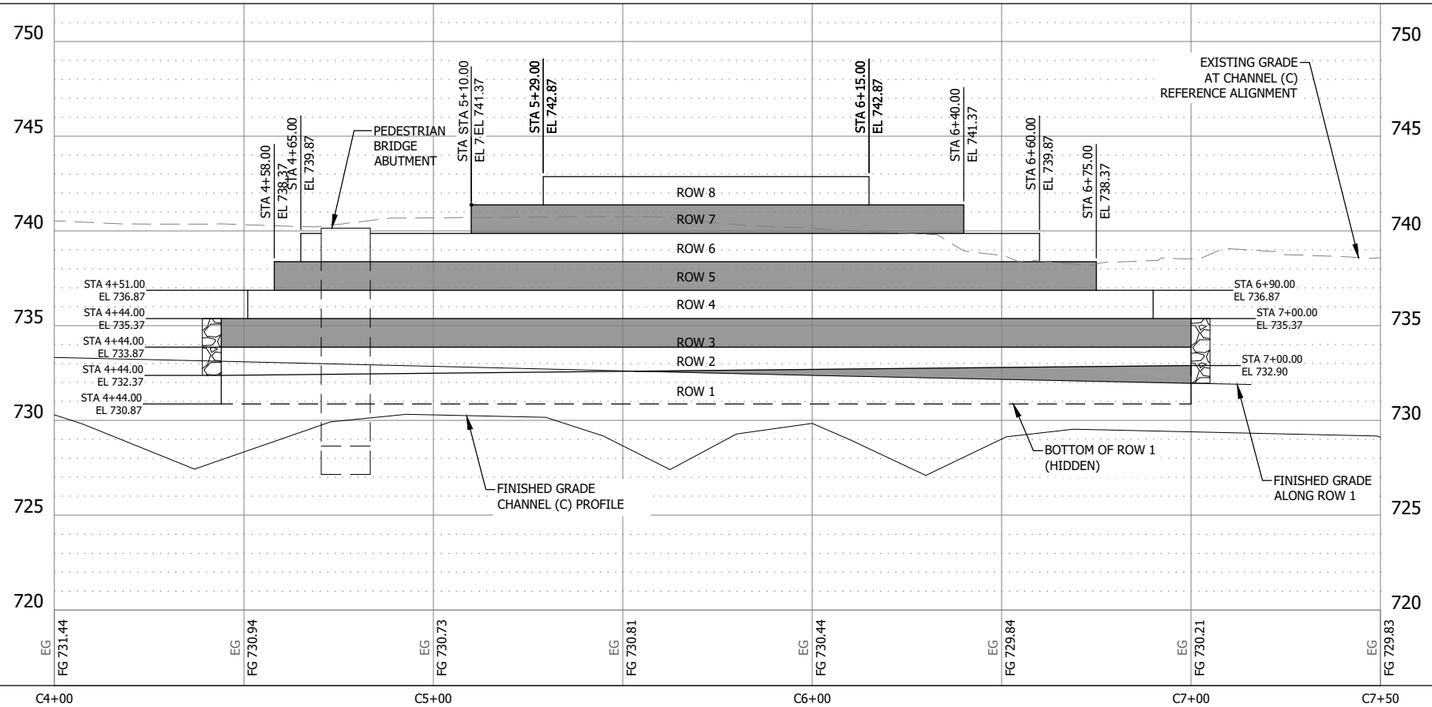
UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

UPSTREAM WEST QUARRY STONE BANK

DRAWING NO.	CB-4
SHEET NO.	56
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING - ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO STANTEC IMMEDIATELY. ALL REPORTS OF SIMILAR CONDITIONS TO BE BROUGHT TO THE ATTENTION OF STANTEC BEFORE PROCEEDING WITH THE WORK. THE COPYRIGHTS TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF STANTEC. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY STANTEC IS FORBIDDEN.





0 20' 40'
HORIZONTAL

0 4' 8'
VERTICAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

DOWNSTREAM EAST QUARRY STONE BANK

DRAWING NO.	CB-5
SHEET NO.	57
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

Plot Date: 12/30/2025 - 8:24am
Drawing Path: C:\Users\...\193806812_CB.dwg
Xrefs: Border: 193806812_XAT, 193806812_XNU, 193806812_XPL, 193806812_XSHD, Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Waterstop, HF Storm Connect, Wall Expansion Joint, Wall Construction Joint, Wall Insor Construction Joint, 193806812_XPR, 193806812_XSHD, 193806812_XNO

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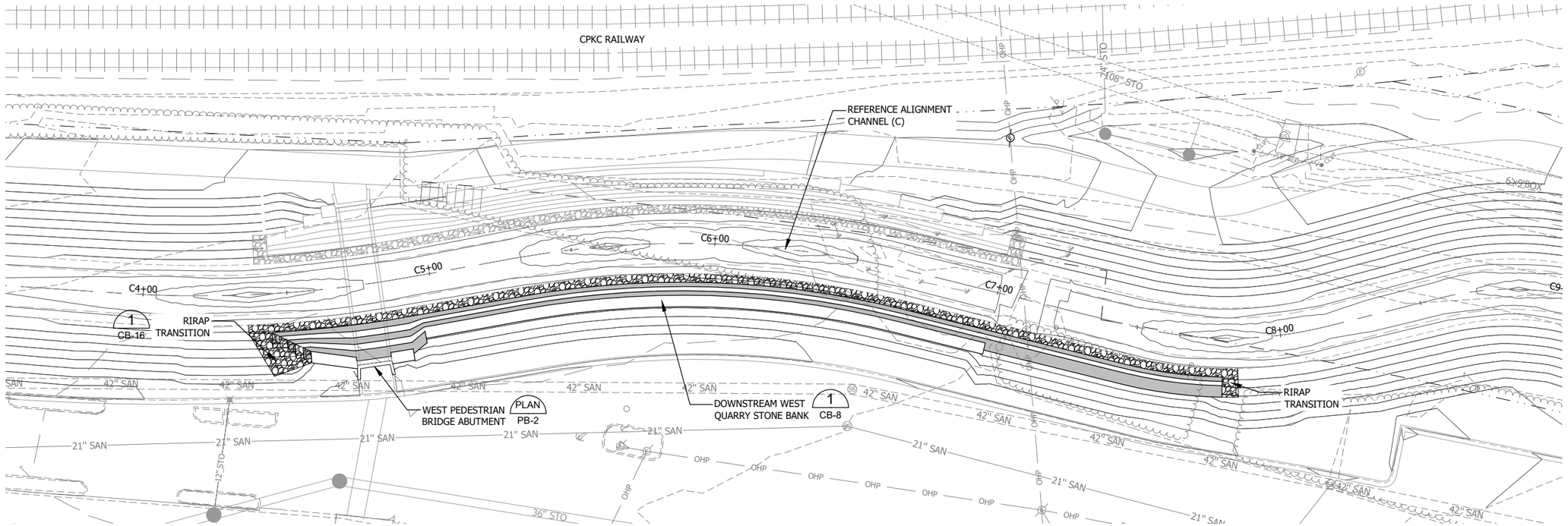

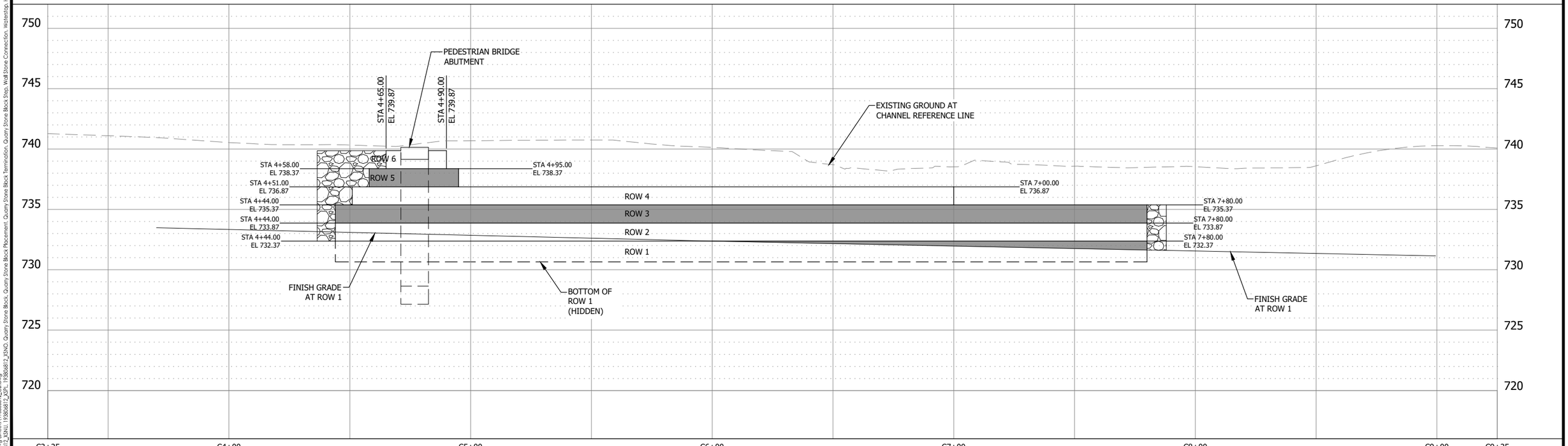

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

DOWNSTREAM WEST QUARRY STONE BANK

DRAWING NO.	CB-6
SHEET NO.	58
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

Plot Date: 12/30/2025 - 8:24am
Plotted By: Amundsen, Dan
Xrefs: Border: I:\193806812_XAR_193806812_XNO_Quarry Stone Block Placement_Quarry Stone Block Termination_Quarry Stone Block Step_Wall Stone Connection_Waterstop_HE Storm Connect_Wall Expansion Joint_Wall Construction Joint_Wall Incor Construction Joint_193806812_CB.dwg

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Plot By: Ryan Klein
Plot Date: 12/20/2025 - 8:24am
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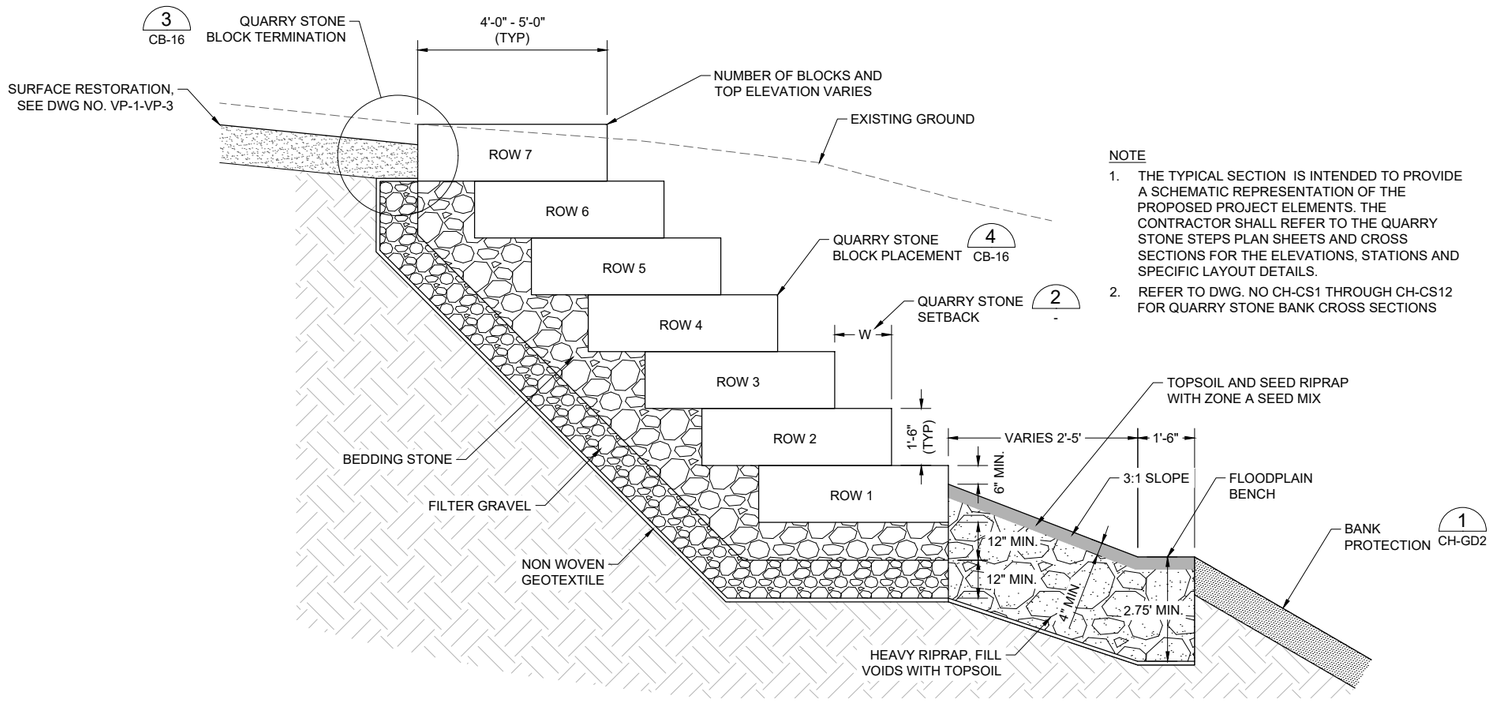
Xrefs: Border: I:\193806812_XSIT\193806812_XDNU\193806812_XPP_193806812_XSNO_Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Waterdrop, HE Storm Connect, Wall Expansion Joint, Wall Construction Joint, Wall Insoz Construction Joint, 193806812_XSNO_QUARRY STONE BLOCK_EXPANSION JOINT_CB.dwg



EAST QUARRY STONE BANK TYPICAL SECTION

SCALE

1
CB-3
CB-5

NOTE

1. THE TYPICAL SECTION IS INTENDED TO PROVIDE A SCHEMATIC REPRESENTATION OF THE PROPOSED PROJECT ELEMENTS. THE CONTRACTOR SHALL REFER TO THE QUARRY STONE STEPS PLAN SHEETS AND CROSS SECTIONS FOR THE ELEVATIONS, STATIONS AND SPECIFIC LAYOUT DETAILS.
2. REFER TO DWG. NO CH-CS1 THROUGH CH-CS12 FOR QUARRY STONE BANK CROSS SECTIONS

UPSTREAM EAST QUARRY STONE BLOCK ROW RANGE TABLE					
ROW	UPSTREAM STATION	DOWNSTREAM STATION	BOTTOM ELEVATION	TOP ELEVATION	ROW SETBACK (W)
6	0+22.2	0+50.0	741.86	743.36	2'-6"
5	0+22.2	1+00.0	740.36	741.86	2'-6"
4	0+22.2	1+75.0	738.86	740.36	2'-6"
4	1+75.0	2+00.0	738.86	740.36	TRANSITION
4	2+00.0	2+90.0	738.86	740.36	1'-6"
3	0+22.2	1+75.0	737.36	738.86	2'-6"
3	1+75.0	2+00.0	737.36	738.86	TRANSITION
3	2+00.0	3+21.5	737.36	738.86	1'-6"
2	0+22.2	1+75.0	735.86	737.36	2'-6"
2	1+75.0	2+00.0	735.86	737.36	TRANSITION
2	2+00.0	3+21.5	735.86	737.36	1'-6"
1	0+22.2	1+75.0	734.36	735.86	2'-6"
1	1+75.0	2+00.0	735.86	737.36	TRANSITION
1	2+00.0	3+21.5	734.36	735.86	1'-6"

DOWNSTREAM EAST QUARRY STONE BLOCK ROW RANGE TABLE					
ROW	UPSTREAM STATION	DOWNSTREAM STATION	BOTTOM ELEVATION	TOP ELEVATION	ROW SETBACK (W)
*8	5+29.0	6+15.0	741.8	743.3	2'-0"
7	5+10.4	6+40.0	740.40	741.90	1'-6"
6	4+65.0	4+70.4	738.90	740.40	2'-0"
6	PEDESTRIAN BRIDGE ABUTMENT				
6	4+83.3	5+10.4	738.90	740.40	-
6	5+10.4	6+60.0	738.90	740.40	1'-6"
5	4+58.0	4+90.0	737.40	738.90	2'-3"
5	4+90.0	5+10.0	737.40	738.90	TRANSITION
5	5+10.0	6+75.0	737.40	738.90	1'-6"
4	4+51.0	4+51.0	735.90	737.40	1'-6"
4	4+51.0	4+65.0	735.90	737.40	TRANSITION
4	4+65.0	4+90.0	735.90	737.40	2'-3"
4	4+90.0	5+10.0	735.90	737.40	TRANSITION
4	5+10.0	6+90.0	735.90	737.40	1'-6"
3	4+44.0	4+44.0	734.40	735.90	1'-6"
3	4+44.0	4+65.0	734.40	735.90	TRANSITION
3	4+65.0	4+90.0	734.40	735.90	2'-3"
3	4+90.0	5+10.0	734.40	735.90	TRANSITION
3	5+10.0	7+00.0	734.40	735.90	1'-6"
2	4+44.0	4+44.0	732.90	734.40	1'-6"
2	4+44.0	4+65.0	732.90	734.40	TRANSITION
2	4+65.0	4+90.0	732.90	734.40	2'-3"
2	4+90.0	5+10.0	732.90	734.40	TRANSITION
2	5+10.0	7+00.0	732.90	734.40	1'-6"
1	4+44.0	4+44.0	731.40	732.90	1'-6"
1	4+44.0	4+65.0	731.40	732.90	TRANSITION
1	4+65.0	4+90.0	731.40	732.90	2'-3"
1	4+90.0	5+10.0	731.40	732.90	TRANSITION
1	5+10.0	7+00.0	731.40	732.90	1'-6"

*ROW 8 IS A 2' TOTAL WIDTH BLOCK

EAST QUARRY STONE BLOCK TABLE

SCALE

2

FOR BIDDING AND CONSTRUCTION

DESIGNER M. SIERACKI
DRAWN BY A. ROCK
CHECKER D. AMUNDSEN
APPROVED R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST BANK QUARRY STONE TYPICAL SECTION

DRAWING NO.	CB-7
SHEET NO.	59
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

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Plot Date: 12/30/2025 - 8:24am
User: Bursen
Xrefs: Bursen: 193806812_XSM1, 193806812_XSN1, 193806812_XSN2, 193806812_XSN3, 193806812_XSN4, 193806812_XSN5, 193806812_XSN6, 193806812_XSN7, 193806812_XSN8, 193806812_XSN9, 193806812_XSN10, 193806812_XSN11, 193806812_XSN12, 193806812_XSN13, 193806812_XSN14, 193806812_XSN15, 193806812_XSN16, 193806812_XSN17, 193806812_XSN18, 193806812_XSN19, 193806812_XSN20, 193806812_XSN21, 193806812_XSN22, 193806812_XSN23, 193806812_XSN24, 193806812_XSN25, 193806812_XSN26, 193806812_XSN27, 193806812_XSN28, 193806812_XSN29, 193806812_XSN30, 193806812_XSN31, 193806812_XSN32, 193806812_XSN33, 193806812_XSN34, 193806812_XSN35, 193806812_XSN36, 193806812_XSN37, 193806812_XSN38, 193806812_XSN39, 193806812_XSN40,

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Plot Date: 12/30/2025 - 8:26am
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Plot Date: 12/20/2025 - 8:26am
Project Location: C:\Users\mike.sieracki\Documents\ACCDocs\Stantec\193806812_CB.dwg
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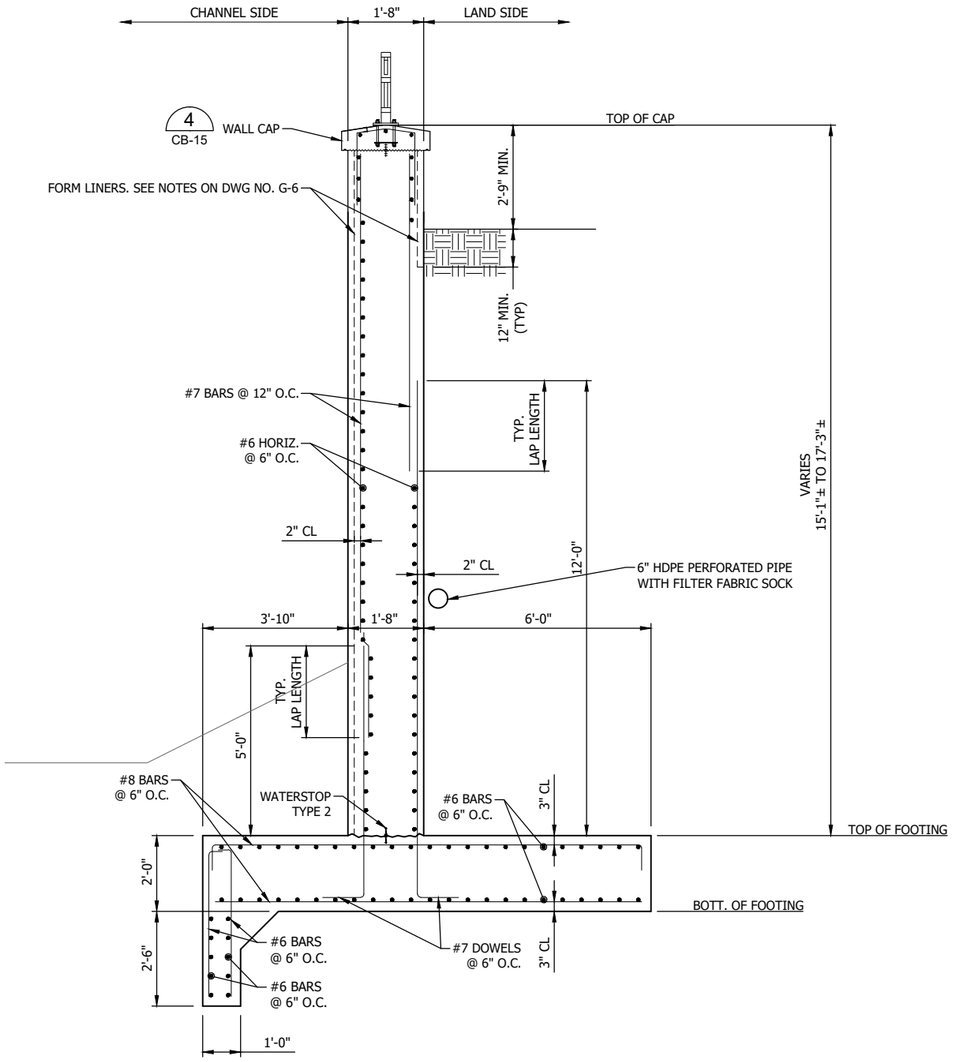
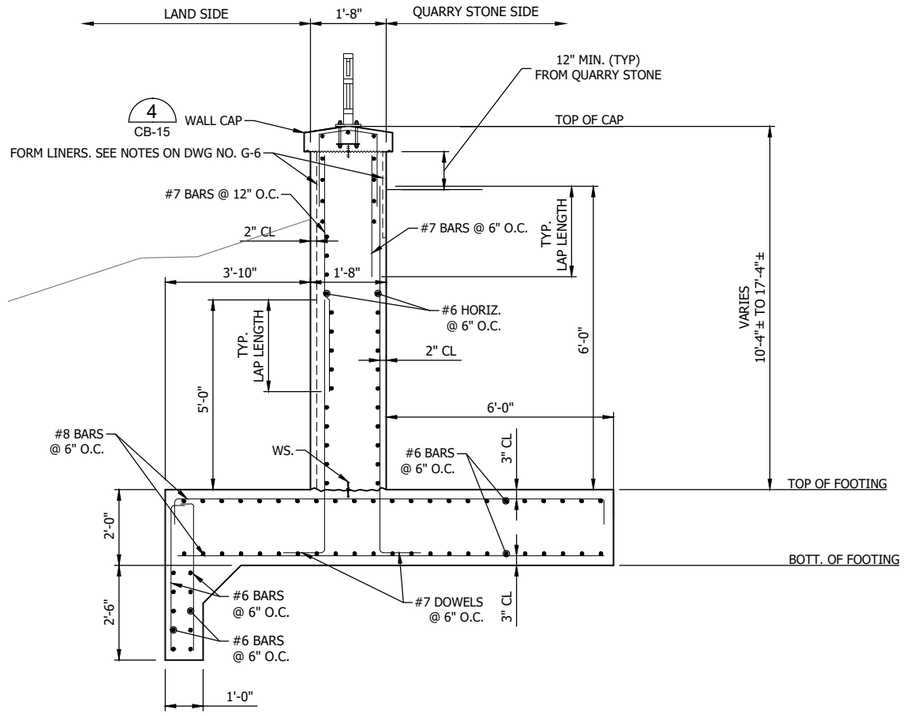
NOTE:
1. STRUCTURAL FILL REQUIRED BEHIND RETAINING WALL.



WEST CHANNEL BANK WALL SECTION 1

SCALE: 1/4" = 1'-0"

1 CB-2



WEST CHANNEL BANK WALL SECTION 2

SCALE: 1/4" = 1'-0"

2 CB-2

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WEST CHANNEL BANK WALL - TYPICAL SECTIONS

DRAWING NO.	CB-10
SHEET NO.	62
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

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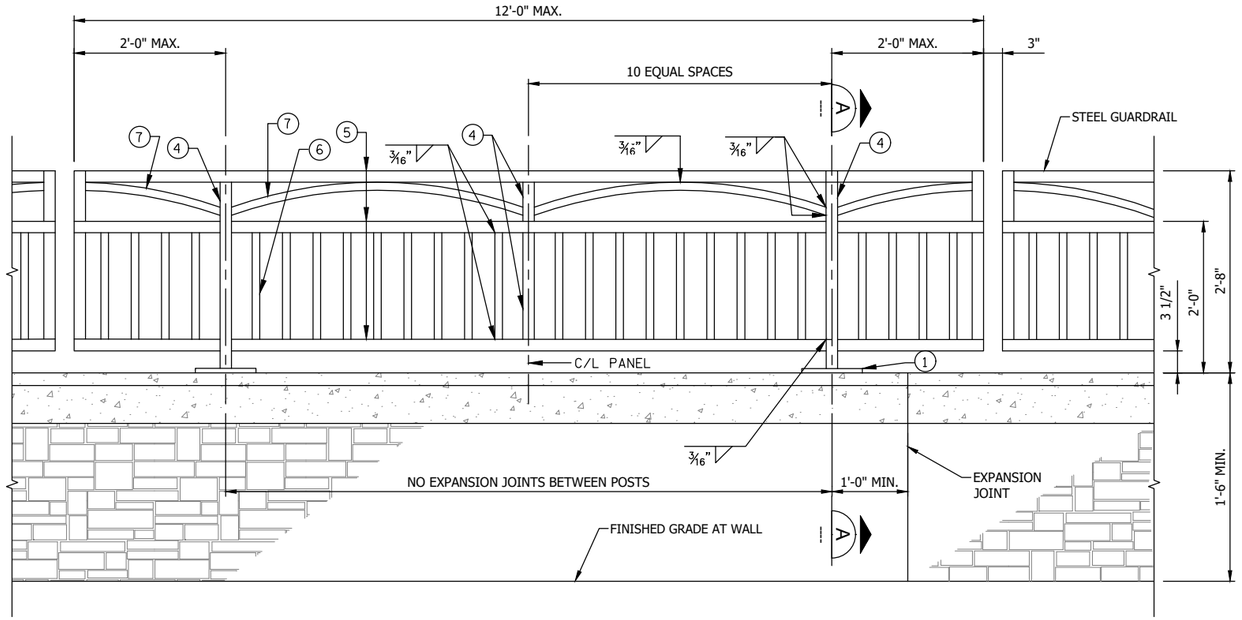
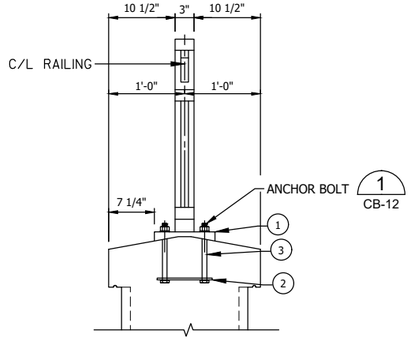


GUARDRAIL - ELEVATION (RETAINING WALLS NEAR WATERTOWN PLANK ROAD) 1

SCALE: NTS

CB-1,CB-2



SECTION VIEW A

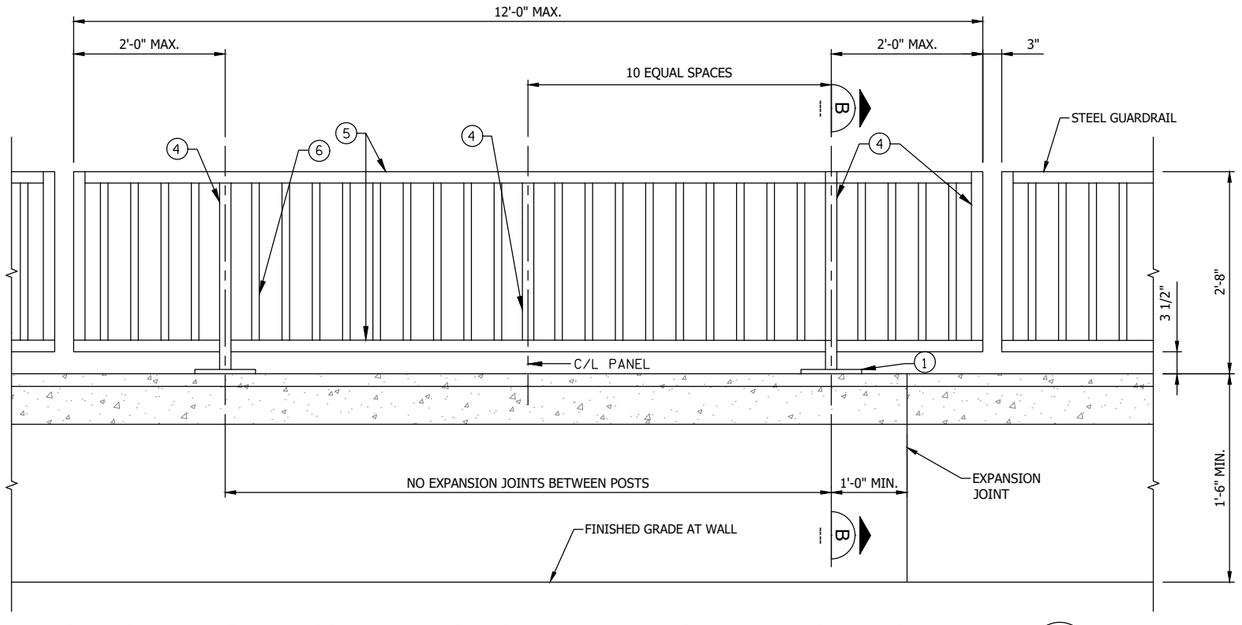
SCALE: NTS

NOTES

1. POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FRAME CUTS.
2. ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING. SET NORMAL TO GRADE.
3. CUT BOTTOM OF POST TO MAKE POST VERTICAL IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTION.
4. STEEL SHIMS SHALL BE PROVIDED & USED UNDER BASE PLATES WHERE REQUIRED FOR ALIGNMENT.
5. CAULK AROUND PERIMETER OF BASE PLATES, NO. 1, AND FILL BOLT SLOT OPENINGS IN SHIMS AND BASE PLATES WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.
6. VENT HOLES SHALL BE DRILLED IN TOP RAIL OVER RAIL POSTS AND AT LOW END OF OTHER RAILS AND IN POST MEMBERS TO FACILITATE DRAINAGE.
7. RAILING SHALL BE FABRICATED FULL LENGTH.
8. TOUCH-UP PAINTING TO BE DONE AT COMPLETION OF STEEL RAILING INSTALLATION TO THE SATISFACTION OF THE ENGINEER AT NO EXTRA COST.
9. ALL JOINTS AND RECESSES IN CONCRETE PARAPET ARE TO BE VERTICAL.
10. RAILING AND ALL RAILING COMPONENTS SHALL BE HOT DIPPED GALVANIZED STEEL.
11. RAILING AND ALL RAILING COMPONENTS SHALL BE PAINTED WITH PRIMER AND FINISH COATING AFTER GALVANIZING. SEE SPECIFICATION.
12. HOT DIPPED GALVANIZING SHALL BE TOUCHED UP WITH A ZINC RICH COATING WHERE NECESSARY AND REPAINTED.

LEGEND

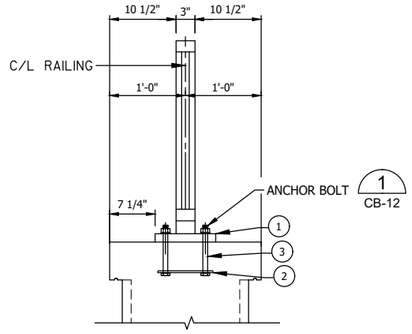
1. PLATE $\frac{5}{8}$" X 6" X 8" WITH $\frac{3}{4}$" X 1 $\frac{1}{4}$" SLOTTED HOLES.
2. $\frac{1}{4}$" X 5" X 7" ANCHOR PLATE WITH $\frac{11}{16}$" DIA. HOLES FOR ANCHOR BOLTS NO. 3.
3. $\frac{5}{8}$" DIA. X 9" LONG TYPE 316 STAINLESS STEEL THREADED RODS (MIN. TENSILE STRENGTH = 70 KSI) WITH NUT AND WASHERS OF SAME ALLOY GROUP.
4. STRUCTURAL EXTRUSION 3" X 1 $\frac{1}{2}$" X $\frac{1}{4}$" PLACE VERTICAL. WELD TO NO. 1 & 5.
5. STRUCTURAL EXTRUSION 3" X 1 $\frac{1}{2}$" X $\frac{1}{4}$" RAILS. WELD TO NO. 1 & NO. 4. INSIDE OF TUBE TO BE PAINTED AT ALL FIELD ERECTION & EXPANSION JOINTS.
6. BAR 1" X 1" PICKETS. WELD TO NO. 5 PLACE VERTICAL.
7. BAR 1" X 1". BEND TO REQUIRED RADIUS. WELD TO NO. 4 & 5.



GUARDRAIL - ELEVATION (WALL STREET HEADWALLS AND WINGWALLS) 2

SCALE: NTS

WS-3



SECTION VIEW B

SCALE: NTS

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

GUARD RAILS

DRAWING NO.	CB-11
SHEET NO.	63
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

Plot Date: 12/30/2025 - 8:27pm
User Name: Brandon.Bursen
Xrefs: Bursen_193806812_XSH1, 193806812_XSN1, 193806812_XPR, 193806812_XSNO, Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Rec, Wall Stone Connection, Waterstop, HE Storm Connect, Wall Expansion Joint, Wall Const Joint, Wall Horz Construction Joint, 193806812_XPR, 193806812_XSNO, Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Rec, Wall Stone Connection, Waterstop, HE Storm Connect, Wall Expansion Joint, Wall Horz Construction Joint, 193806812_CB.dwg
C:\Users\brandon.bursen\Desktop\Projects\193806812_CB.dwg

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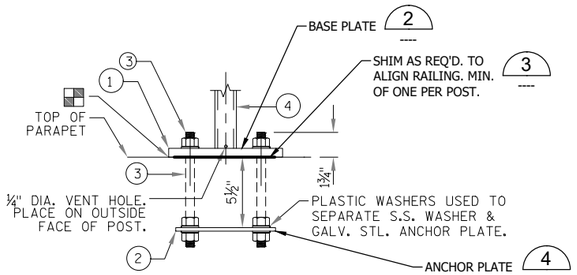
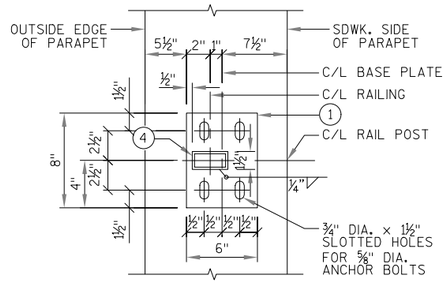
Plot Date: 12/30/2025 - 8:27pm
Plotted By: Mieracki, Matthew
Xrefs: Borders 193806812_XM1, 193806812_XNU, 193806812_XPL, 193806812_XNO, Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Waterstop, HF Storm Connect, Wall Expansion Joint, Wall Construction Joint, Wall Insul Construction Joint, 193806812_CB_xrfp
Path: C:\Dev\Sheets\193806812_CB.dwg



ANCHOR BOLT DETAIL 1

SCALE: NTS

CB-11

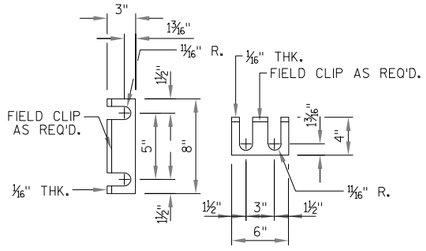


BASE PLATE 2

SCALE: NTS

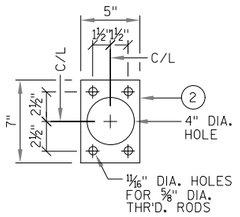
NOTES

1. SEE NOTES AND LEGEND ON SHEET CB-11.



SHIM DETAIL (2 SETS PER POST) 3

SCALE: NTS



ANCHOR PLATE 4

SCALE: NTS

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

GUARD RAIL ANCHOR DETAILS

DRAWING NO.	CB-12
SHEET NO.	64
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

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Plot Date: 12/30/2025 - 8:27pm
Plotted by: Mark Sieracki
Xrefs: Borders 193806812_XM1, 193806812_XM2, 193806812_XM3, 193806812_XM4, 193806812_XM5, 193806812_XM6, 193806812_XM7, 193806812_XM8, 193806812_XM9, 193806812_XM10, 193806812_XM11, 193806812_XM12, 193806812_XM13, 193806812_XM14, 193806812_XM15, 193806812_XM16, 193806812_XM17, 193806812_XM18, 193806812_XM19, 193806812_XM20, 193806812_XM21, 193806812_XM22, 193806812_XM23, 193806812_XM24, 193806812_XM25, 193806812_XM26, 193806812_XM27, 193806812_XM28, 193806812_XM29, 193806812_XM30, 193806812_XM31, 193806812_XM32, 193806812_XM33, 193806812_XM34, 193806812_XM35, 193806812_XM36, 193806812_XM37, 193806812_XM38, 193806812_XM39, 193806812_XM40,

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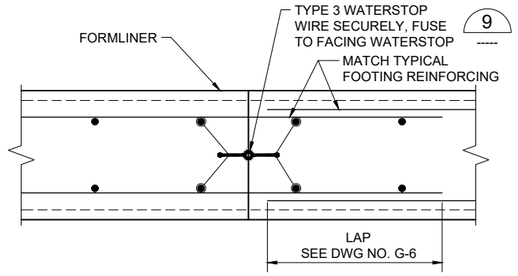
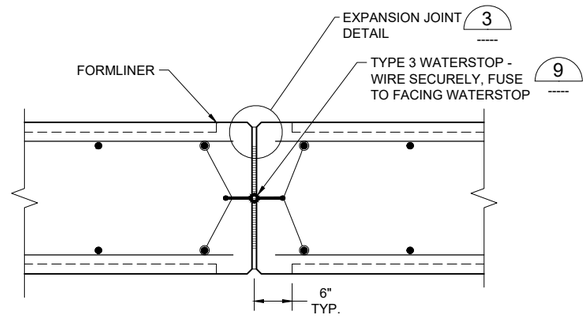
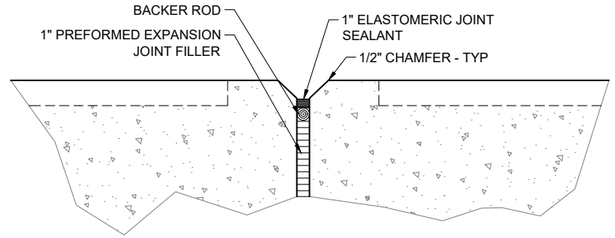
Plot Date: 12/20/2025 - 8:27pm
Project Number: 193806812
Xrefs: Border: I:\193806812_ASVI_193806812_XBO.dwg Connect: I:\193806812_XNU_193806812_XNO.dwg Exposition Joint: I:\193806812_XPJ_193806812_XNO.dwg Wall Construction Joint: I:\193806812_XNO_193806812_XNO.dwg Waterstop, HE Storm Connect: I:\193806812_XNO_193806812_XNO.dwg Exposition Joint: Wall Construction Joint: I:\193806812_XNO_193806812_XNO.dwg Block Placement: Quarry Stone Block Termination: Quarry Stone Block Step: Wall Stone Connection: Waterstop, HE Storm Connect: I:\193806812_XNO_193806812_XNO.dwg Quarry Stone Block: Quarry Stone Block: I:\193806812_XNO_193806812_XNO.dwg Sheets: I:\193806812_CB.dwg



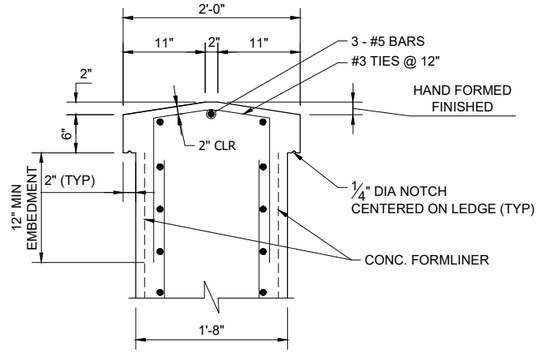
WALL VERTICAL CONSTRUCTION JOINT
SCALE: 1" = 2'
1
CB-1 TO CB-2



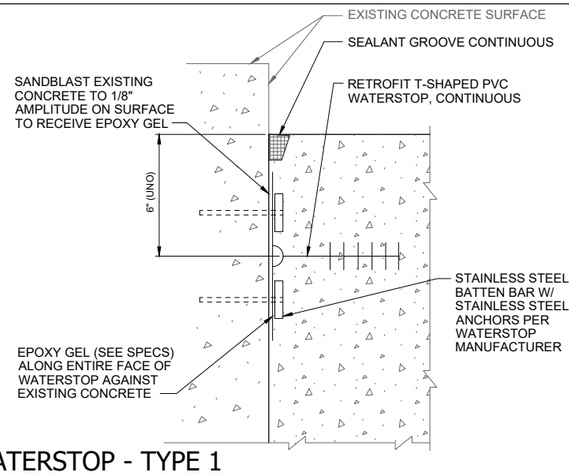
WALL VERTICAL EXPANSION JOINT
SCALE: 1" = 2'
2
CB-1 TO CB-2



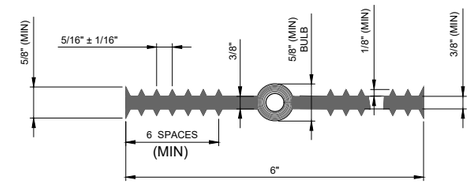
WALL EXPANSION JOINT DETAIL
NTS
3
—



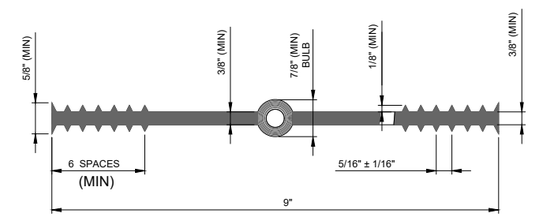
WALL CAP DETAIL
SCALE: 1" = 2'
4
CB-1 TO CB-2



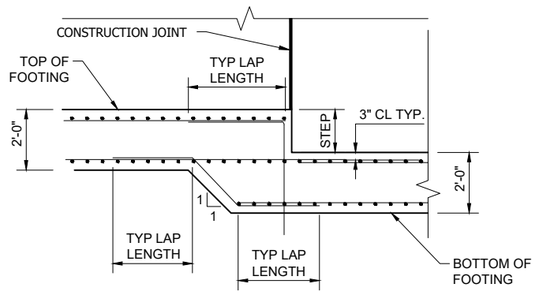
WATERSTOP - TYPE 1
SCALE: NTS
5
CB-1 TO CB-2



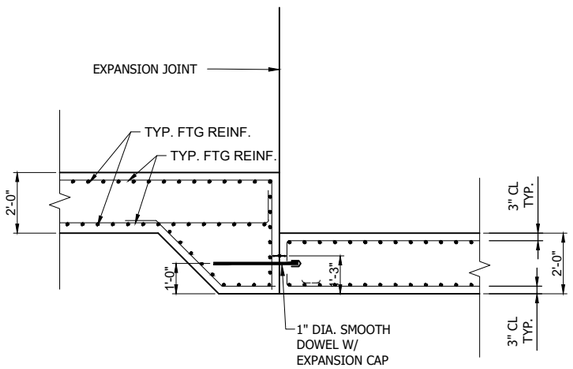
WATERSTOP - TYPE 2
SCALE: NTS
8
CB-2



WATERSTOP - TYPE 3
SCALE: NTS
9
CB-2



FOOTING STEP DETAIL - CONSTRUCTION JOINT
SCALE: 1" = 5'
6
CB-1 TO CB-2



FOOTING STEP DETAIL - EXPANSION JOINT
SCALE: 1" = 5'
7
CB-1 TO CB-2

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CONSTRUCTION DETAILS - CHANNEL BANK WALLS

DRAWING NO.	CB-15
SHEET NO.	67
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CB.dwg

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Plot Date: 12/30/2025 - 8:27pm
Xrefs: Border: I:\938\06812\CAD\Dwg\Sheets\193806812_CB.dwg
Xrefs: Border: I:\938\06812_XST: I:\938\06812_XSTI: I:\938\06812_XNN: I:\938\06812_XPI: I:\938\06812_XNO: Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Waterstop, HF Storm Connect, Wall Expansion Joint, Wall Construction Joint, Wall Insoz Construction Joint, I:\938\06812_XSNO, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Waterstop, HF Storm Connect, Wall Expansion Joint, Wall Construction Joint, Wall Insoz Construction Joint, I:\938\06812_XSNO, Quarry Stone Block

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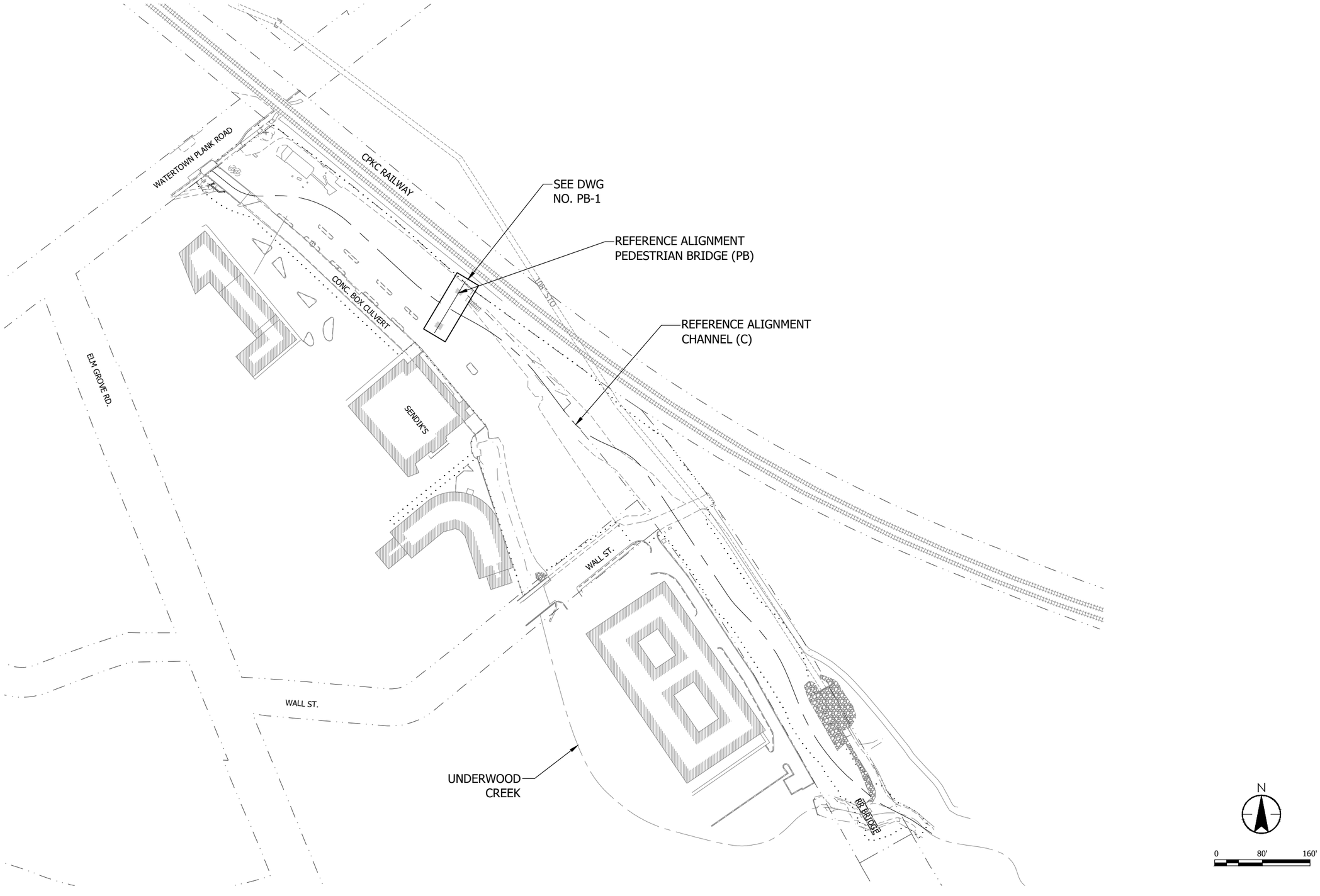

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

PEDESTRIAN BRIDGE AND ABUTMENTS SHEET INDEX

DRAWING NO.	PB-0
SHEET NO.	69
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_PB.dwg

Plot Date: 12/30/2025 - 12:39pm
User Name: mike.sieracki
Xrefs: Border: 193806812_XSH1, 193806812_XSNJ, 193806812_XVP, 193806812_XSNO, Quarry Stone Block, Quarry Stone Block Placement, Quarry Stone Block Termination, Quarry Stone Block Step, Wall Stone Connection, Bridge Abutment Details

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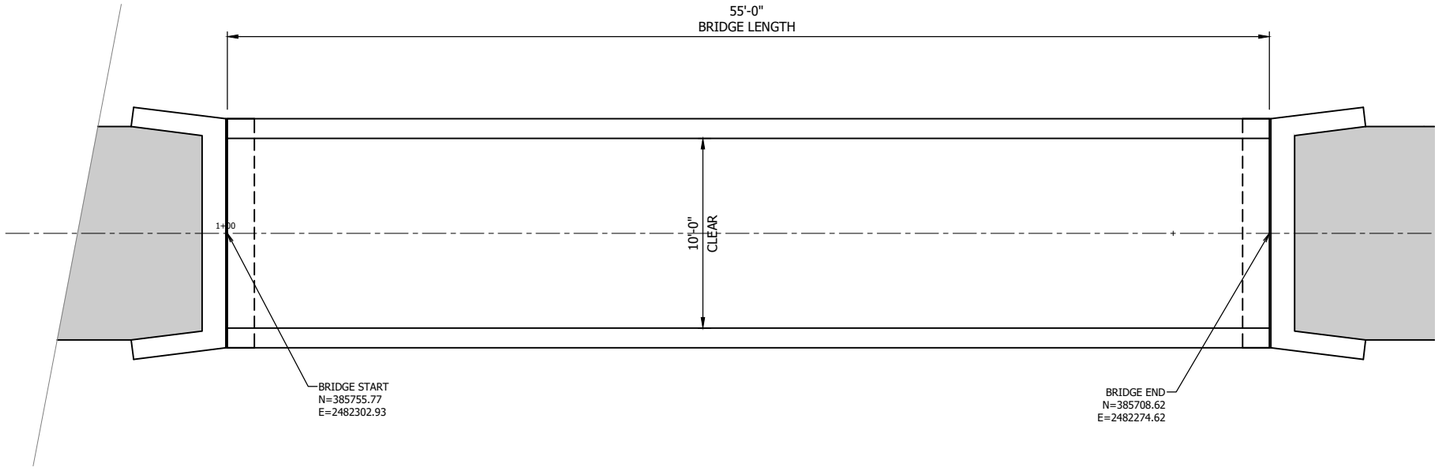
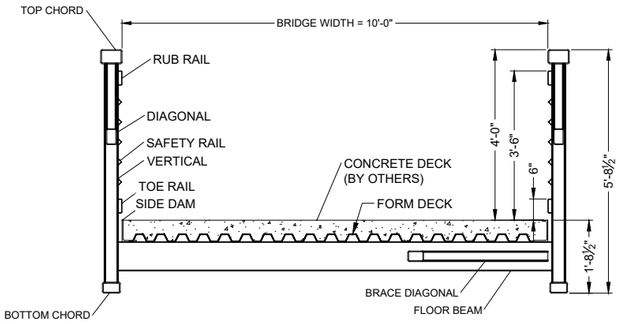
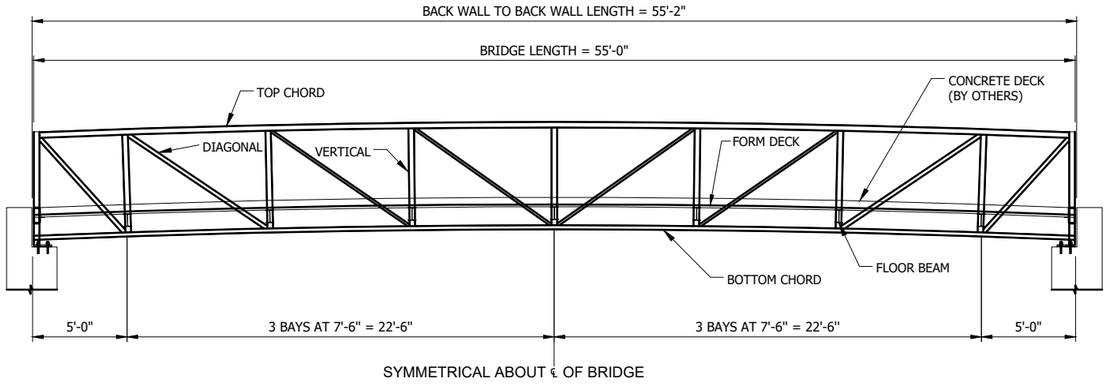




BRIDGE SECTION



BRIDGE ELEVATION

DESIGN DATA

BRIDGE LOADING:

PED LIVELOAD: 90 PSF

VEHICLE LOAD: 30% IMPACT + 10,000 LB. VEHICLE

ULTIMATE DESIGN STRESSES:

CONCRETE - ABUTMENT	f'c = 4,500 P.S.I.
CONCRETE - BRIDGE DECK	f'c = 4,000 P.S.I.
STEEL REINFORCEMENT	fy = 60,000 P.S.I.

FOUNDATION DATA:

MAXIMUM ULTIMATE BEARING PRESSURE IS 18,000 POUNDS PER SQUARE FOOT.

HYDRAULIC DATA:

100 YEAR FREQUENCY

HIGH WATER ELEVATION ——— 735.96 ft

GENERAL NOTES

1. DRAWINGS SHALL NOT BE SCALED.
2. JOINT FILLER SHALL CONFORM TO THE REQUIREMENTS OF A.A.S.H.T.O. DESIGNATION M153, TYPES I, II, OR III OR M213.
3. AT ABUTMENTS, ALL EXCAVATED VOLUME NOT OCCUPIED BY THE NEW STRUCTURE SHALL BE BACKFILLED WITH STRUCTURE BACKFILL.
4. THE EXISTING GROUND LINE SHALL BE THE UPPER LIMITS OF EXCAVATION FOR STRUCTURES.
5. MINIMUM CAMBER NEEDED FOR PREFABRICATED BRIDGE TO BE DETERMINED BY MANUFACTURER.
6. ANCHOR BOLTS, BEARINGS, AND THEIR LOCATION ON THE SUBSTRUCTURE UNITS SHALL BE PROVIDED BY THE BRIDGE MANUFACTURER AND INCLUDED IN THE APPROPRIATE BID ITEM.
7. IF CROSS SECTION OF PEDESTRIAN BRIDGE IS DIFFERENT FROM THAT SHOWN ON THESE PLANS, THE ABUTMENT MUST BE MODIFIED TO ACCOMMODATE THE CHANGE. THE ENGINEER OF RECORD SHALL APPROVE THESE CHANGES.
8. ALL PREFABRICATED BRIDGE DIMENSIONS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS WITH BRIDGE MANUFACTURER.
9. THE DISTANCE BETWEEN THE FRONT FACE OF ABUTMENT SEATS SHALL BE 55 FEET PLUS THE EXPANSION JOINT WIDTH REQUIRED BY THE BRIDGE MANUFACTURER.
10. CONTRACTOR SHALL REINFORCE AND PLACE THE CONCRETE BRIDGE DECK IN ACCORDANCE WITH THE BRIDGE SHOP DRAWINGS.
11. SHOP DRAWINGS AND CALCULATIONS FOR PREFABRICATION BRIDGE SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF WISCONSIN.

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

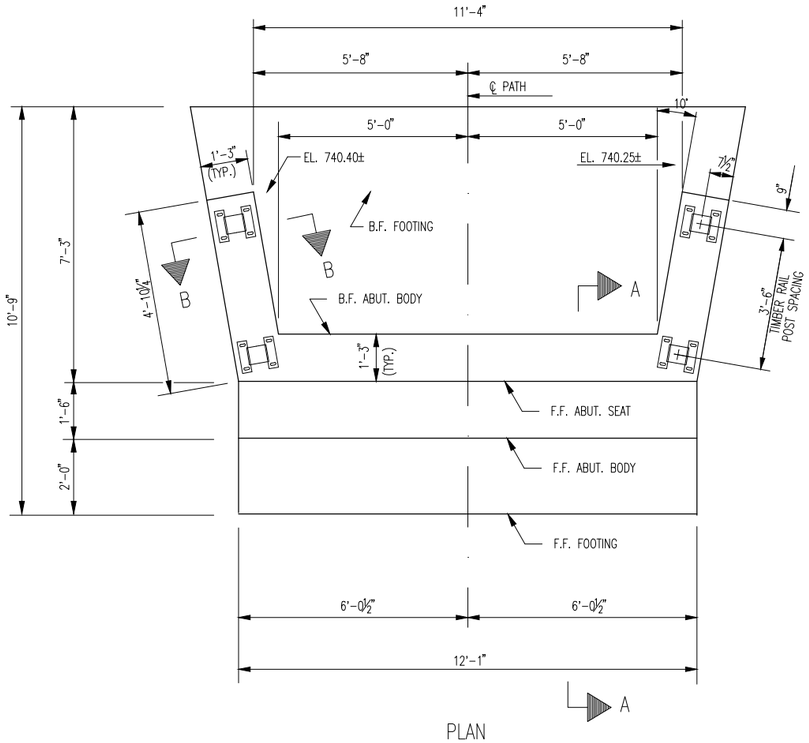
UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

PEDESTRIAN BRIDGE GENERAL PLAN

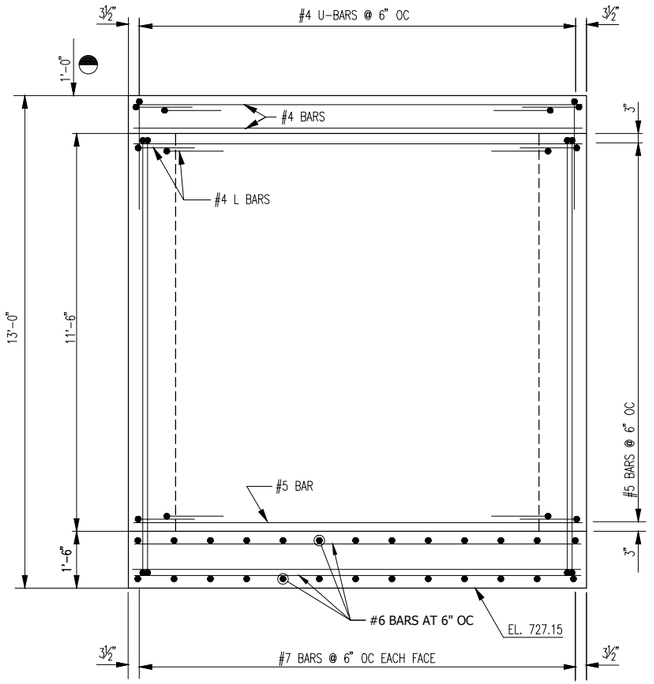
DRAWING NO.	PB-1
SHEET NO.	70
DATE	December 30, 2025
PROJ NO.	193806812
FILE	BR01.dwg

Plot Date: 12/30/2025 - 12:39pm
Plotted by: Amundsen, Dan
Xrefs: Border: 193806812_ASV0

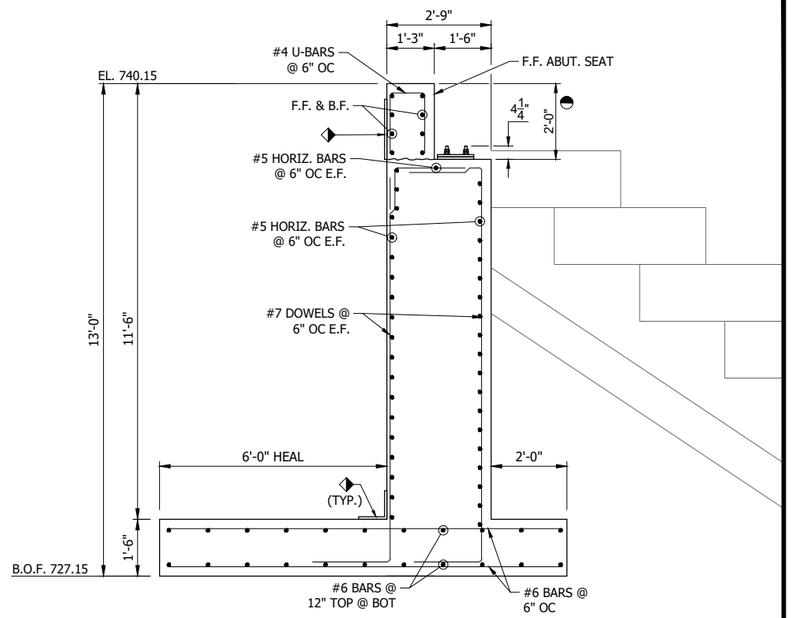
THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. ALL REPRODUCTIONS, COPIES OR USES OF THIS DRAWING AND THE COPYRIGHTS TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF STANTEC. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY STANTEC IS FORBIDDEN.



PLAN



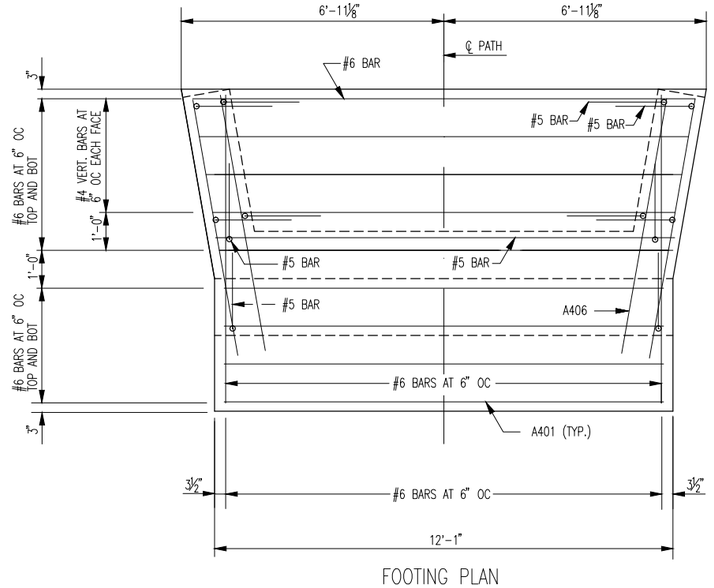
ELEVATION BODY



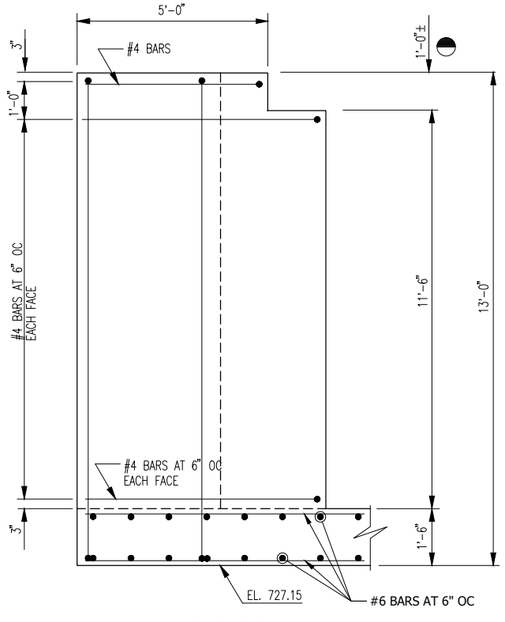
SECTION A–A

◐ THE HEIGHT OF BACKWALL IS APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE ACTUAL HEIGHT BASED ON THE DIMENSIONS OF THE PREFABRICATED BRIDGE.

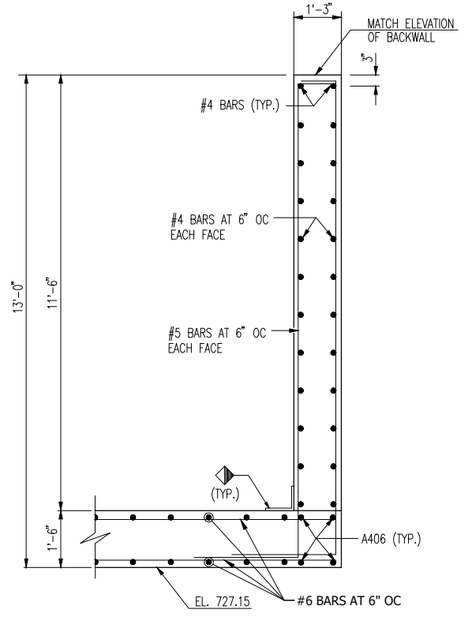
◈ 18" MIN. WIDTH RUBBERIZED MEMBRANE WATERPROOFING ALONG HORIZ. CONST. JOINTS AND VERTICALLY AT WINGWALL JOINT.



FOOTING PLAN



ELEVATION WING



SECTION B–B

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

PEDESTRIAN BRIDGE ABUTMENTS

DRAWING NO.	PB-2
SHEET NO.	71
DATE	December 30, 2025
PROJ NO.	193806812
FILE	BR01.dwg

Plot Date: 12/30/2025 - 12:39pm
User Name: mmcmahon
Xrefs: Border: 193806812_ASNO

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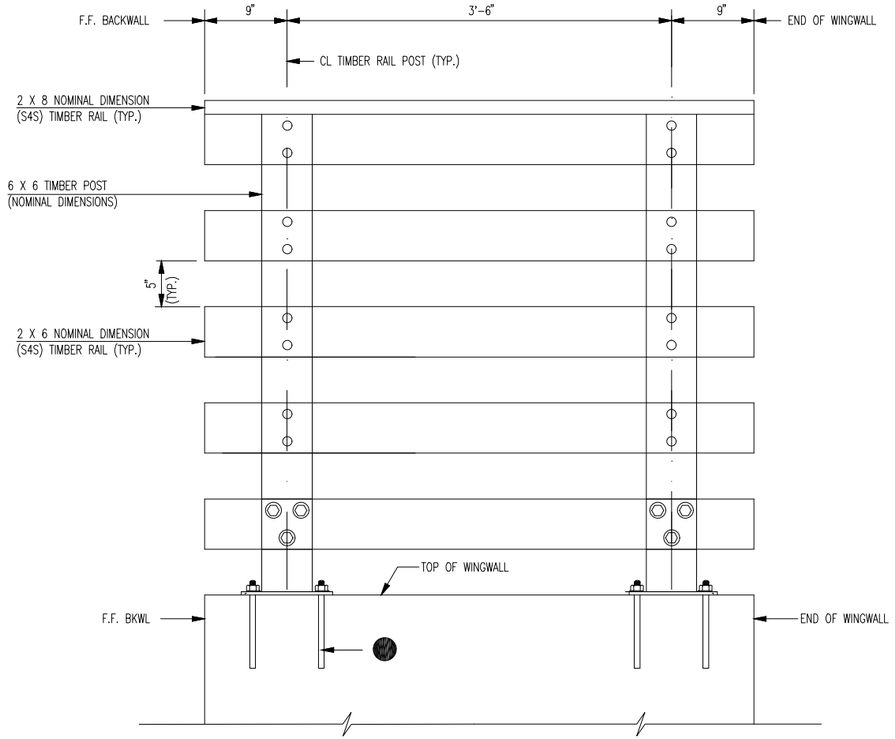
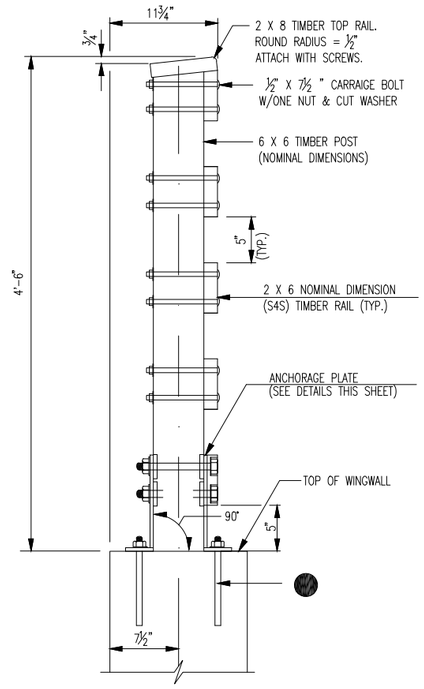


END ELEVATION TIMBER RAIL

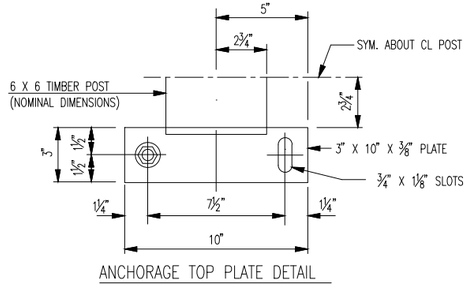


TYPICAL SECTION TIMBER RAIL

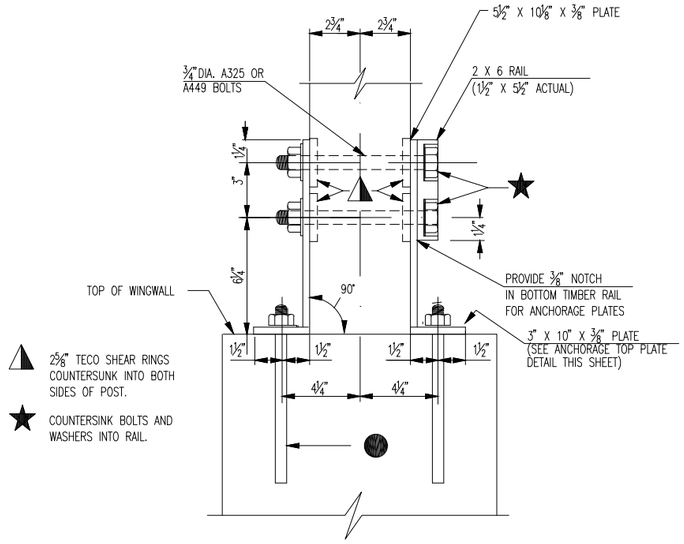
GENERAL NOTES – RAILING

1. ALL PLATES, SCREWS, BOLTS, NUTS, & WASHERS SHALL BE HOT DIPPED GALVANIZED.
2. TIMBER RAILS SHALL BE PRESSURE TREATED SELECT SOUTHERN YELLOW PINE NO. 1 OR DOUGLAS FIR
3. ALL HARDWARE, INCLUDING PLATES, SCREWS, CARRIAGE BOLTS, NUTS, WASHERS, AND TECO SHEAR RINGS SHALL BE INCLUDED IN THE APPLICABLE LUMP SUM BID ITEM.
4. TIMBER DIMENSIONS ARE NOMINAL. USE ACTUAL DIMENSIONS IN THE FIELD.

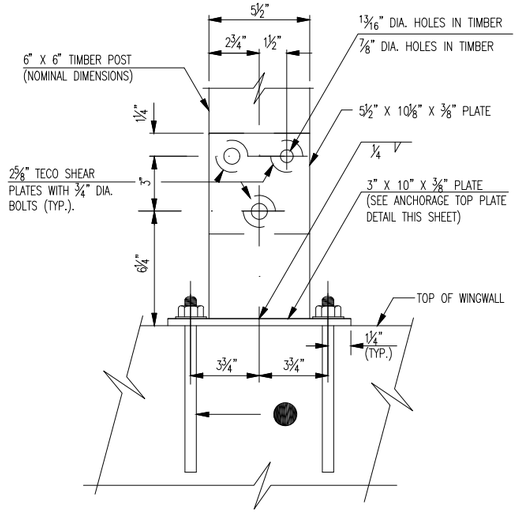
⬤ ⅝" X 9" LONG THREADED ROD TO BE PAID FOR UNDER THE APPROPRIATE BID ITEM. THE ANCHOR SHALL HAVE AN ULTIMATE PULLOUT CAPACITY OF 20 KIPS AND BE DRILLED OR EMBEDDED A MINIMUM OF 7" INTO CONCRETE WITH EPOXY.



ANCHORAGE TOP PLATE DETAIL



SIDE ELEVATION RAIL ANCHORAGE



FRONT ELEVATION RAIL ANCHORAGE

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

PEDESTRIAN BRIDGE TIMBER RAIL DETAILS

DRAWING NO.	PB-3
SHEET NO.	72
DATE	December 30, 2025
PROJ NO.	193806812
FILE	BR01.dwg

Plot Date: 12/30/2025 - 12:39pm
Plotted By: Mieracki, Mike
Xref: Border: I:\193806812_ENG\CAD\Dwg\Sheets\BR01.dwg

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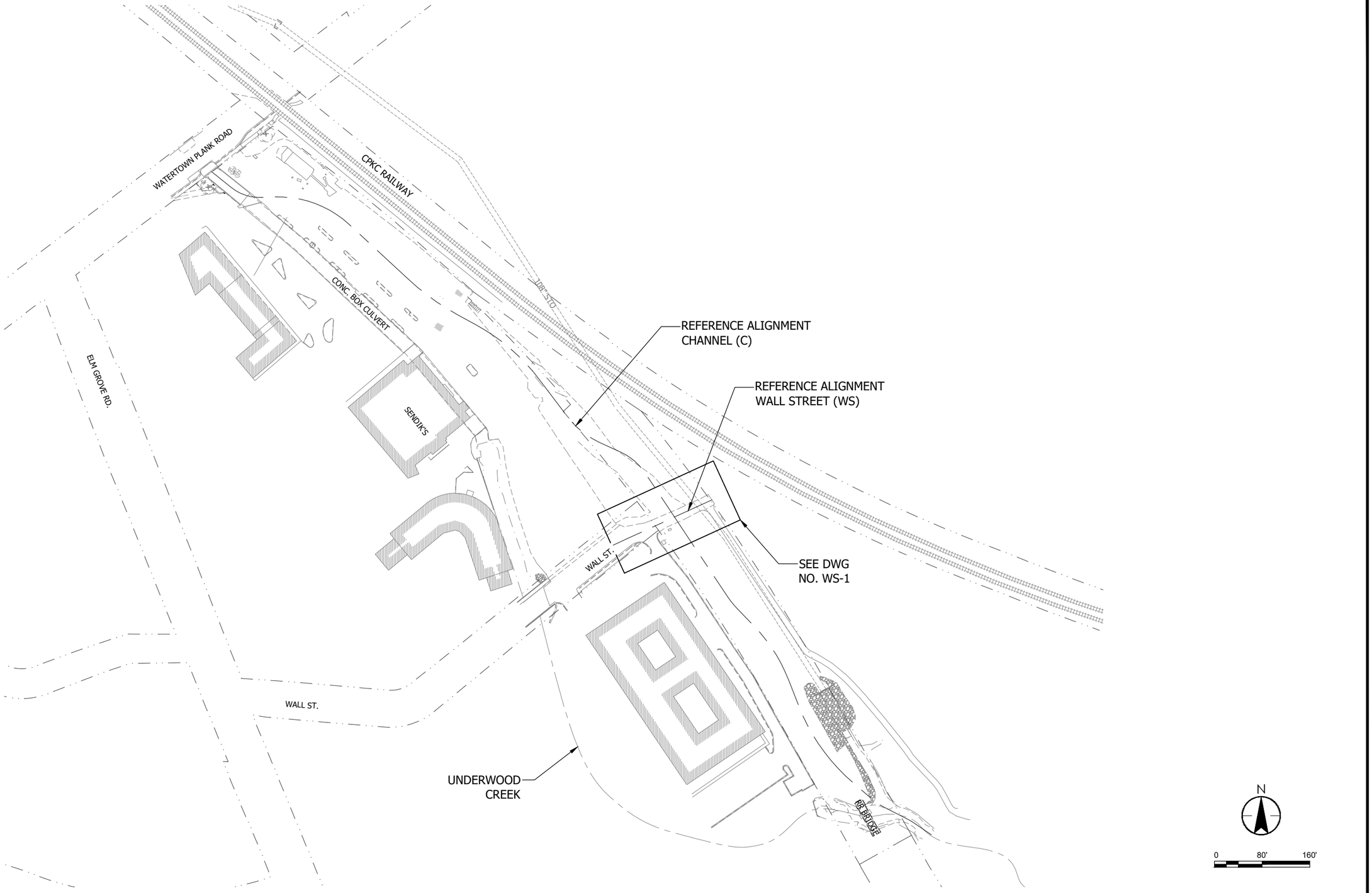

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WALL STREET CROSSING SHEET INDEX

DRAWING NO.	WS-0
SHEET NO.	73
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_WS.dwg

Plot Date: 12/30/2025 - 8:28pm
Plotted By: Andrew.Rock
Xrefs: Border: 193806812_2kNO; 193806812_2SXT; 193806812_2SNo; 193806812_2XP1

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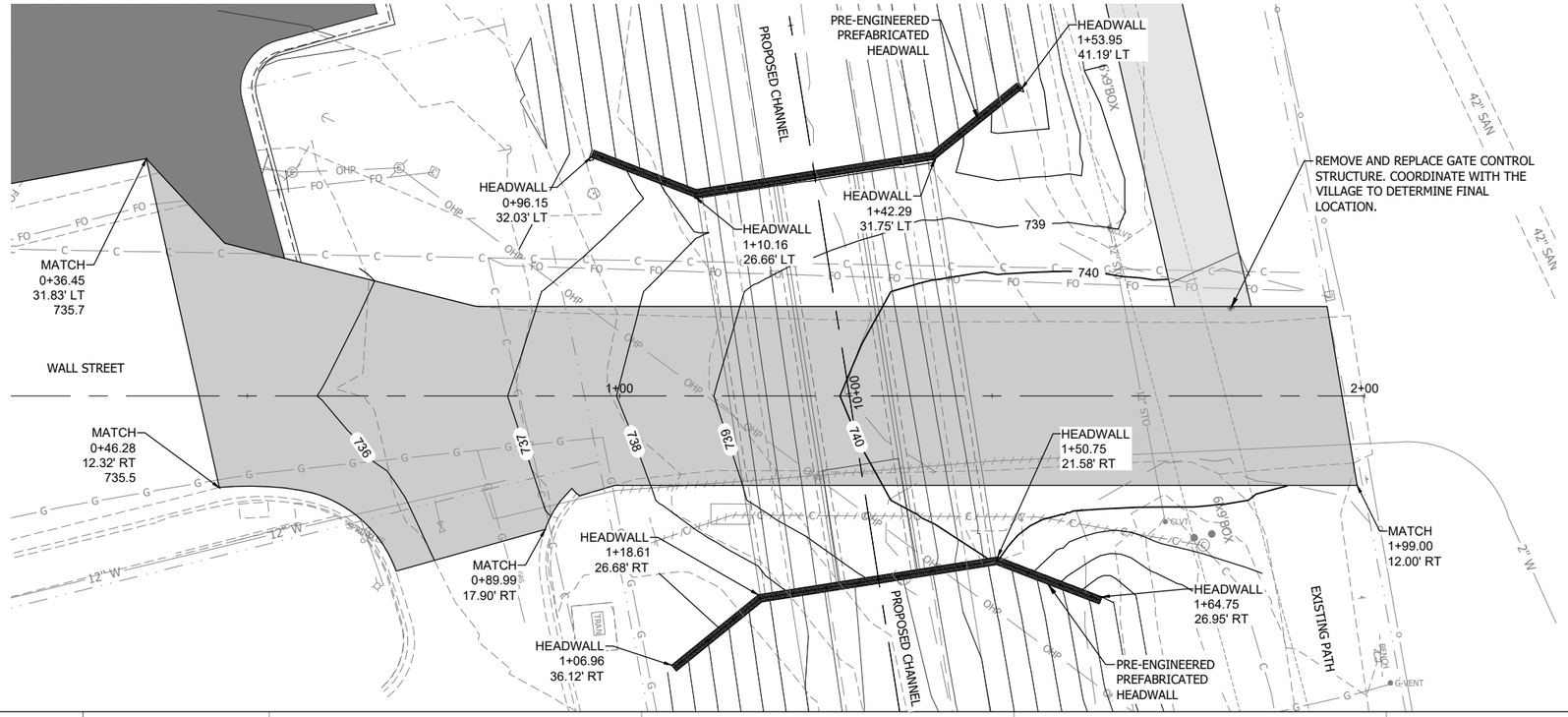


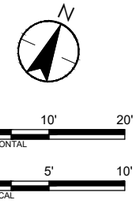
DESIGN DATA

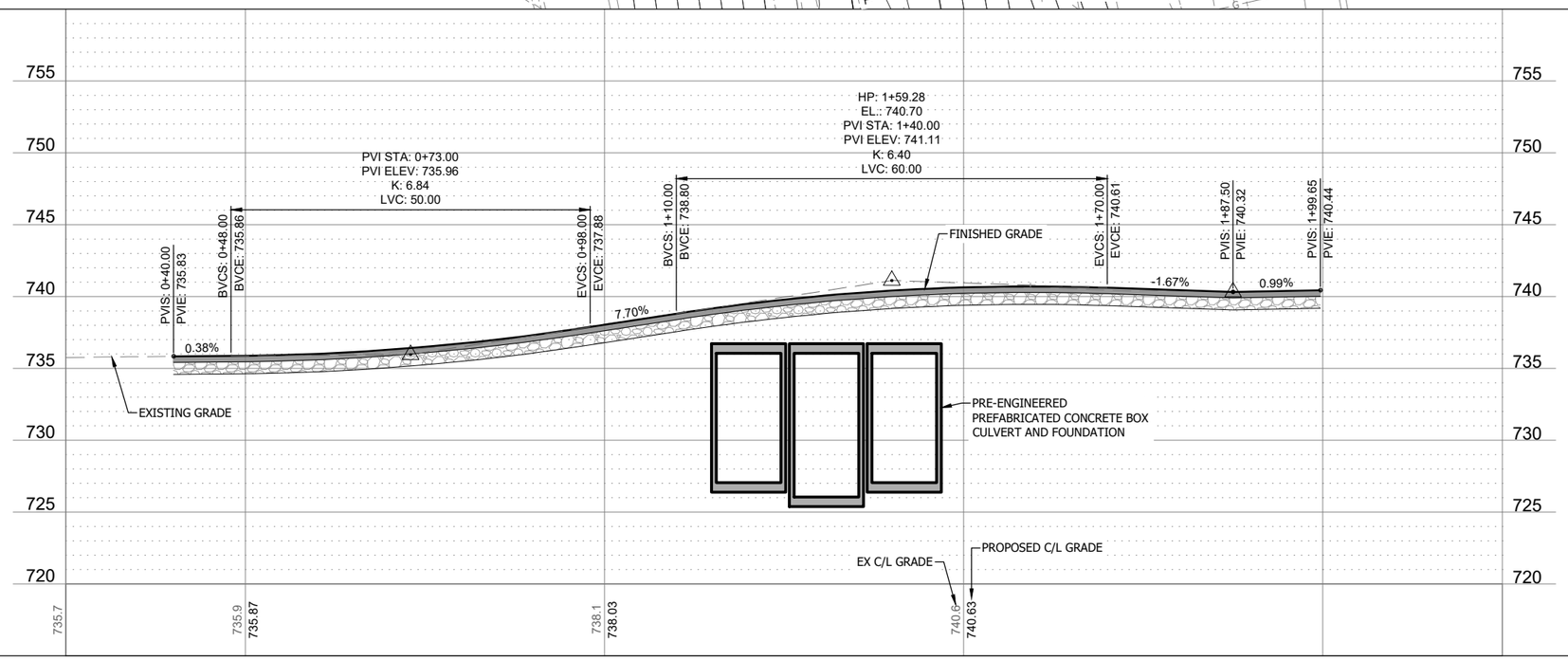
Wall Backfill Material	Soil Unit Weight (pcf)		Soil Internal Friction Angle (deg.)	Active Earth Pressure Coefficient, K_a	At-Rest Earth Pressure Coefficient, K_o	Passive Earth Pressure Coefficient, K_p
	Above Groundwater	Below Groundwater				
Cohesive	120	130	30	0.33	0.50	3.00
Cohesive	125	135	32	0.31	0.47	3.25

Soil Bearing Capacity (elev. 723): 3,500 psf

Design Loading: HL-93

Speed Limit: 25 MPH





FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WALL STREET CROSSING PLAN AND PROFILE

DRAWING NO.	WS-1
SHEET NO.	74
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_WS.dwg

Plot Date: 12/20/2025 - 12:40pm
Plotted by: Andrew.Rock
Xrefs: Border: I:\938\6812_ADMO\...\193806812_DSIT_193806812_ASNU\...\193806812_XSPL

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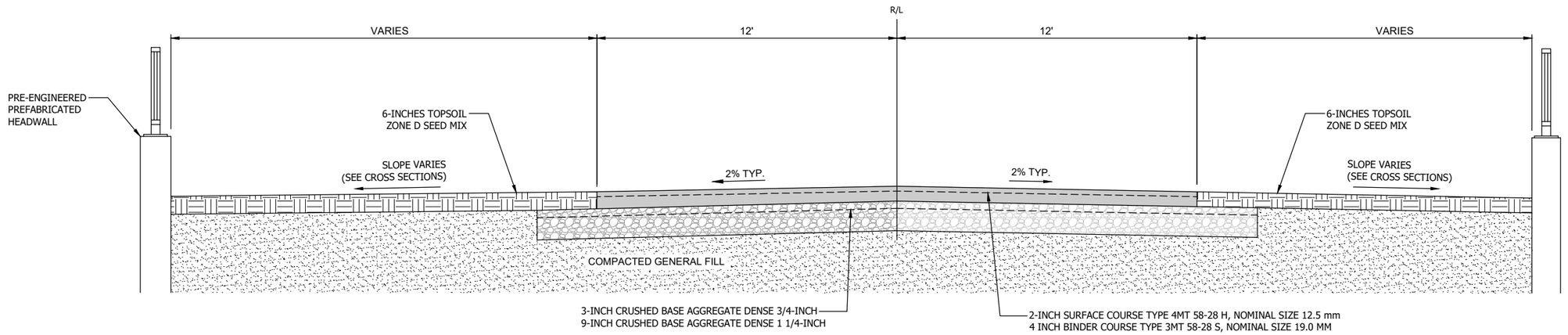


WALL STREET TYPICAL SECTION

NOT TO SCALE

1
WS-1

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

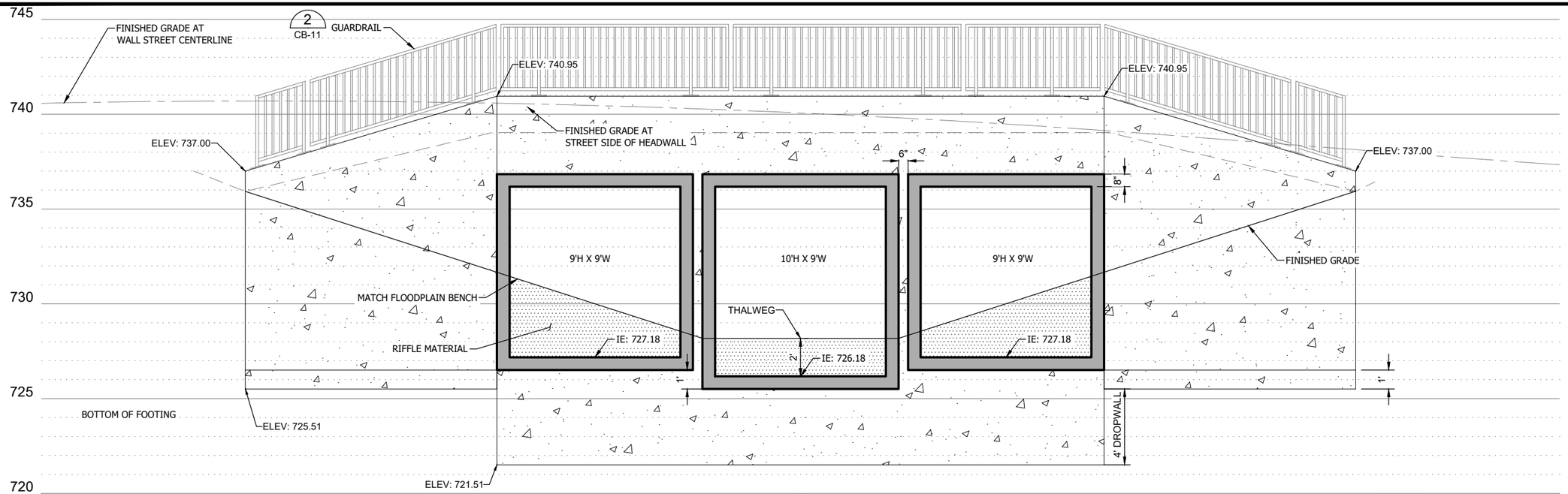
UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WALL STREET CROSSING TYPICAL SECTION

DRAWING NO.	WS-2
SHEET NO.	75
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_WS.dwg

Plot Date: 12/30/2025 - 8:28cm
Plotted by: Mieracki, Matthew
Xrefs: Borders 193806812_ANO, 193806812_JSXT, 193806812_JSNU, 193806812_JSPL

THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING - ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO STANTEC IMMEDIATELY. ALL REPRODUCTIONS, COPIES OR USES OF THIS DRAWING BY ANY MEANS WHATSOEVER, EXCEPT THOSE EXPRESLY AUTHORIZED BY THE CONTRACT, ARE FORBIDDEN. THE COPYRIGHTS TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF STANTEC. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY STANTEC IS FORBIDDEN.

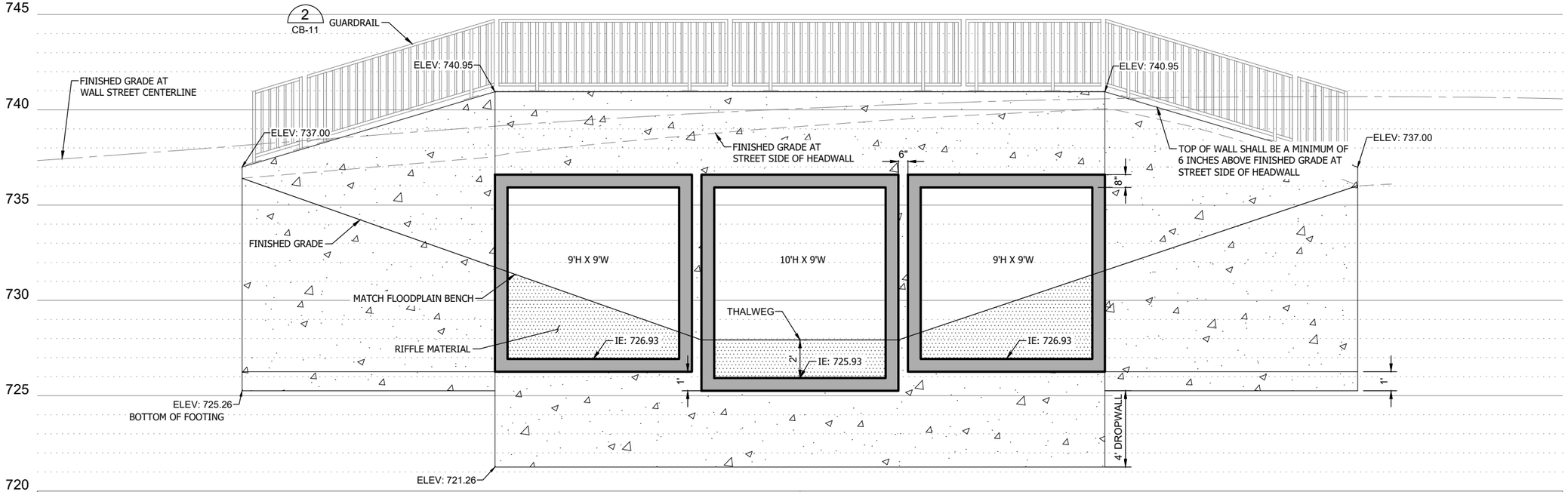


BOX CULVERT ELEVATION VIEW (UPSTREAM) STA. 9+69.74

NTS

A
CH-2

NOTES:
1. BACKFILL BETWEEN BOX CULVERT SECTIONS SHALL BE LOW DENSITY CONCRETE CONFORMING TO SECTION 03 34 00 OF THE SPECIFICATIONS.



BOX CULVERT ELEVATION VIEW (DOWNSTREAM) STA. 10+25.74

NTS

B
CH-2

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

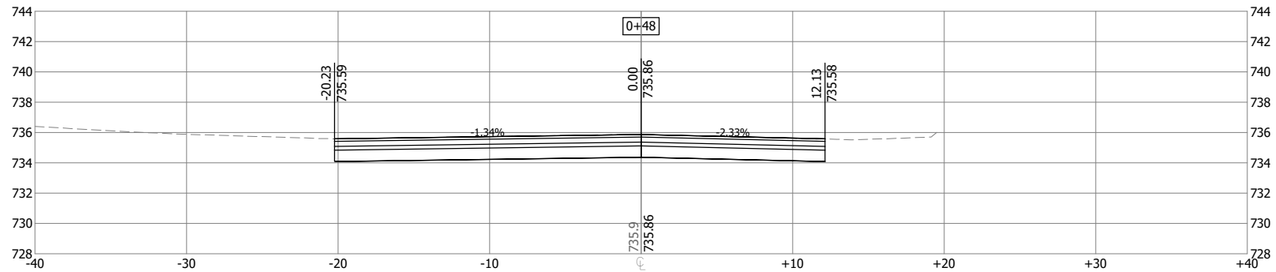
UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

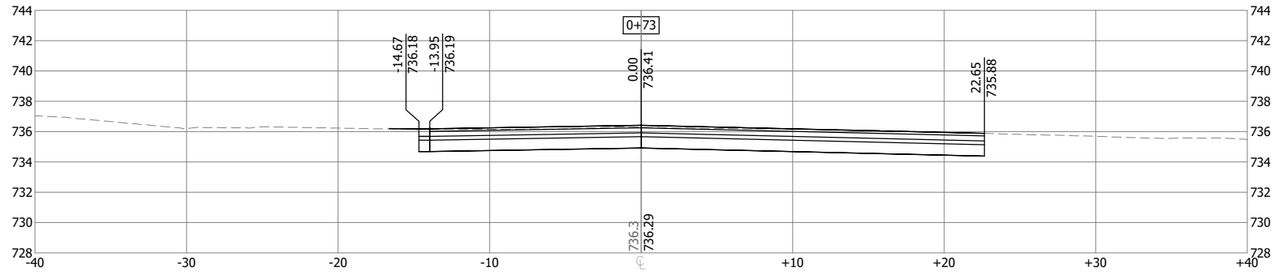
BOX CULVERT HEADWALL VIEWS

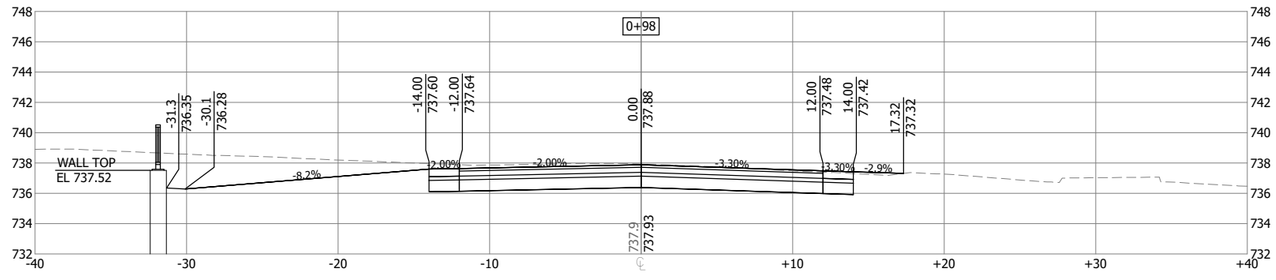
DRAWING NO.	WS-3
SHEET NO.	76
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_CA.dwg

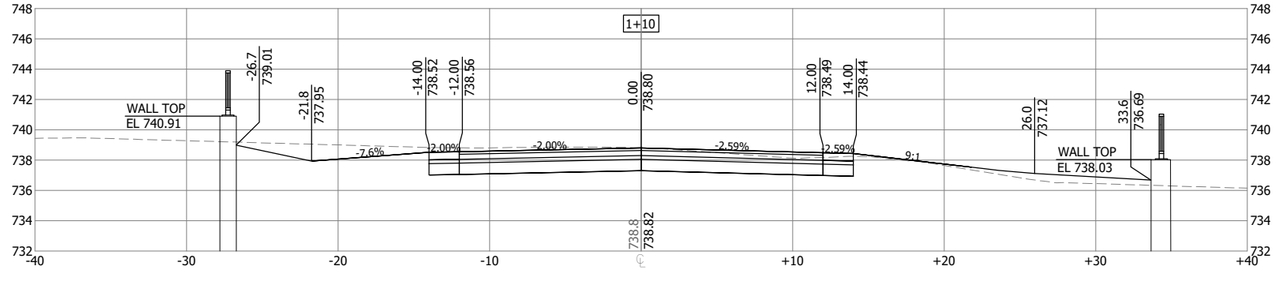
Plot Date: 12/30/2025 - 8:28pm
Plotted by: Amber Schroeder
Xrefs Bonded: I:\193806812\ASHO_193806812_ASHD_CivilSheets\193806812_CA.dwg
I:\193806812_ASHO_193806812_ASHD_CivilSheets\193806812_ASHT_193806812_ASNU_193806812_ASPL

THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING - ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO STANTEC IMMEDIATELY. THE CONTRACTOR IS TO NOTIFY STANTEC AT LEAST 48 HOURS IN ADVANCE OF WORK BEING READY FOR REVIEW. THE COPYRIGHTS TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF STANTEC. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY STANTEC IS FORBIDDEN.









0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WALL STREET CROSSING CROSS SECTIONS

DRAWING NO.	WS-CS1
SHEET NO.	77
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_WS-CS.dwg

Plot Date: 12/30/2025 - 8:28pm
Plotted by: Dominic Lombardi
Xrefs: Border: I:\938\812_JEFL_I\938\812_JUNO

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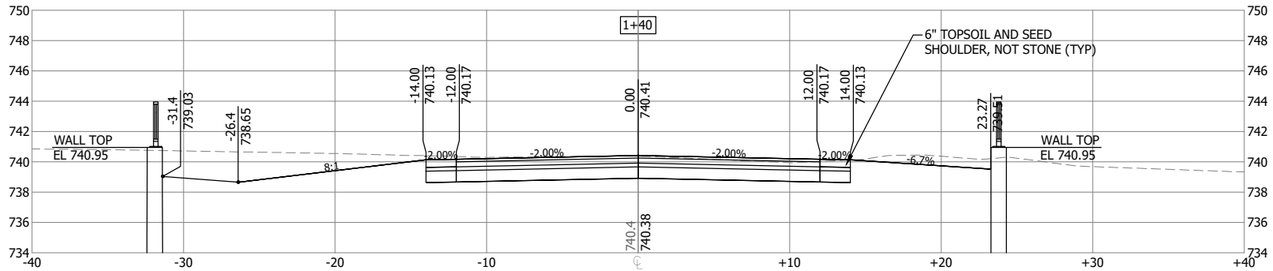

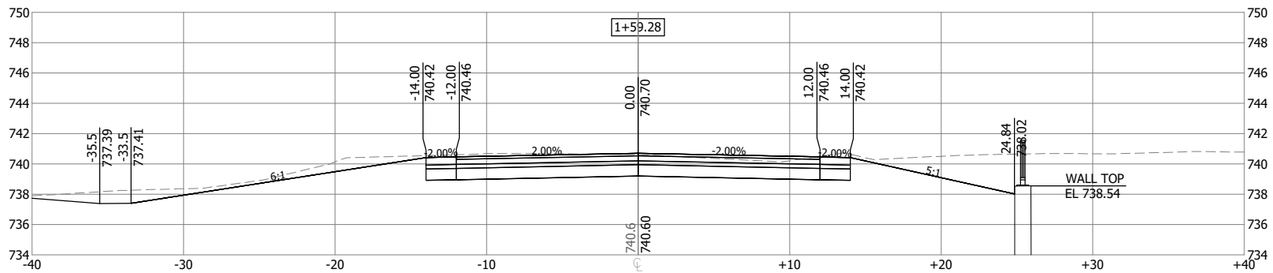

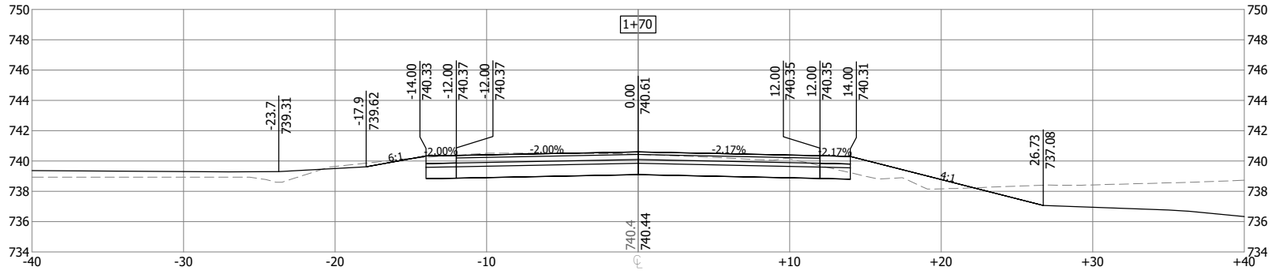

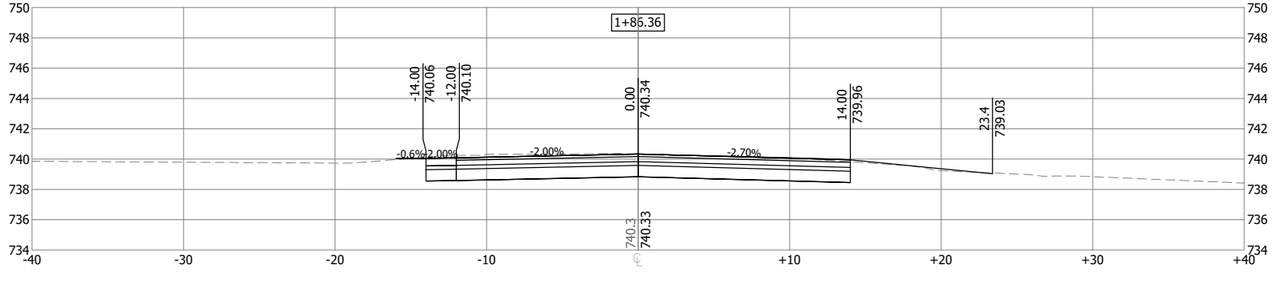

0 5' 10' VERTICAL
0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

WALL STREET CROSSING CROSS SECTIONS

DRAWING NO.	WS-CS2
SHEET NO.	78
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_WS-CS.dwg

Plot Date: 12/30/2025 - 8:28pm
Plotted by: Brandon.Jones
Xrefs: Border: I:\938\06812_JEFL_I\938\06812_JUND

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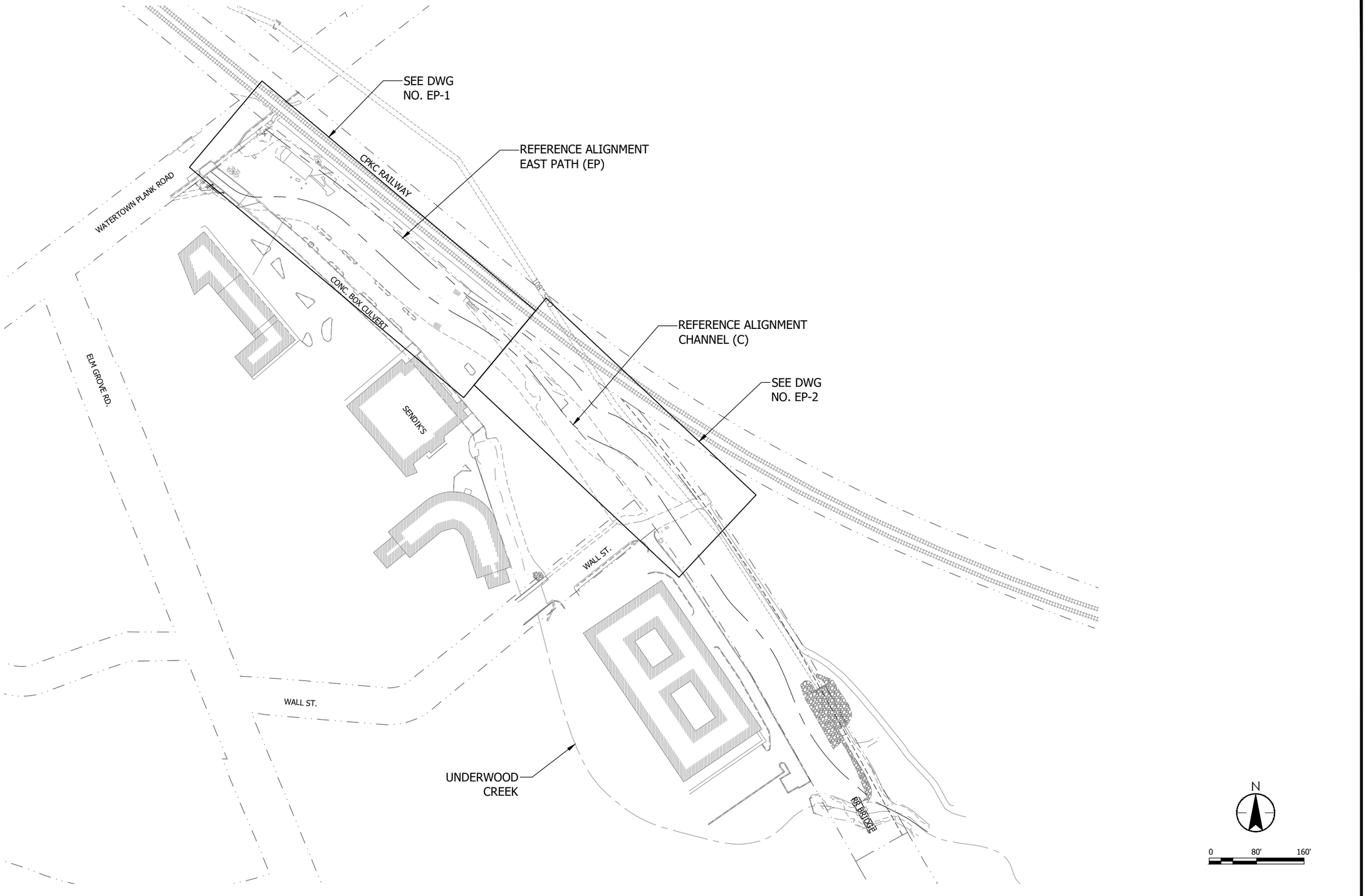

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST PATH SHEET INDEX

DRAWING NO.	EP-0
SHEET NO.	79
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_EP.dwg

Plot Date: 12/30/2025 - 8:28pm
Plotted by: Mieracki, Matthew
Xrefs: Border: I:\193806812\CAD\Dwg\Sheets\193806812_EP.dwg
193806812_XSH1: I:\193806812\CAD\Dwg\Sheets\193806812_XSH1.dwg
193806812_XSN1: I:\193806812\CAD\Dwg\Sheets\193806812_XSN1.dwg
193806812_XSNO: I:\193806812\CAD\Dwg\Sheets\193806812_XSNO.dwg

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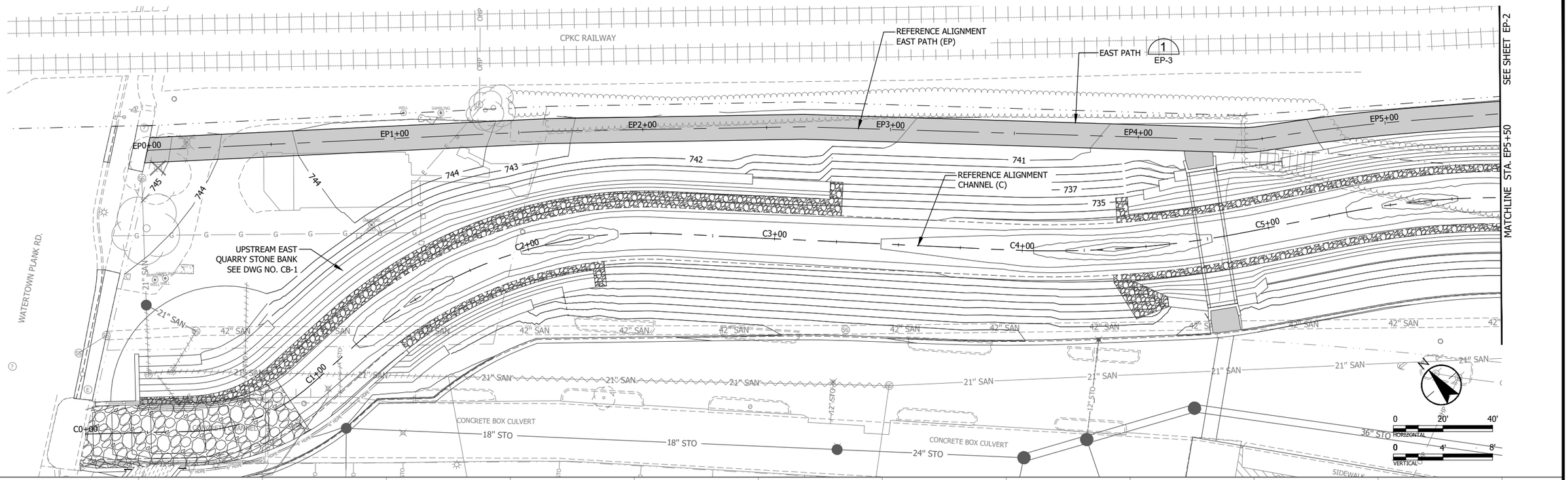

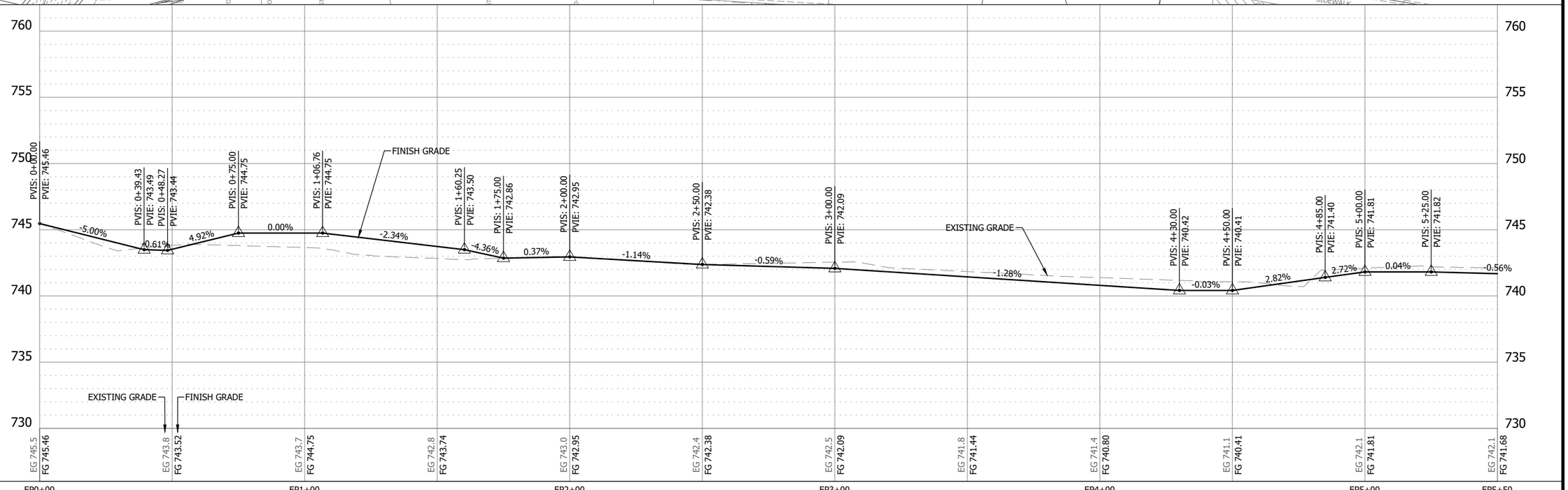

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST PATH PLAN & PROFILE

DRAWING NO.	EP-1
SHEET NO.	80
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_EP.dwg

Plot Date: 12/30/2025 - 8:28am
Plotted By: Stephen.Lee
Xrefs: Bonded: I:\193806812_XSIT\ I:\193806812_XSNU\ I:\193806812_XDR\ I:\193806812_XSNO

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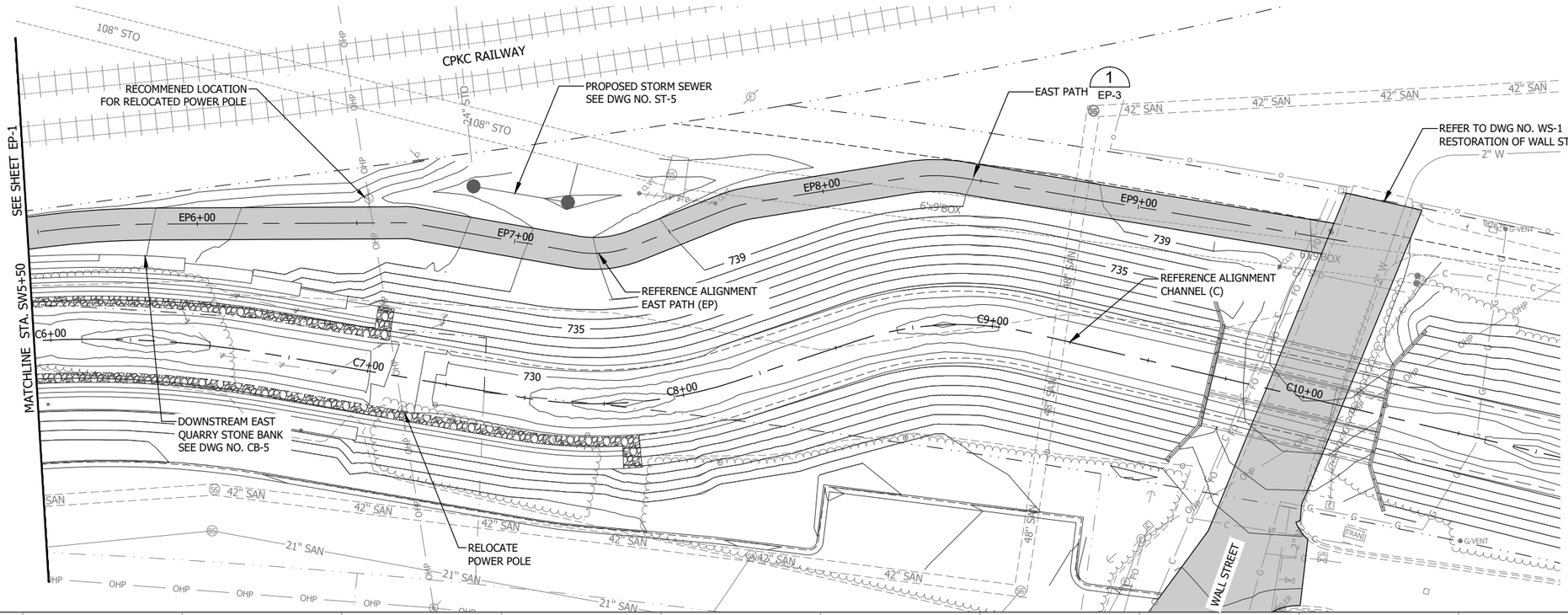

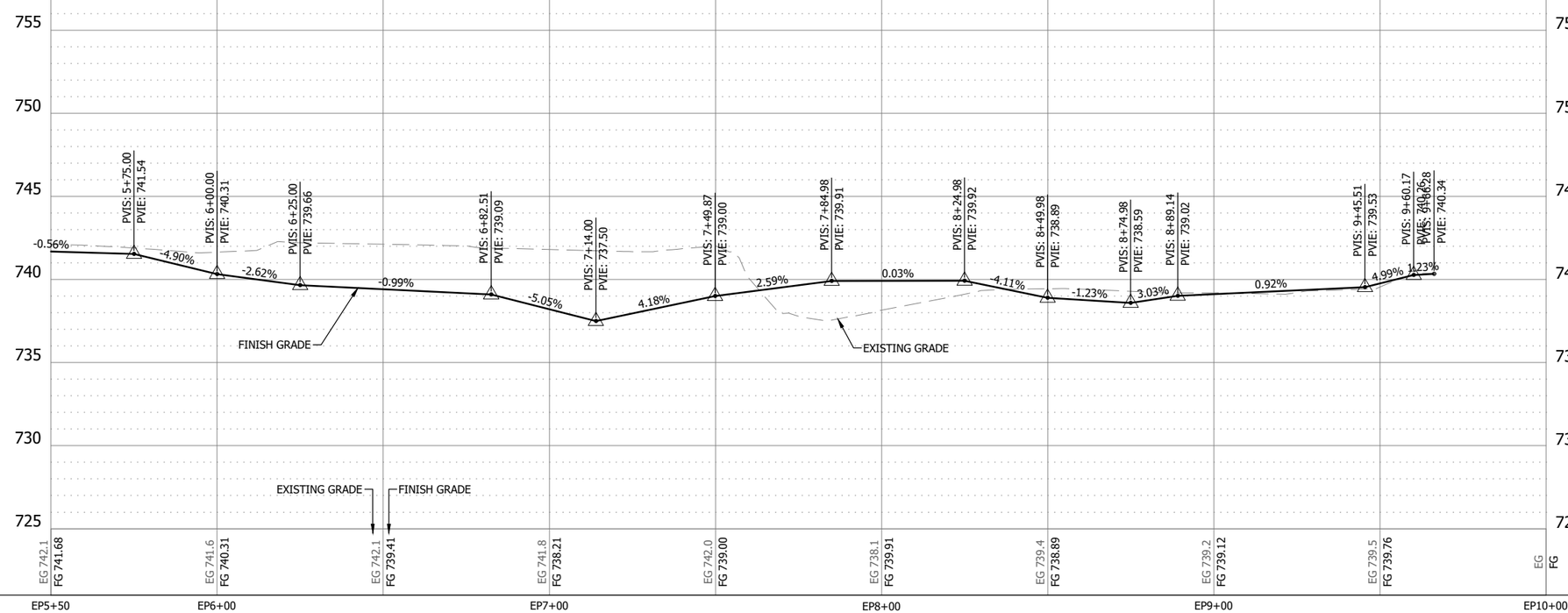

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST PATH PLAN & PROFILE

DRAWING NO.	EP-2
SHEET NO.	81
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_EP.dwg

Plot Date: 12/30/2025 - 8:29pm
User Name: Brandon.Bonsen
Xrefs: Borders 193806812_XM1, 193806812_XNU, 193806812_XAP, 193806812_XSNO

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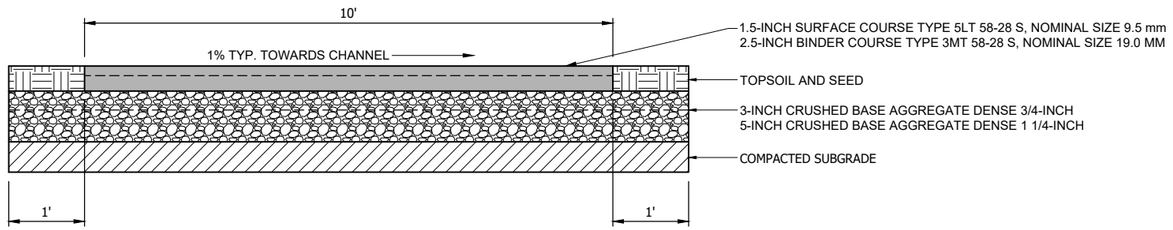

EAST PATH TYPICAL SECTION

SCALE: NTS

1
EP-1
EP-2

Plot Date: 12/30/2025 - 8:29pm
Plotted by: Mark Sieracki
Xrefs: Borders 193806812_XAT1 193806812_XNU 193806812_XPL 193806812_XSNO

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST PATH TYPICAL SECTION

DRAWING NO.	EP-3
SHEET NO.	82
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_EP.dwg

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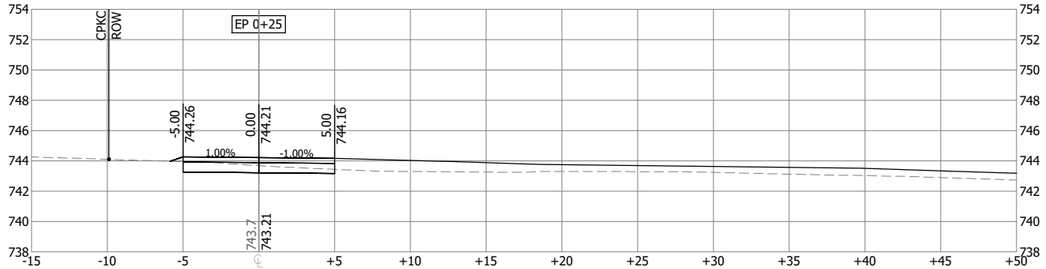

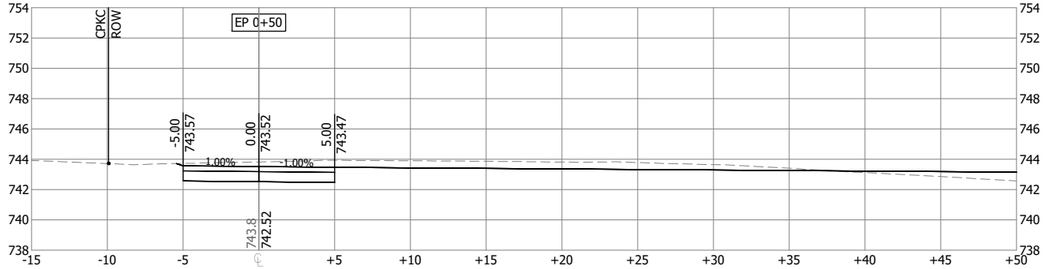

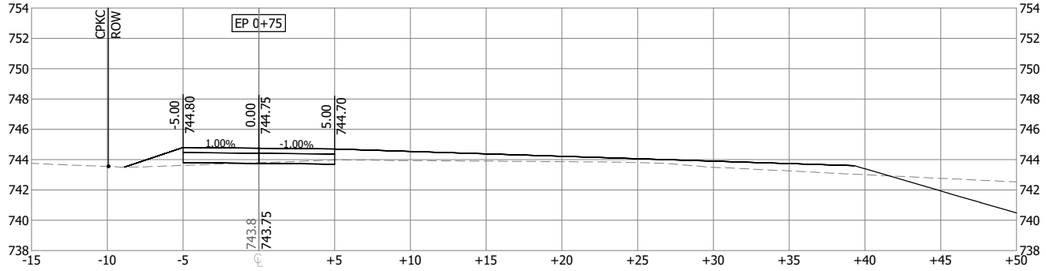

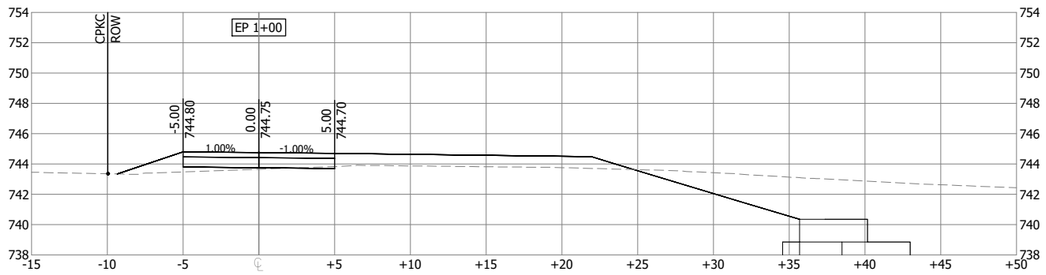

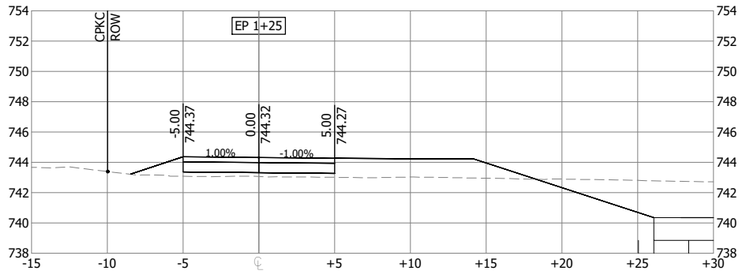

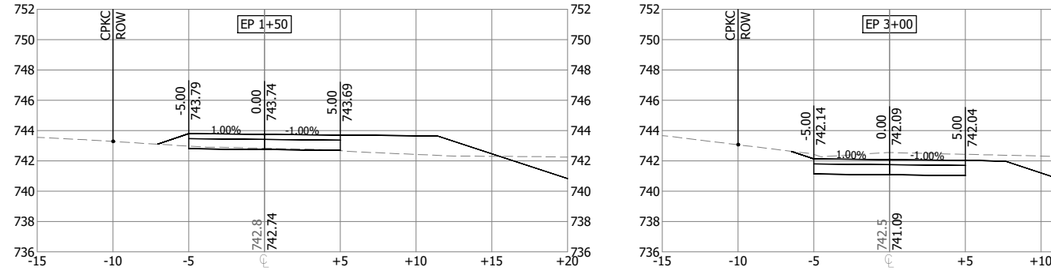

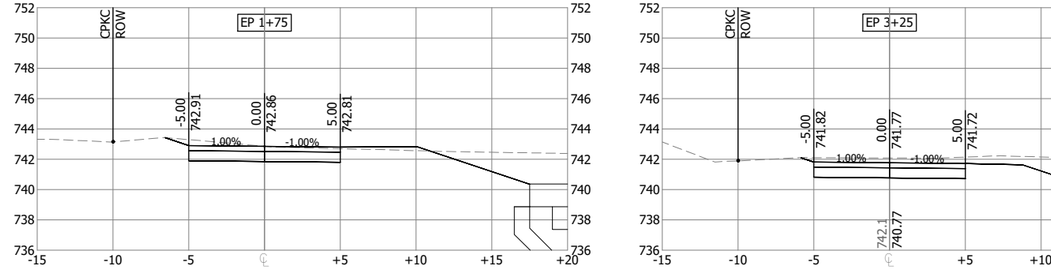

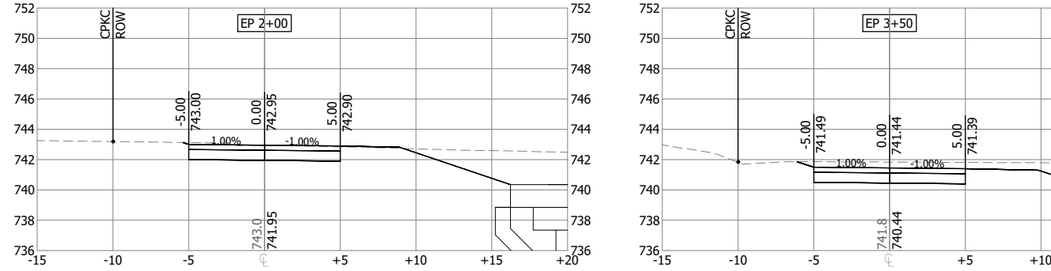

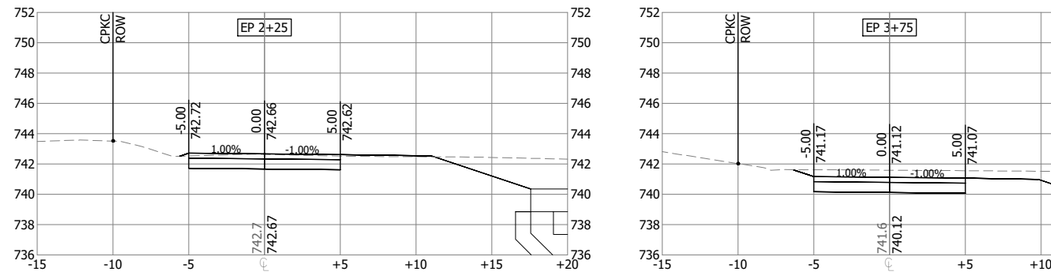

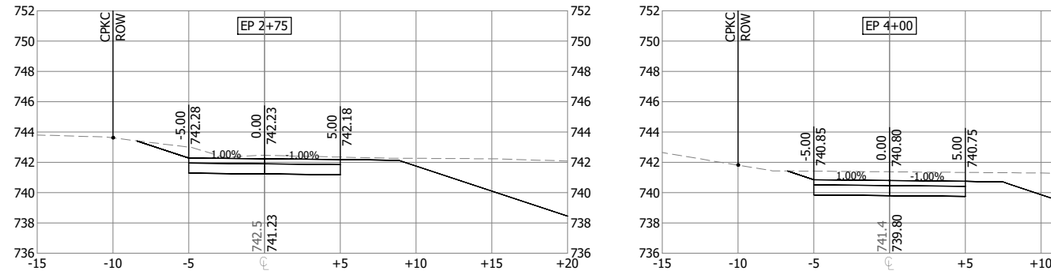

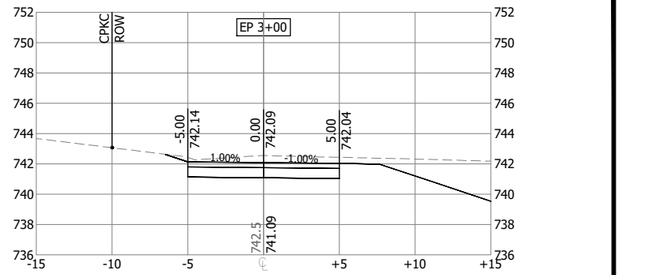

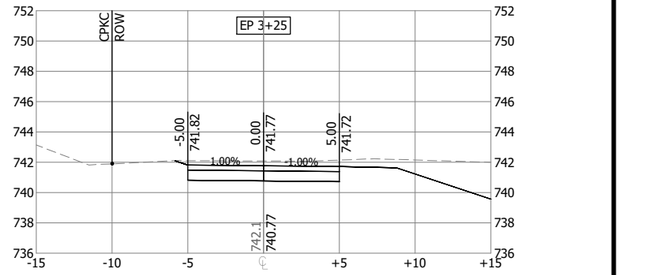

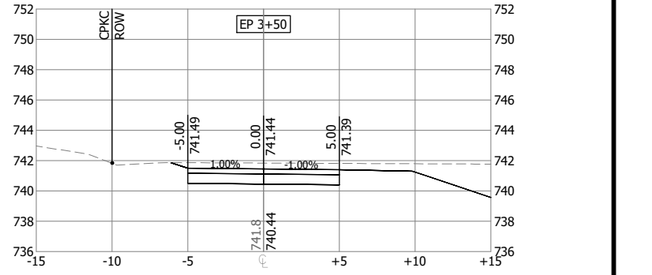

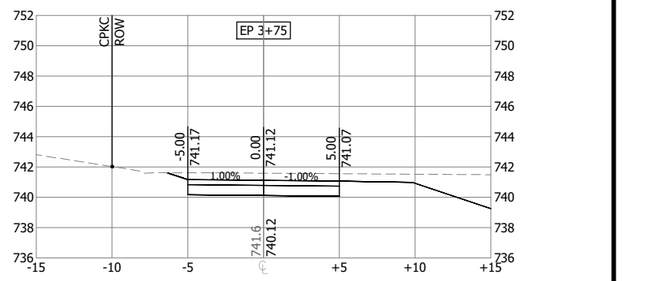

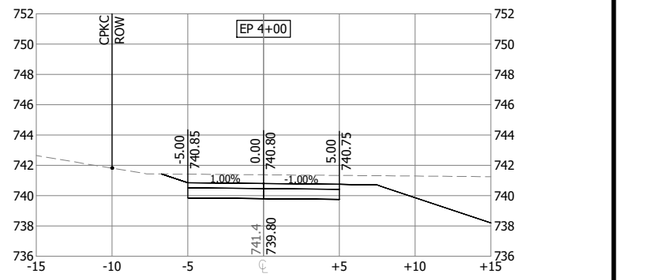

0 5' 10' VERTICAL
0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST PATH CROSS SECTIONS

DRAWING NO.	EP-CS1
SHEET NO.	83
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_EP-CS.dwg

Plot Date: 12/30/2025 - 8:29mm
Drawing Name: C:\Users\mike.rock\Stantec\Documents - Underwood Creek\Civil\CAD\Dwg\Sheets\193806812_EP-CS.dwg
Xrefs: Border: 193806812_JSR, 193806812_ANO: 193806812_JSVT

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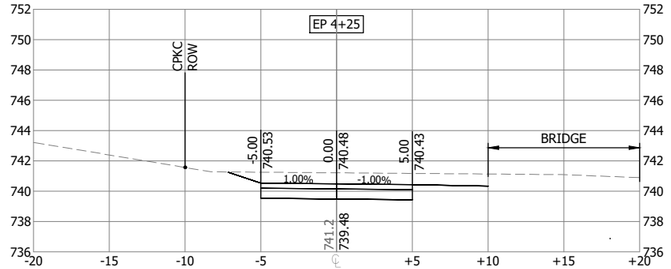

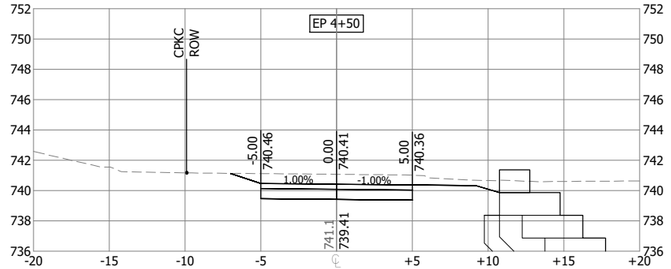

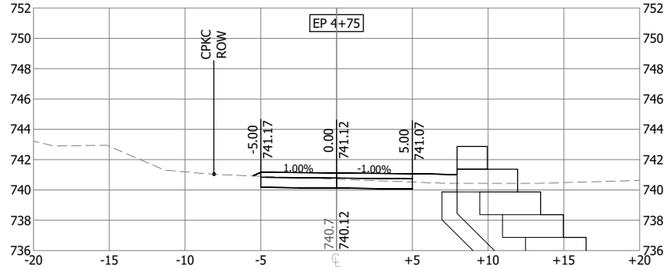

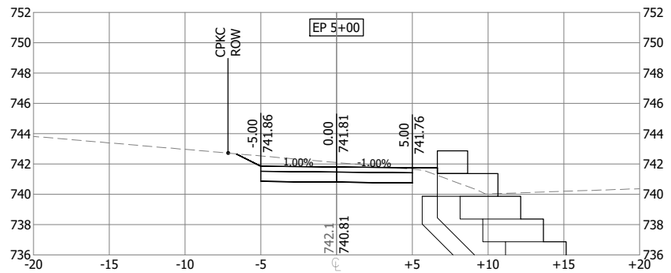

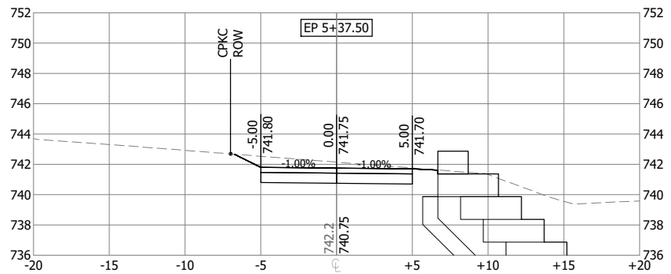

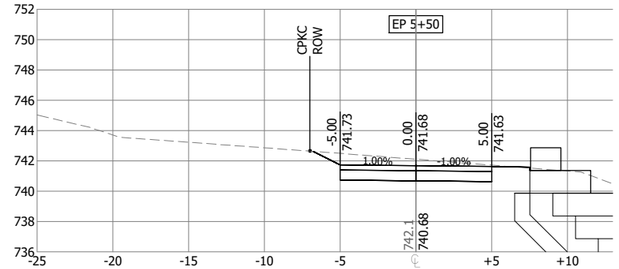

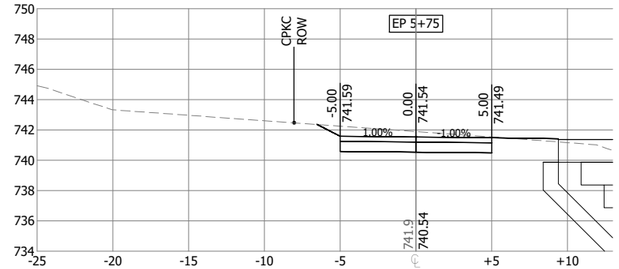

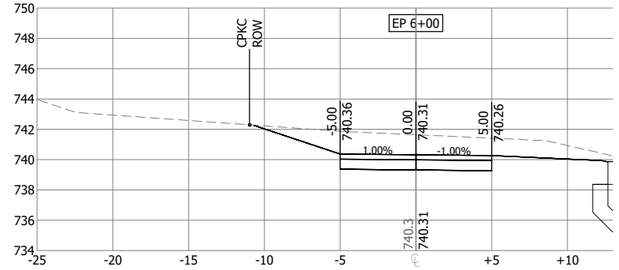

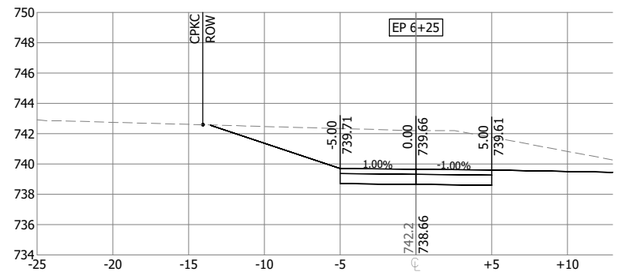

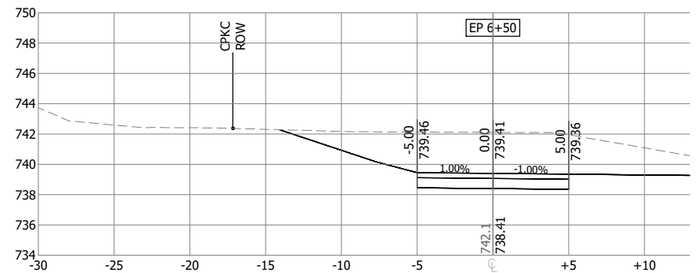

0 5' 10' VERTICAL

0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST PATH CROSS SECTIONS

DRAWING NO.	EP-CS2
SHEET NO.	84
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_EP-CS.dwg

Plot Date: 12/30/2025 - 8:29nm
Drawing Path: C:\Users\...\193806812_EP-CS.dwg
Xrefs: Border: 193806812_XP1, 193806812_ANO: 193806812_ANT

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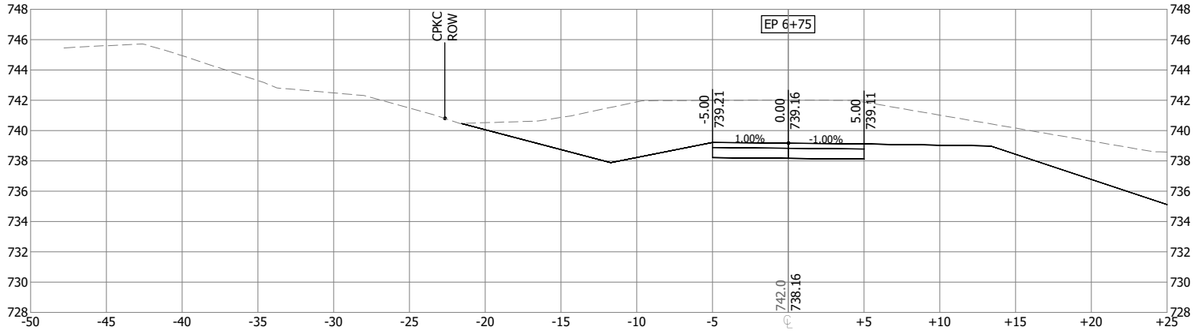

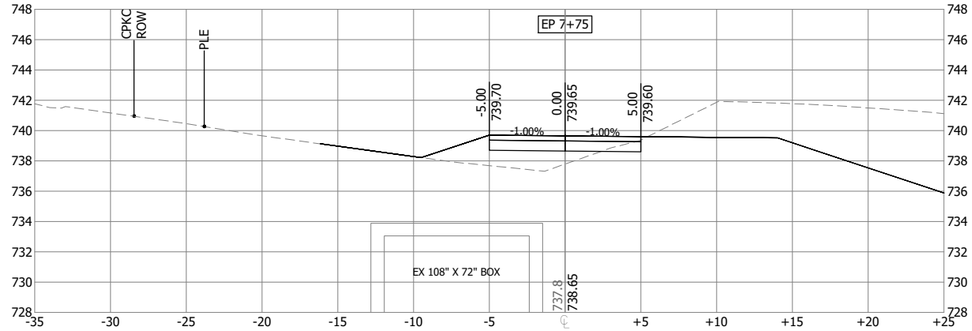

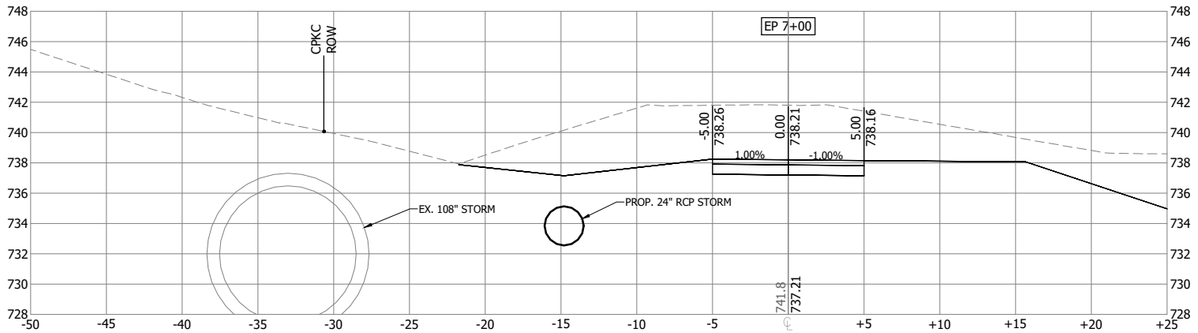

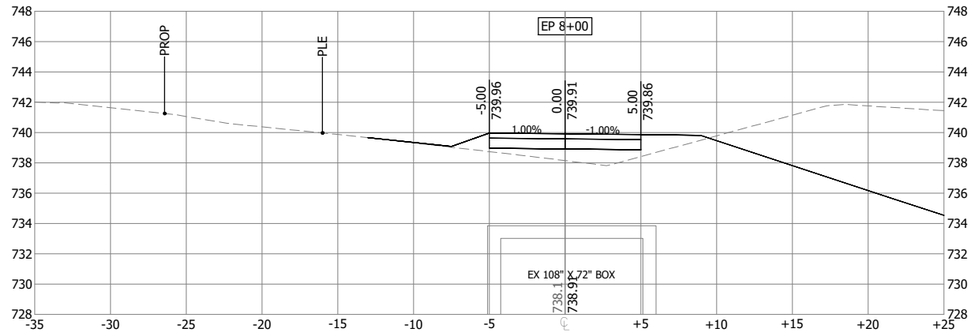

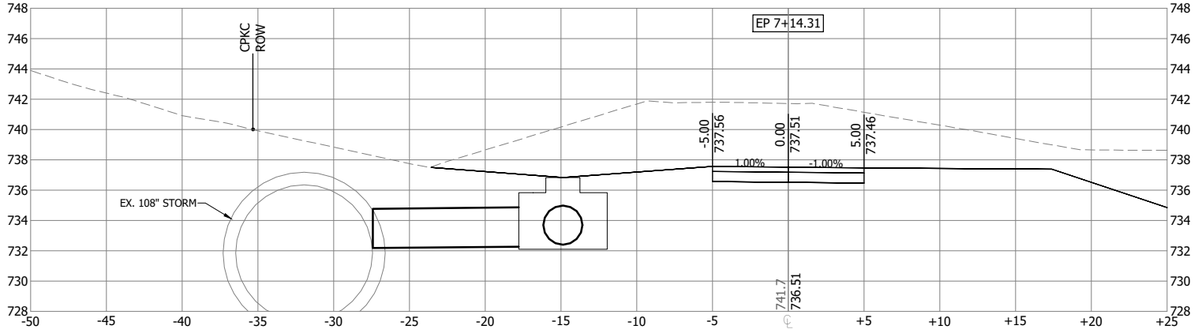

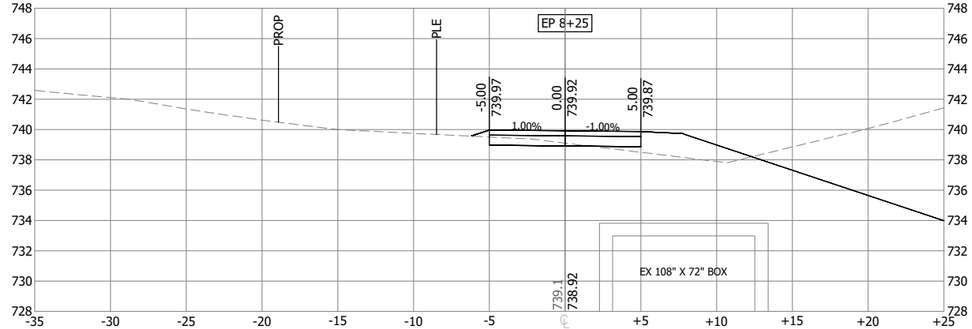

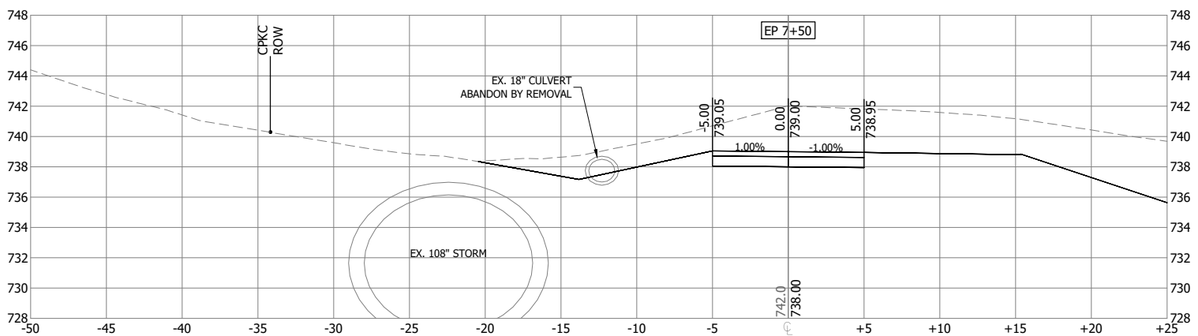

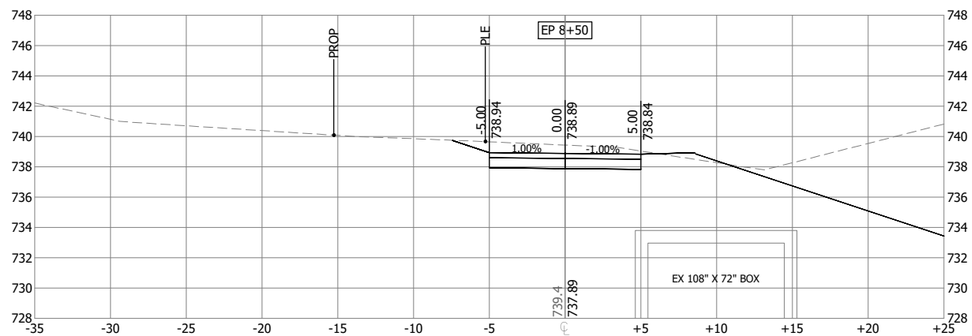

0 5' 10' VERTICAL
0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST PATH CROSS SECTIONS

DRAWING NO.	EP-CS3
SHEET NO.	85
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_EP-CS.dwg

Plot Date: 12/30/2025 - 8:29pm
Plotted by: Andrew.Rock
Xrefs: Bonded: I:\193806812_XBP\ | Attached: I:\193806812_XNO\193806812_XSM.dwg

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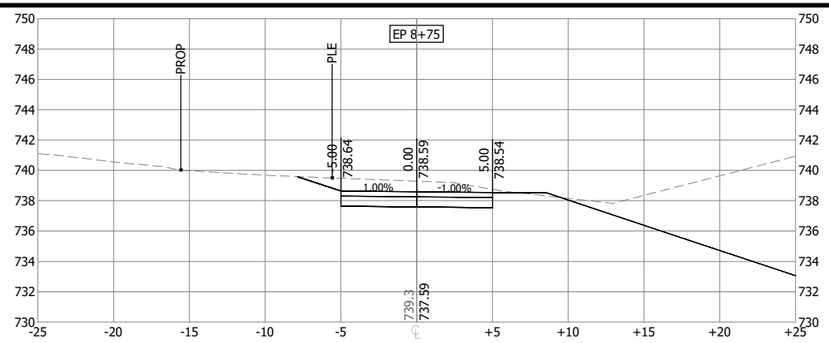

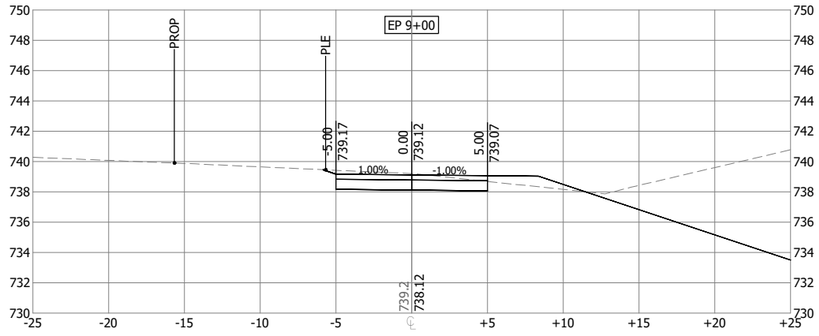

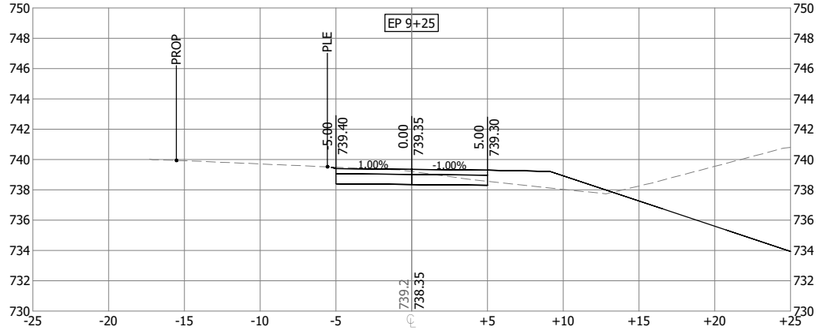

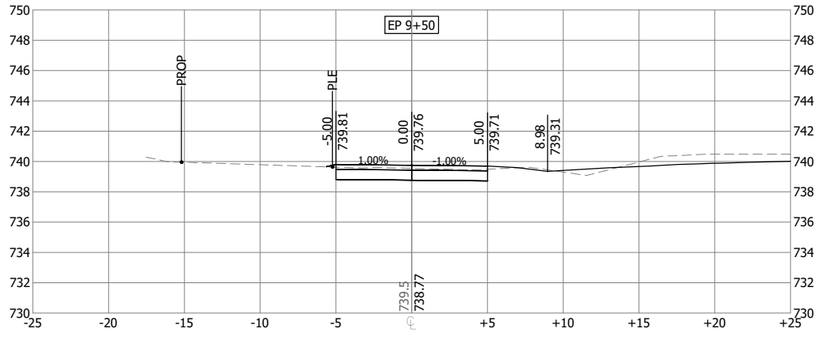

0 5' 10' VERTICAL
0 5' 10' HORIZONTAL

FOR BIDDING AND CONSTRUCTION

DESIGNER M. SIERACKI
DRAWN BY A. ROCK
CHECKER D. AMUNDSEN
APPROVED R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

EAST PATH CROSS SECTIONS

DRAWING NO.	EP-CS4
SHEET NO.	86
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_EP-CS.dwg

Plot Date: 12/30/2025 - 8:20am
Plotted by: Mieracki, Mark
Drawing Name: N:\193806812-CAD-Dyn\Sheets\193806812_EP-CS.dwg
Xrefs Bound: 193806812_ASPL 193806812_ASNO 193806812_XSXT

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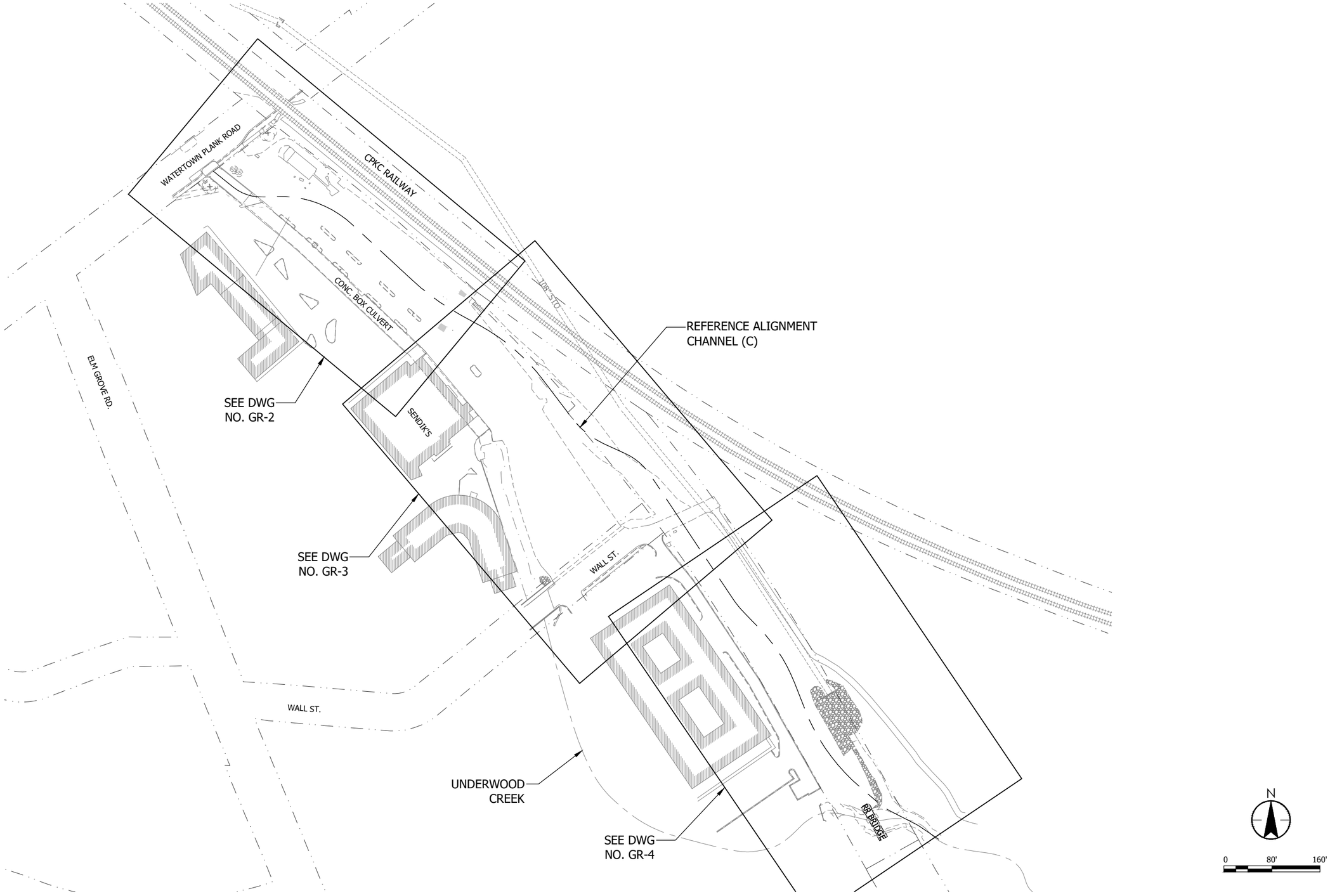

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

GRADING PLAN SHEET INDEX

DRAWING NO.	GR-0
SHEET NO.	87
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_GR.dwg

Plot Date: 12/30/2025 - 8:29pm
Plotted by: Mieracki, Matthew
Xrefs: Border: I:\193806812_XSHT; I:\193806812_XSNU; I:\193806812_XSPL; I:\193806812_XSNO; I:\193806812_XSXZ; I:\193806812_XSRD; volume; Environmental Borings

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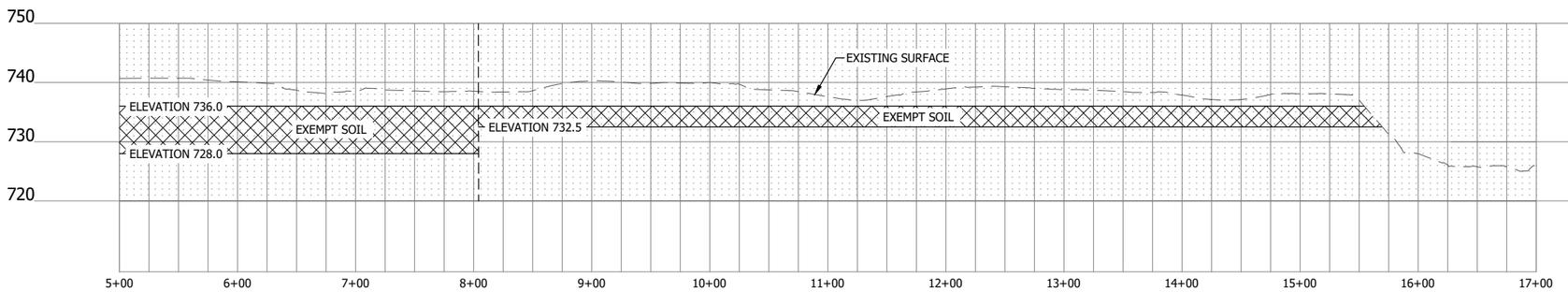
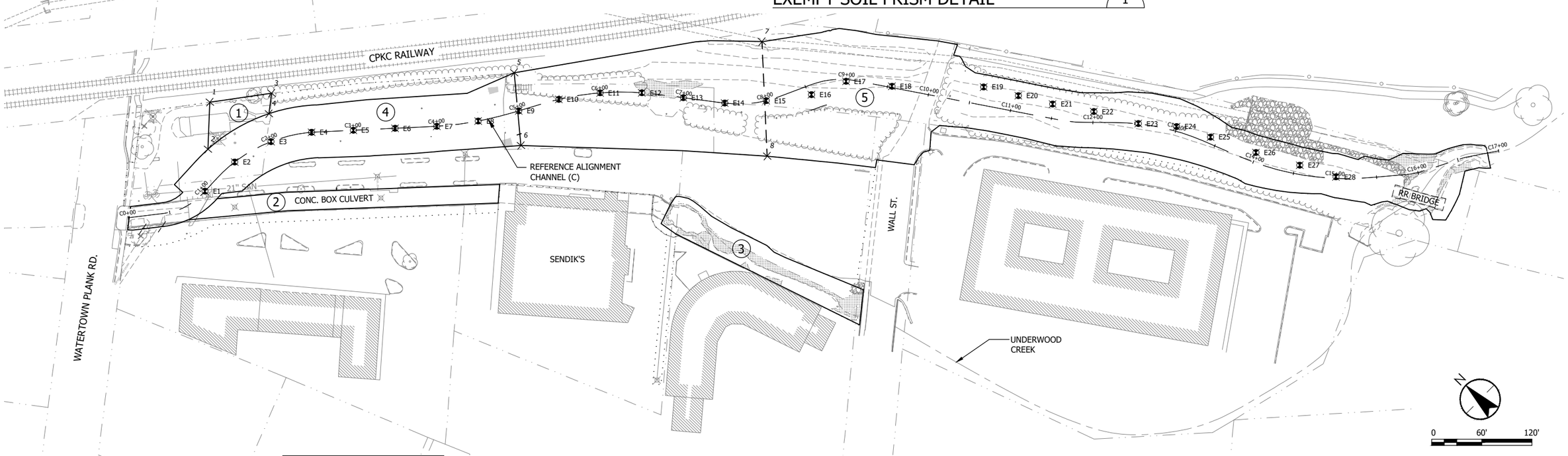


EXEMPT SOIL PRISM DETAIL 1



SMU COORDINATE TABLE		
POINT NUMBER	NORTHING	EASTING
1	85991.45	82056.97
2	85953.52	82015.25
3	85946.27	82116.39
4	85931.45	82096.74
5	85756.55	82337.70
6	85689.77	82281.33
7	85571.43	82572.22
8	85470.85	82478.97

NOTES:
1. THE PROJECT SITE HAS FIVE SOIL MANAGEMENT UNITS (SMUs) (SMU-1 THROUGH SMU-5) WHOSE BOUNDARIES ARE DEFINED BY THE GRADING LIMITS OR BY THE COORDINATES PROVIDED IN THE SMU COORDINATE TABLE. SOIL MOVEMENT SHALL GENERALLY ADHERE TO THE CONSTRAINTS DESCRIBED FOR THE APPROPRIATE SMU.
2. EXEMPT SOIL IS CONSIDERED TO BE NOT CONTAMINATED. EXEMPT SOIL MAY BE USED ON-SITE AS FILL WHERE IT MEETS THE SPECIFIED GEOTECHNICAL CHARACTERISTICS FOR GENERAL FILL, STRUCTURAL FILL, OR IMPERVIOUS FILL, OR DISPOSED OF OFF-SITE AT CONTRACTOR'S OPTION.
3. ALL EXCAVATION NOT WITHIN THE EXEMPT SOIL PRISM, AS SHOWN IN DETAIL 1 ON THIS SHEET, IS CONSIDERED NON-EXEMPT. NON-EXEMPT SOIL IS CONSIDERED TO BE CONTAMINATED AND MUST BE DISPOSED OF AT A SUBTITLE D LANDFILL.
4. FILL VOLUMES SHOWN IN THE TABLE ONLY INCLUDE VOLUMES NEEDED FOR ABANDONMENT OF EXISTING STREAM STRUCTURES AND IMPERVIOUS MATERIAL FOR THE SOIL CAP, AND DO NOT INCLUDE BACKFILL FOR NEW STRUCTURES, TOPSOIL, OR CHANNEL BED AND BANK MATERIALS.
5. LANDFILL WASTE VOLUMES SHOWN IN THE TABLE DO NOT INCLUDE CONCRETE DEBRIS OR ASPHALT PAVEMENT WASTE.

SOIL MANAGEMENT TABLE

SMU	Description	Fill Volumes (CY)		Cut Volumes (CY)		
		General Fill	Impervious Fill	Exempt	Non-Exempt (Landfill Diposal)	Applicable Waste Profiles for Landfill Disposal
1	Soil cap construction.		50			
2	Existing box culvert to be abandoned.	1,450				
3	Existing stream channel to be abandoned.	1,350				
4	Channel excavation: all excavated soil is Non-Exempt.				9,800	Waste Management: 160861W1 GFL: EPL2025-042
5	Channel excavation: Soil volumes within the Exempt Soil Prisms shown are Exempt Soil. The remainder are Non-Exempt.			7,750	11,700	
Totals		2,800	50	7,750	21,500	

FOR BIDDING AND CONSTRUCTION

DESIGNER M. SIERACKI
DRAWN BY A. ROCK
CHECKER D. AMUNDSEN
APPROVED R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

SOIL MANAGEMENT PLAN

DRAWING NO.	GR-1
SHEET NO.	88
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_GR.dwg

Plot Date: 12/30/2025 - 8:29pm
Plotted By: Amundsen, David
Xrefs Bonded: I:\193806812_XSIT\ 193806812_XSNU I:\193806812_XSPI\ 193806812_XSNO\ 193806812_XSV2\ 193806812_XSRD_volume, Environmental Borings

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CPKC RAILWAY

OHP

WATERTOWN PLANK ROAD

EAST PATH
SEE DWG NO. EP-1

UPSTREAM EAST
QUARRY STONE BANK
SEE DWG NO. CB-3

EAST CHANNEL BANK
WALL SEE DWG NO. CB-1

UPSTREAM WEST
QUARRY STONE BANK
SEE DWG NO. CB-4

ADJUST EXISTING
MANHOLE RIM TO
FINISHED GRADE

PEDESTRIAN BRIDGE
SEE DWG NO. PB-1

MATCHLINE SEE SHEET GR-3

WEST CHANNEL BANK
WALL SEE DWG NO. CB-2

ENERGY
DISSIPATOR A CH-GD2

SENDIK'S

741.84 740.49 740.11 739.12 739.58 740.00
741.80 741.52 740.31 740.01 739.81 739.62
742.00 742.29 742.70

18" STO 24" STO 36" STO

0 20 40

LEGEND

952 / 950	EXISTING CONTOUR MINOR / EXISTING CONTOUR MAJOR
952 / 950	NEW CONTOUR MINOR / NEW CONTOUR MAJOR
	CONSTRUCTION LIMITS
744.40 × 745.47	NEW SPOT ELEVATION
743.21 × 743.78	EXISTING SPOT ELEVATION
4:1	RUN:RISE (SLOPE)

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

GRADING PLAN

DRAWING NO.	GR-2
SHEET NO.	89
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_GR.dwg

Plot Date: 12/30/2025 - 8:29pm
User Name: Brandon.Bursen
Xrefs: Bursen: 193806812_XSH1, 193806812_XSN1, 193806812_XVP1, 193806812_XSNO, 193806812_XSX1, 193806812_XSRO, cvclume, Environmental Borings

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MATCHLINE SEE SHEET GR-2

MATCHLINE SEE SHEET GR-4

CPKC RAILWAY

DOWNSTREAM EAST QUARRY STONE BANK SEE DWG NO. CB-5

EAST PATH SEE DWG NO. EP-2

DOWNSTREAM WEST QUARRY STONE BANK SEE DWG NO. CB-6

SEE DWG NO. WS-1 FOR GRADING ON WALL STREET OVER PROPOSED CONCRETE BOX CULVERT

WALL STREET

AFTER COMPLETION OF CULVERT ABANDONMENT, ABANDON CHANNEL BY FILLING WITH CLEAN FILL. COMPACT TO 95% MAX. DRY DENSITY (ASTM D1557).

NOTE:
1. AN ADDITIONAL NEW STORM SEWER TO ADDRESS REQUIRED DRAINAGE FOR THE 890 ELM GROVE ROAD BUILDING WILL BE PROVIDED BY OTHERS AND AMENDED TO THE CONTRACT.

0 20 40

LEGEND

952 / 950	EXISTING CONTOUR MINOR / EXISTING CONTOUR MAJOR
952 / 950	NEW CONTOUR MINOR / NEW CONTOUR MAJOR
	CONSTRUCTION LIMITS
744.40 × 745.47	NEW SPOT ELEVATION
743.21 × 743.78	EXISTING SPOT ELEVATION
4:1	RUN:RISE (SLOPE)

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

GRADING PLAN

DRAWING NO.	GR-3
SHEET NO.	90
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_GR.dwg

Plot Date: 12/30/2025 - 8:29pm
Plotted by: Aaron.Rock
Project Name: C:\Users\aaron.rock\Stantec\Documents - Underwood Creek Daylighting\Civil\Drawings\Sheets\193806812_GR.dwg
Xrefs: Border: I:\938\active\193806812\civil\193806812_XSTL.dwg, Profile: I:\938\active\193806812\civil\193806812_XVNU.dwg, Plan: I:\938\active\193806812\civil\193806812_XNO.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP1.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP2.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP3.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP4.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP5.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP6.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP7.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP8.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP9.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP10.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP11.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP12.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP13.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP14.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP15.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP16.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP17.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP18.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP19.dwg, Plan: I:\938\active\193806812\civil\193806812_XSP20.dwg, Plan:

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EXISTING PEDESTRIAN PATH

MATCHLINE SEE SHEET GR-3

6'x9' BOX

42" SAN

2" W

OHP

UNDERWOOD CREEK

RAILROAD BRIDGE
(TO BE REMOVED)

0 20 40

LEGEND

952	EXISTING CONTOUR MINOR
950	EXISTING CONTOUR MAJOR
952	NEW CONTOUR MINOR
950	NEW CONTOUR MAJOR
	CONSTRUCTION LIMITS
744.40	NEW SPOT ELEVATION
743.21 × 743.78	EXISTING SPOT ELEVATION
4:1	RUN:RISE (SLOPE)

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING

VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

GRADING PLAN

DRAWING NO.	GR-4
SHEET NO.	91
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_GR.dwg

Plot Date: 12/30/2025 - 8:29pm
User Name: mark.sieracki
File Name: C:\Users\mark.sieracki\Documents\2025 CAD Dyn\Sheets\193806812_GR.dwg
Xref: Border: I:\938\06812_ASIT\ 193806812_JENU\ 193806812_JPP\ 193806812_JSNO\ 193806812_JSV2\ 193806812_JSRD_volume, Environmental Borings

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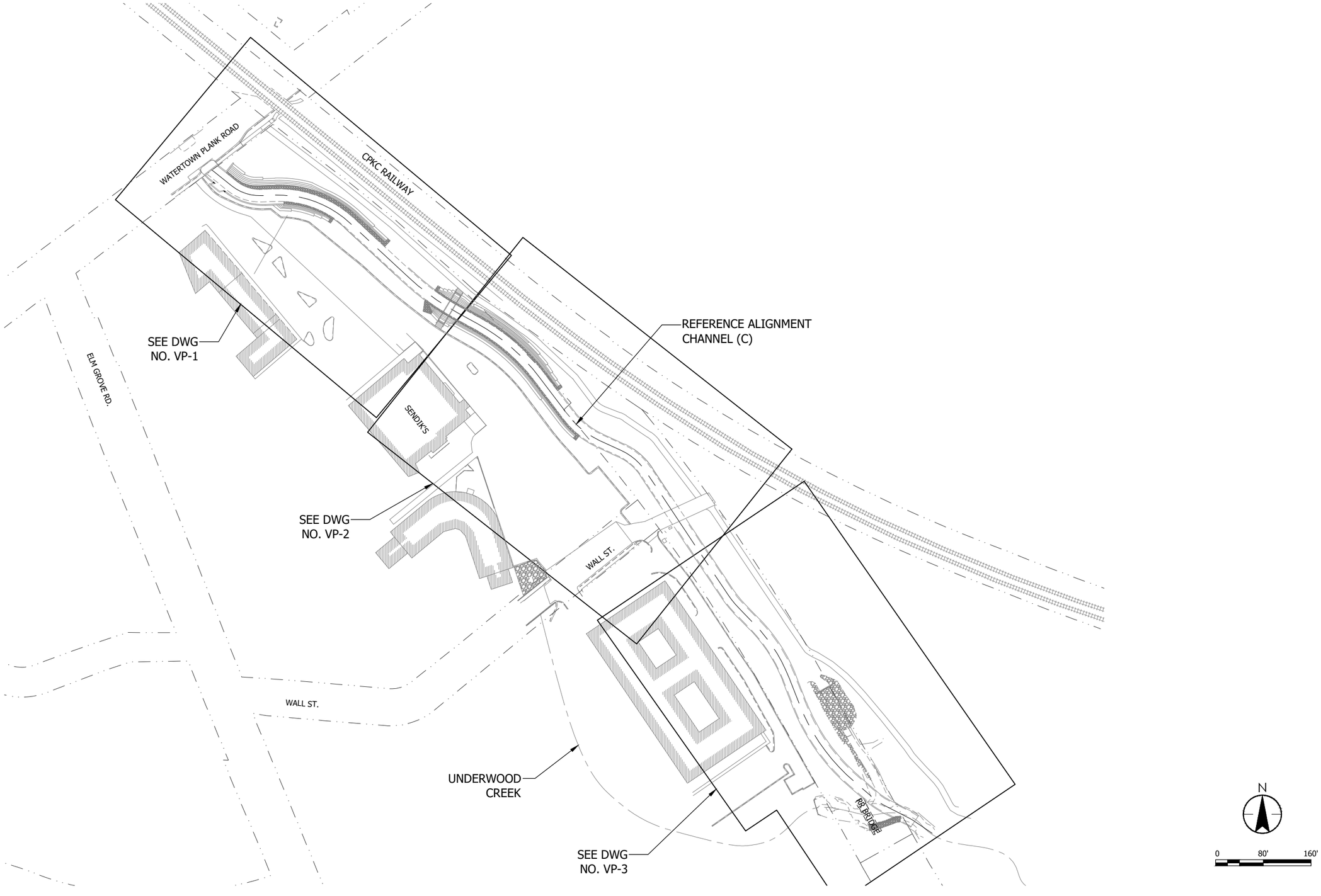

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

SURFACE RESTORATION SHEET INDEX

DRAWING NO.	VP-0
SHEET NO.	92
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_VP.dwg

Plot Date: 12/30/2025 - 8:30pm
Plotted by: mieracki on DESKTOP-C4-D-Drwg\Sheets\193806812_VP.dwg
Xrefs: Borders 193806812_XX1, 193806812_XP1, 193806812_XSND

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CPKC RAILWAY

OHP

ZONE A SEED MIX SHALL USED ON FLOODPLAIN BENCH IN AREAS OF VEGETATED RIPRAP (TYP.)

EAST PATH 1 EP-3

SEE SHEET VP-2

3 VP-6 INSTALL 30" CURB & GUTTER

INSTALL SIDEWALK

3 VP-6 INSTALL 30" CURB & GUTTER

1 VP-6 INSTALL SIDEWALK

UPSTREAM EAST QUARRY STONE BANK SEE DWG NO. CB-3

EAST CHANNEL BANK WALL SEE DWG NO. CB-1

C0+00

C1+00

C2+00

C3+00

C4+00

C5

MATCHLINE STA. C5+00

UPSTREAM WEST QUARRY STONE BANK SEE DWG NO. CB-4

WEST CHANNEL BANK WALL SEE DWG NO. CB-2

REFERENCE ALIGNMENT CHANNEL (C)

INSTALL 30" CURB & GUTTER 3 VP-6

INSTALL HANDICAP RAMP

ASPHALT PARKING LOT SECTION 2 VP-6

SENDIK'S

LEGEND

- CONCRETE SIDEWALK 1 VP-6
- ASPHALT PAVEMENT
- ZONE A (SEE SHEETS VP-4, VP-5)
- ZONE B (SEE SHEETS VP-4, VP-5)
- ZONE C (SEE SHEETS VP-4, VP-5)
- ZONE D (SEE SHEETS VP-4, VP-5)
- SOIL CAP (SEE SHEET VP-6)

0 20' 40'

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

SURFACE RESTORATION PLAN

DRAWING NO.	VP-1
SHEET NO.	93
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_VP.dwg

Plot Date: 12/30/2025 - 8:30cm
Drawing: C:\Users\mike.rock\Stantec\Documents - Underwood Creek\Civil\CAD\Dwg\Sheets\193806812_VP.dwg
Xrefs: Border: I:\938\active\193806812_ISSUE\193806812_BDR; 193806812_XMO

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CPKC RAILWAY

MATCHLINE STA. C5+00

SEE SHEET VP-1

ZONE A SEED MIX SHALL USED ON FLOODPLAIN BENCH IN AREAS OF VEGETATED RIPRAP (TYP.)

DOWNSTREAM EAST QUARRY STONE BANK SEE DWG NO. CB-5

EAST PATH 1 EP-3

REFERENCE ALIGNMENT CHANNEL (C)

C6+00

C7+00

C8+00

C9+00

C10+00

INSTALL 30" CURB & GUTTER 3 VP-6

DOWNSTREAM WEST QUARRY STONE BANK SEE DWG NO. CB-6

SEE SHEET VP-3

MATCHLINE STA. C10+75

WALL STREET ASPHALT 1 WS-2

WALL STREET

SENDIK'S

2 VP-6 ASPHALT PARKING LOT SECTION

3 VP-6 INSTALL 30" CURB & GUTTER

4 VP-6 CURB CUT

LEGEND

- CONCRETE SIDEWALK 1 VP-6
- ASPHALT PAVEMENT
- ZONE A (SEE SHEETS VP-4, VP-5)
- ZONE B (SEE SHEETS VP-4, VP-5)
- ZONE C (SEE SHEETS VP-4, VP-5)
- ZONE D (SEE SHEETS VP-4, VP-5)
- SOIL CAP (SEE SHEET VP-6)

0 20' 40'

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

SURFACE RESTORATION PLAN

DRAWING NO.	VP-2
SHEET NO.	94
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_VP.dwg

Plot Date: 12/30/2025 - 8:30pm
Drawing Name: C:\Users\mike.rock\Desktop\193806812_VP.dwg
Xref Border: I:\2024\812_XS\1_193806812_XS\1_193806812_XBR_193806812_IDNO_

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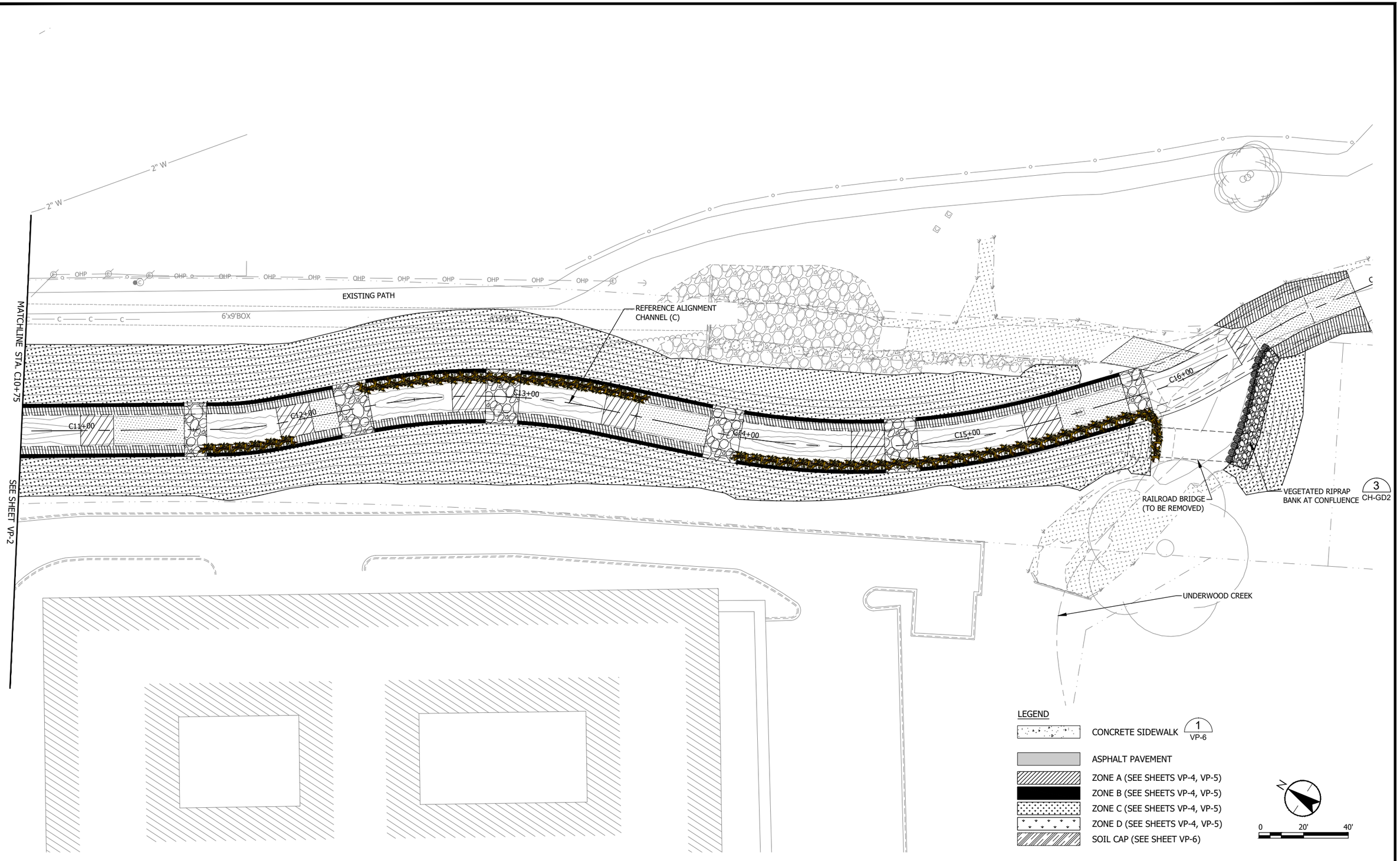

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

SURFACE RESTORATION PLAN

DRAWING NO.	VP-3
SHEET NO.	95
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_VP.dwg

Plot Date: 12/30/2025 - 8:30cm
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Xrefs: Border: I:\938\806812_XSR\ 193806812_XSR\ 193806812_XBR\ 193806812_XNO

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TABLE 1 – ZONE A, B, & C - TEMPORARY EROSION CONTROL AND/OR COVER CROP SEED MIXTURE [1]

SCIENTIFIC NAME	COMMON NAME	SEEDING RATE (PLS)[2]	PERCENT	SEASON[3]
AVENA SATIVA	COMMON OATS	38 LBS/AC 19 LBS/AC AS A COVER CROP	86	LATE SPRING - EARLY FALL (APRIL 15 THRU NOVEMBER 15)
LOLIUM MULTIFORUM	ANNUAL RYE	6 LBS / AC 3 LBS/AC AS A COVER CROP	14	

NOTES
1. CONTRACTOR MAY SELECT OTHER SPECIES THAT MUST BE APPROVED BY THE OWNER: SELECT SPECIES SUITABLE FOR SOIL CONDITIONS PER TESTING AS DESCRIBED IN SEED BED/SOIL PREPARATION NOTES.
2. PLS - PURE LIVE SEED.
3. CONTRACTOR SHALL SUBSTITUTE WINTER WHEAT BETWEEN NOVEMBER 15 AND APRIL 15 AT A RATE OF 40 LBS/AC FOR SEEDING AND 15 LBS/AC AS A COVER CROP.
4. ALL COVERED AREA SHALL BE COVERED WITH EROSION MAT.

PLANTING TABLE 1

TABLE 2 – ZONE A & B - NATIVE GRASS SEED MIXTURE [1]

SCIENTIFIC NAME	COMMON NAME	PHYSIOLOGY	SEEDING RATE (PLS)[2]
ALISMA SUBCORDATUM	SOUTHERN WATER-PLANTAIN	*FORB*	*VARIES*[3,4,5]
ANGELICA ATROPURPUREA	ANGELICA	*FORB*	*VARIES*[3,4,5]
ASCLEPIAS INCARNATA	SWAMP MILKWEED	*FORB*	*VARIES*[3,4,5]
BIDENS COMOSA COMOUS	SWAMP TICKSEED	*FORB*	*VARIES*[3,4,5]
BIDENS FRONDOSA	COMMON BEGGER-TICKS	*FORB*	*VARIES*[3,4,5]
EUPATORIUM PERFOLIATUM	BONESET	*FORB*	*VARIES*[3,4,5]
EUTROCHIUM MACULATUM	JOE-PYE-WEED	*FORB*	*VARIES*[3,4,5]
HELIANTHUS GIGANTEUS	TALL SUNFLOWER	*FORB*	*VARIES*[3,4,5]
IRIS VIRGINICA	BLUE FLAG	*FORB*	*VARIES*[3,4,5]
JUNCUS DUDLEYI	DUDLEY'S RUSH	*FORB*	*VARIES*[3,4,5]
JUNCUS EFFUSUS	SOFT RUSH	*FORB*	*VARIES*[3,4,5]
JUNCUS TENUIS	PATH RUSH	*FORB*	*VARIES*[3,4,5]
JUNCUS TORREYI	TORREY'S RUSH	*FORB*	*VARIES*[3,4,5]
LOBELIA SIPHILITICA	GREAT BLUE LOBELIA	*FORB*	*VARIES*[3,4,5]
MENTHA ARVENSIS	WILD MINT	*FORB*	*VARIES*[3,4,5]
MIMULUS RINGENS	MONKEY-FLOWER	*FORB*	*VARIES*[3,4,5]
MONARDA FISTULOSA	WILD-BERGAMOT	*FORB*	*VARIES*[3,4,5]
PHYSOSTEGIA VIRGINIANA	OBEDIENT PLANT	*FORB*	*VARIES*[3,4,5]
PYCNANTHEMUM VIRGINIANUM	VIRGINIA MOUNTAIN MINT	*FORB*	*VARIES*[3,4,5]
RANUNCULUS HISPIDUS	SWAMP BUTTERCUP	*FORB*	*VARIES*[3,4,5]
RUDBECKIA HIRTA	BLACK-EYED SUSAN	*FORB*	*VARIES*[3,4,5]
SCUTELLARIA LATERIFLORA	MAD-DOG SKULLCAP	*FORB*	*VARIES*[3,4,5]
SOLIDAGO GIGANTEA	LATE GOLDENROD	*FORB*	*VARIES*[3,4,5]
SOLIDAGO RIDDELLII	RIDDELLI GOLDENROD	*FORB*	*VARIES*[3,4,5]
SPARGANIUM EURYCARPUM	COMMON BUR-REED	*FORB*	*VARIES*[3,4,5]
SYMPHYOTRICHUM NOVAE-ANGLIAE	NEW ENGLAND ASTER	*FORB*	*VARIES*[3,4,5]
TEUCRIUM CANADENSE	WOOD-SAGE	*FORB*	*VARIES*[3,4,5]
THALICTRUM DASYCARPUM	PURPLE MEADOW-RUE	*FORB*	*VARIES*[3,4,5]
VERBENA HASTATA	BLUE VERVAIN	*FORB*	*VARIES*[3,4,5]
VERBENA URTICIFOLIA	WHITE VERVAIN	*FORB*	*VARIES*[3,4,5]
BROMUS CILIATUS	FRINGED BROME	*GRASS*	*VARIES*[3,4,5]
CALAMAGROSTIS CANADENSIS	BLUE-JOINT GRASS	*GRASS*	*VARIES*[3,4,5]
CAREX BLANDA	COMMON WOOD SEDGE	*SEDGE*	*VARIES*[3,4,5]
CAREX CRISTATELLA	CRESTED OVAL SEDGE	*SEDGE*	*VARIES*[3,4,5]
CAREX GRANULARIS	PALE SEDGE	*SEDGE*	*VARIES*[3,4,5]
CAREX LACUSTRIS	COMMON LAKE SEDGE	*SEDGE*	*VARIES*[3,4,5]
CAREX LUPULINA	COMMON HOP SEDGE	*SEDGE*	*VARIES*[3,4,5]
CAREX STICTA	COMMON TUSSOCK SEDGE	*SEDGE*	*VARIES*[3,4,5]
CAREX VULPINOIDEA	BROWN FOX SEDGE	*SEDGE*	*VARIES*[3,4,5]
ELYMUS CANADENSIS	CANADA WILD RYE	*GRASS*	*VARIES*[3,4,5]
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	*GRASS*	*VARIES*[3,4,5]
GLYCERIA STRIATA	FOWL MANNA GRASS	*GRASS*	*VARIES*[3,4,5]
PANICUM VIRGATUM	SWITCH GRASS	*GRASS*	*VARIES*[3,4,5]
SCHOENOPLECTUS ACUTUS	HARDSTEM BULRUSH	*SEDGE*	*VARIES*[3,4,5]
SCIRPUS ATROVIRENS	DARK GREEN RUSH	*SEDGE*	*VARIES*[3,4,5]
SCIRPUS CYPERINUS	WOOL-GRASS	*SEDGE*	*VARIES*[3,4,5]
SORGHASTRUM NUTANS	INDIAN GRASS	*GRASS*	*VARIES*[3,4,5]
SPARTINA PECTINATA	CORDGRASS	*GRASS*	*VARIES*[3,4,5]

NOTES
1. CONTRACTOR MAY SELECT OTHER SPECIES THAT MUST BE APPROVED BY THE OWNER: SELECT SPECIES SUITABLE FOR SOIL CONDITIONS PER TESTING AS DESCRIBED IN SEED BED/SOIL PREPARATION NOTES.
2. PLS - PURE LIVE SEED.
3. SEED MIXES SHALL INCLUDE 35% WILD RYE SPECIES. MAINTAIN SPECIES DIVERSITY BY USING NO MORE THAN 20% OF ANY SINGLE WILD RYE SPECIES.
4. SEED MIX SHALL INCLUDE 65% OF AT LEAST 9 "OTHER" SPECIES (3 FORBS, 3 GRASSES, AND 3 SEDGE SPECIES). MAINTAIN SPECIES DIVERSITY BY USING NO MORE THAN 10% OF ANY SINGLE SPECIES IN THE 65% "OTHER" COMPONENT OF THE SEED MIX.
5. APPLY SEED MIX AT A RATE OF 10 LB/AC.

PLANTING TABLE 2

TABLE 3 – ZONE C - NATIVE GRASS SEED MIXTURE [1]

SCIENTIFIC NAME	COMMON NAME	PHYSIOLOGY	SEEDING RATE (PLS)[2]
ASCLEPIAS INCARNATA	SWAMP MILKWEED	*FORB*	*VARIES*[3,4,5]
EUPATORIUM PERFOLIATUM	BONESET	*FORB*	*VARIES*[3,4,5]
EUTROCHIUM MACULATUM	JOE-PYE-WEED	*FORB*	*VARIES*[3,4,5]
IRIS VIRGINICA	BLUE FLAG	*FORB*	*VARIES*[3,4,5]
MONARDA FISTULOSA	WILD-BERGAMOT	*FORB*	*VARIES*[3,4,5]
RUDBECKIA HIRTA	BLACK-EYED SUSAN	*FORB*	*VARIES*[3,4,5]
SOLIDAGO GIGANTEA	LATE GOLDENROD	*FORB*	*VARIES*[3,4,5]
SOLIDAGO RIDDELLII	RIDDELLI GOLDENROD	*FORB*	*VARIES*[3,4,5]
THALICTRUM DASYCARPUM	PURPLE MEADOW-RUE	*FORB*	*VARIES*[3,4,5]
CALAMAGROSTIS CANADENSIS	BLUE-JOINT GRASS	*GRASS*	*VARIES*[3,4,5]
ELYMUS CANADENSIS	CANADA WILD RYE	*GRASS*	*VARIES*[3,4,5]
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	*GRASS*	*VARIES*[3,4,5]
PANICUM VIRGATUM	SWITCH GRASS	*GRASS*	*VARIES*[3,4,5]

NOTES
1. CONTRACTOR MAY SELECT OTHER SPECIES THAT MUST BE APPROVED BY THE OWNER: SELECT SPECIES SUITABLE FOR SOIL CONDITIONS PER TESTING AS DESCRIBED IN SEED BED/SOIL PREPARATION NOTES.
2. PLS - PURE LIVE SEED.
3. SEED MIXES SHALL INCLUDE 35% WILD RYE SPECIES. MAINTAIN SPECIES DIVERSITY BY USING NO MORE THAN 20% OF ANY SINGLE WILD RYE SPECIES.
4. SEED MIX SHALL INCLUDE 65% OF AT LEAST 6 "OTHER" SPECIES (BLACK-EYED SUSAN, 2 ADDITIONAL FORBS, AND 3 GRASSES). MAINTAIN SPECIES DIVERSITY BY USING NO MORE THAN 15% OF ANY SINGLE SPECIES IN THE 65% "OTHER" COMPONENT OF THE SEED MIX.
5. APPLY SEED MIX AT A RATE OF 10 LB/AC.

PLANTING TABLE 3

TABLE 4. ZONE D – TURF GRASS [1]

SCIENTIFIC NAME	COMMON NAME	SEEDING RATE (PLS)[2]	PERCENT
POA PRATENSIS L.	KENTUCKY BLUEGRASS	4 LBS/1,000 SQ. FT	80
LOLIUM PERENNE L.	ELITE PERENNIAL RYE	1 LBS/1,000 SQ. FT	20

NOTES
1. CONTRACTOR MAY SELECT OTHER SPECIES THAT MUST BE APPROVED BY THE OWNER: SELECT SPECIES SUITABLE FOR SOIL CONDITIONS PER TESTING AS DESCRIBED IN SEED BED/SOIL PREPARATION NOTES.
2. PLS - PURE LIVE SEED.

PLANTING TABLE 4

TABLE 5 – ZONE A - SPECIES FOR DORMANT WOODY CUTTINGS [1,2]

SCIENTIFIC NAME	COMMON NAME	SIZE (INCHES)	SPACING[3]
SALIX COTTETII	BANKERS WILLOW	LENGTH 24-36, DIA. ¾" – 1½"	STAGGERED WITH 1 STAKE PER 3 LINEAR FEET OF STREAM BANK IN 3 ROWS SPACED 1 FOOT APART. THE FIRST ROW IS ALONG THE TOP OF BANK (BANKFULL) AND THE NEXT 2 ARE BELOW BANKFULL BETWEEN THE TOP OF BANK AND THE INNER BERM INCLUDING WITHIN THE TOE WOOD.
SALIX EXIGUA	SANDBAR WILLOW	LENGTH 24-36, DIA. ¾" – 1½"	
SAMBUCUS CANADENSIS	ELDERBERRY	LENGTH 24-36, DIA. ¾" – 1½"	
VIBURNUM OPOLUS (TRILOBUM)	HIGH BUSH CRANBERY	LENGTH 24-36, DIA. ¾" – 1½"	
CORNUS STOLONIFERA	RED-OSIER DOGWOOD	LENGTH 24-36, DIA. ¾" – 1½"	
CORNUS AMOMUM	SILKY DOGWOOD	LENGTH 24-36, DIA. ¾" – 1½"	

NOTES
1. CONTRACTOR MAY SELECT OTHER SPECIES THAT MUST BE APPROVED BY THE OWNER: SELECT SPECIES SUITABLE FOR SOIL CONDITIONS PER TESTING AS DESCRIBED IN SEED BED/SOIL PREPARATION NOTES.
2. MAINTAIN SPECIES DIVERSITY BY USING AT LEAST FOUR (4) SPECIES WITH NO MORE THAN 25% OF ANY ONE (1) SPECIES.
3. THE QUANTITY OF LIVE STAKES BELOW THE TOP OF BANK (BANKFULL) MAY BE REDUCED WITHIN THE TOE WOOD APPLICATION BASED ON THE DENSITY OF CONTAINERIZED PLANTINGS.

PLANTING TABLE 5

TABLE 6 – ZONE B & C – SHRUBS

SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING
CEPHALANTHUS OCCIDENTALIS	COMMON BUTTONBUSH	1 GAL, 8" – 24" TALL	CLUSTERS SHALL BE INSTALLED RANDOMLY AT VARYING FLOODPLAIN AND SLOPE ELEVATIONS 30 FEET APART
CORNUS AMOMUM	SILKY DOGWOOD	1 GAL, 8" – 24" TALL	
CORNUS FOEMINA	GRAY DOGWOOD	1 GAL, 8" – 24" TALL	
CORNIUS SERICEA	RED–OSIER DOGWOOD	1 GAL, 8" – 24" TALL	
SAMBUCUS CANADENSIS	ELDERBERRY	1 GAL, 8" – 24" TALL	
VIBURNUM LENTAGO	NANNYBERRY	1 GAL, 8" – 24" TALL	
PHYSOCARPUS OPULIFOLIUS	COMMON NINEBARK	1 GAL, 8" – 24" TALL	
VIBURNUM OPULUS VAR. AMERICANUM	AMERICAN CRANBERRY	1 GAL, 8" – 24" TALL	
VACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	1 GAL, 8" – 24" TALL	

NOTES
1. CONTRACTOR MAY SELECT OTHER SPECIES THAT MUST BE APPROVED BY THE OWNER: SELECT SPECIES SUITABLE FOR SOIL CONDITIONS PER TESTING AS DESCRIBED IN SEED BED/SOIL PREPARATION NOTES.
2. MAINTAIN SPECIES DIVERSITY BY USING AT LEAST 6 SPECIES WITH NO MORE THAN 20% OF ANY ONE SPECIES.
3. SHRUBS MAY BE CONTAINERIZED OR B&B.
4. CLUSTERS WILL CONSIST OF 3 TO 5 INDIVIDUAL SHRUBS SPACED AT 5 TO 8 FEET.
5. PLANT SPECIES WILL BE LIMITED TO NO MORE THAN 2 SPECIES PER CLUSTER.

PLANTING TABLE 6

TABLE 7 – ZONE B & C – B&B TREE PLANTING SCHEDULE [1,2]

SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING[3]
ABIES BALSAMEA	BALSAM FIR	5' – 8' HEIGHT	TREES ARE SPACED EVERY 75'-100' AT LOCATIONS STAKED IN THE FIELD. VARYING FLOODPLAIN AND SLOPE ELEVATIONS
ACER SACCHARINUM	SILVER MAPLE	5' – 8' HEIGHT	
CARYA OVALIS SARG.	RED HICKORY	5' – 8' HEIGHT	
JUGLANS NIGRA	BLACK WALNUT	5' – 8' HEIGHT	
PINUS STROBUS L.	EASTERN WHITE PINE	5' – 8' HEIGHT	
PICEA GLAUCA (MOENCH) VOSS	WHITE SPRUCE	5' – 8' HEIGHT	
PLANTUS OCCIDENTALIS L.	AMERICAN SYCAMORE	5' – 8' HEIGHT	
POPULUS BALSAMIFERA L.	BALSAM POPLAR	5' – 8' HEIGHT	
QUERCUS ALBA	WHITE OAK	5' – 8' HEIGHT	
QUERCUS RUBRA	NORTHERN RED OAK	5' – 8' HEIGHT	
TILIA AMERICANA	AMERICAN BASSWOOD	5' – 8' HEIGHT	
ULMUS AMERICANA	AMERICAN ELM	5' – 8' HEIGHT	

NOTES
1. CONTRACTOR MAY SELECT OTHER SPECIES THAT MUST BE APPROVED BY THE OWNER: SELECT SPECIES SUITABLE FOR SOIL CONDITIONS PER TESTING AS DESCRIBED IN SEED BED/SOIL PREPARATION NOTES.
2. MAINTAIN SPECIES DIVERSITY BY USING AT LEAST 8 SPECIES (MINIMUM 2 CONIFER) WITH NO MORE THAN 15% OF ANY ONE SPECIES.
3. TREES OF THE SAME SPECIES TO BE PLANTED IN GROUPS OF 3 TO 4.

PLANTING TABLE 7

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

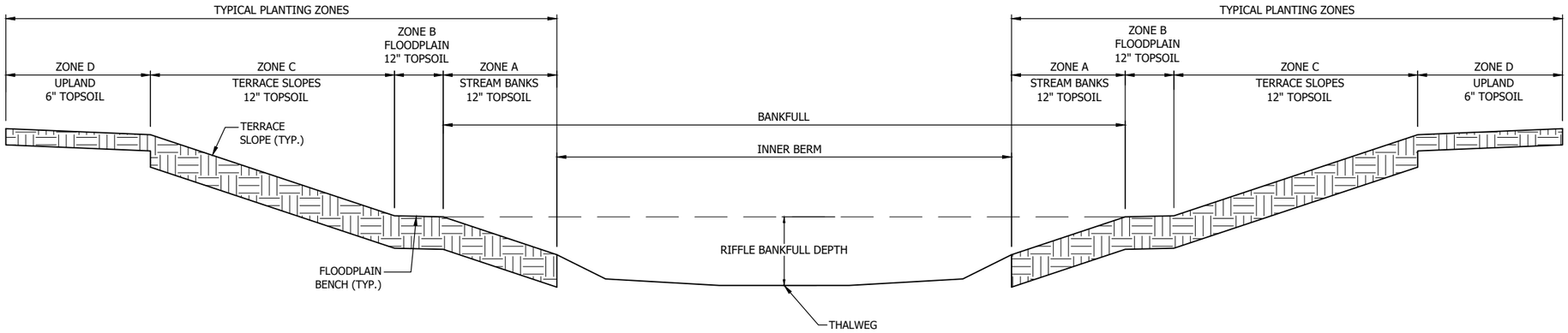
UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

SURFACE RESTORATION PLANTING TABLES

DRAWING NO.	VP-4
SHEET NO.	96
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_VP.dwg

Plot Date: 12/30/2025 - 8:30am
Plotted By: Bonsen.Wilson
Xrefs: Bonsen.193806812_XAT1.193806812_XEP1.193806812_XNO
Path: C:\Civil Projects\193806812_VP.dwg

THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS. DO NOT SCALE THE DRAWING - ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO STANTEC IMMEDIATELY. ALL REPORTS, PLANS AND DRAWINGS ARE THE PROPERTY OF STANTEC. REPRODUCTION OR USE OF THE COPYRIGHTS TO ALL DESIGNS AND DRAWINGS ARE THE PROPERTY OF STANTEC. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY STANTEC IS FORBIDDEN.

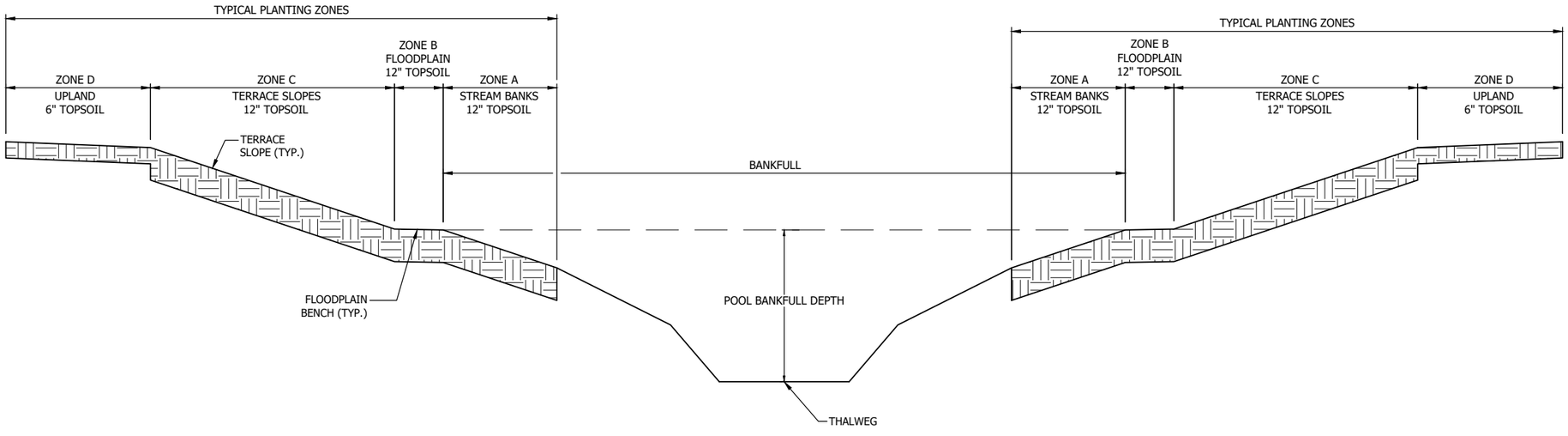


TYPICAL PLANTING SECTION ADJACENT TO RIFFLE, GLIDE, AND RUNS

1

1" = 4'

VP-1 - VP-3



TYPICAL PLANTING SECTION ADJCENT TO POOLS

2

1" = 4'

VP-1 - VP-3

FOR BIDDING AND CONSTRUCTION

DESIGNER	M. SIERACKI
DRAWN BY	A. ROCK
CHECKER	D. AMUNDSEN
APPROVED	R. KLEIN

Stantec

REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD

VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CHANNEL PLANTING ZONES

DRAWING NO.	VP-5
SHEET NO.	97
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_VP.dwg

Plot Date: 12/30/2025 - 8:30pm
User Name: mark.sieracki
Xrefs: Borders 193806812_XX1, 193806812_XP1, 193806812_XSND

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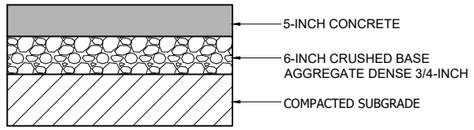
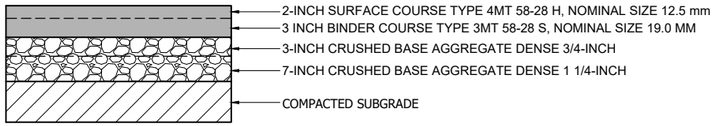
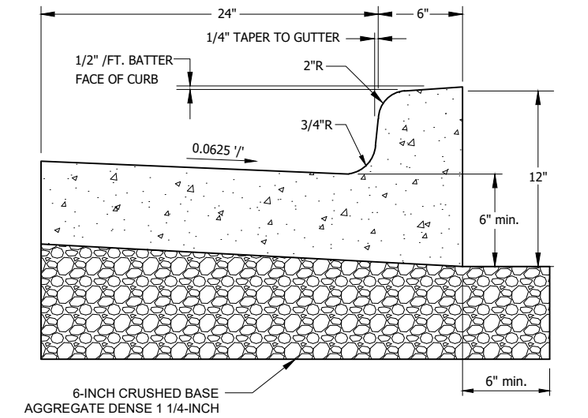


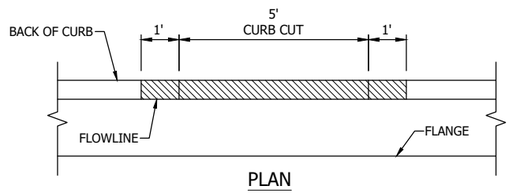
DETAIL - CONCRETE SIDEWALK SECTION 1
NOT TO SCALE
VP-1-VP-2

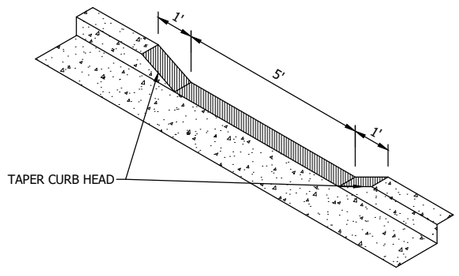


DETAIL - ASPHALT PARKING LOT SECTION 2
NOT TO SCALE
VP-1-VP-2

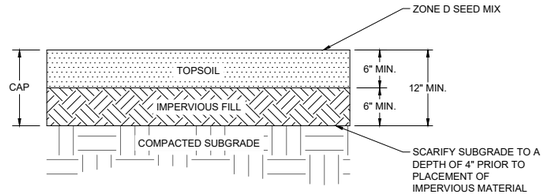


DETAIL - CURB & GUTTER 3
NOT TO SCALE
VP-1-VP-2





DETAIL - CURB CUT 4
NOT TO SCALE
VP-2



DETAIL - SOIL CAP 4
NOT TO SCALE
VP-2

FOR BIDDING AND CONSTRUCTION	DESIGNER M. SIERACKI DRAWN BY A. ROCK CHECKER D. AMUNDSEN APPROVED R. KLEIN	Stantec	REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD	VILLAGE OF ELM GROVE

UNDERWOOD CREEK DAYLIGHTING
VILLAGE OF ELM GROVE
WAUKESHA COUNTY, WISCONSIN

CONSTRUCTION DETAILS

DRAWING NO.	VP-6
SHEET NO.	98
DATE	December 30, 2025
PROJ NO.	193806812
FILE	193806812_VP.dwg

Plot Date: 12/30/2025 - 8:30am
Plot By: Amundsen, Dan
Xrefs: Border_193806812_ANT, 193806812_XP, 193806812_ZNG