ADDENDUM NO. 1

South River Fish Passage and
Veterans Memorial Park Improvements Project
Marshfield, MA

September 6, 2024

PREPARED BY:

Fuss and O'Neill, Inc.
317 Iron Horse Way, Suite 204
Providence, RI 02908

NOTICE TO PROSPECTIVE BIDDERS

ADDENDUM NO. 1

Prospective Bidders and all concerned are hereby notified of the following amendments and interpretations to the Contract Documents of the SOUTH RIVER FISH PASSAGE AND VETERANS MEMORIAL PARK IMPROVEMENTS PROJECT, MARSHFIELD, MA dated September 6, 2024. These amendments and interpretations shall be incorporated in and shall become an integral part of the Contract Documents. The addendum number (No. 1) and date (September 6, 2024) of this addendum must be entered into the space provided on the Bid Form.

GENERAL INFORMATION

1. Bidders are advised of the following requirements/conditions applying to the work, which are to be incorporated into prepared bids. The items listed below do not include all items of discussion at the pre-bid meeting, nor any other critical and binding requirements under the original Contract Documents.

2. Attendance at the August 16, 2024, pre-bid meeting for the South River Fish Passage and Veterans Memorial Park Improvements Project was mandatory; bids will not be accepted from entities not on the sign-in sheet. A copy of the sign-in sheet is provided as Attachment A of this addendum.

3. Per Exhibit B of the Project Manual (pg. 15 of 20 of the MassDEP/Conservation Commission Restoration Order of Conditions), bidders are advised that the contractor shall enable, support and cooperate with the Town of Marshfield in its obligation to comply with Marshfield Conservation Commission's Restoration Special Condition 2 for an archaeological professional to conduct monitoring and reconnaissance visual surveys of dewatered portions of the lagoon and river channel once dewatered conditions are established and through completion of the work to remove the dam (including any buried legacy structures), dredge soil/sediment and establish required subgrades respective work areas.

4. Field records and laboratory results from the supplemental sediment sampling of the Lagoon and South River that was performed by Woods Hole Group in April 2023 are included (for reference purposes) in Exhibit C of the Project Manual.

5. Bidders are advised of the following clarifications to temporary staging and construction access areas:

    a. The Town of Marshfield will allow the gravel parking area to be closed off to the public throughout the duration of construction.
    b. The timber arbor located by the gravel parking area (western temporary staging area) will be removed by the Town prior to the start of construction.
    c. The pathways from the gravel parking area (west temporary staging area) into the park can be widened and leveled as necessary for construction access to the work area. These areas must be restored to existing conditions or better following completion of work.
    d. Situate Chair (SC) must be able to conduct its business unincumbered by the Contractor's access around its building, including but not limited to: no storage of any Contractor's vehicles or materials, no interference with SC's access to its dumpster or in its receipt or delivery of materials/products to/from its property.

6. Division 00 (Bid Requirements and Contract Requirements) and Division 01 documents included in Attachments B and C, respectively, supersede versions of the corresponding documents contained in the Project Manual.

Bidders are advised that the enclosed revised Bid Form and other revised documents included in this addendum, unless superseded by subsequent addenda, shall be completed and included in submitted bid packages as instructed on the Bid Form.

SECTION 00 01 10 – TABLE OF CONTENTS

7. Delete *Section 00 01 10 – Table of Contents* in its entirety and replace with the revised Table of Contents provided in Attachment B. The revised Table of Contents reflects the addition of Sections 01 79 00 and 26 09 00 and updated page numbers of certain specifications.

SECTION 00 41 00 – BID FORM

8. Delete *Section 00 41 00 – Bid Form* in its entirety and replace with the revised Bid Form provided in Attachment B.

SECTION 01 22 19 – PAYMENT ITEMS

9. Delete *Section 01 22 19 – Payment Items* in its entirety and replace with the revised Payment Items specification provided in Attachment C.

A. Changes to the specification section include, but are not limited to, the inclusion of lagoon dredging into the base bid payment items, the change of Alternate Bid Item No. 2.9 from Lagoon Dredging to Electric System Improvements and the change of stone masonry reconstruction/construction bid items from unit price to lump sum.

SECTION 01 41 00 – REGULATORY REQUIREMENTS

10. Delete *Section 014100 –Regulatory Requirements* in its entirety and replace with the revised Regulatory Requirements specification provided in Attachment C.

A. Changes include, but are not limited to, the addition of a table summarizing applicable time of year restrictions for the Project, provided under Section 1.3.B of the specification.

SECTION 01 79 00 – DEMONSTRATION AND TRAINING

11. Insert *Section 01 79 00 – Demonstration and Training* specification provided in Attachment C.

SECTION 04 43 00 – STONE MASONRY

12. Delete *Section 04 43 00 – Stone Masonry* specification in its entirety and replace with the revised Stone Masonry specification provided in Attachment D.

SECTION 26 09 00 – CONTROLS AND INSTRUMENTATION

13. Insert *Section 26 09 00 – Controls and Instrumentation* specification provided in Attachment E.

SECTION 33 37 00 – FLOW CONTROL STRUCTURES

14. Delete *Section 33 37 00 – Flow Control Structures* in its entirety and replace with the revised Flow Control Structures specification provided in Attachment F.

A. General changes include, but are not limited to, deleting gate and frame requirements and replacing them with stop gate and frame requirements.

SECTION 33 40 00 – WATER BYPASS PIPING

14. Delete Section 33 40 00 – Water Bypass Piping in its entirety and replace with the revised Water Bypass Piping specification provided in Attachment F.

SECTION 35 10 70 – CONTROL OF WATER

15. Delete Paragraph 1.6 B of Section 35 10 70 – Control of Water in its entirety and replace with the following paragraph as included in Attachment G:

"Minimum Capacity of Conveyance Structures for Normal Flow Conditions: The conveyance of by-pass flows shall be designed, at minimum, to convey approximately 70 cubic feet per second (cfs) without overtopping cofferdam systems."

16. Delete Paragraph 3.1 C of Section 35 10 70 – Control of Water in its entirety and replace with the following paragraph as included in Attachment G:

"If Contractor is prevented from completing work due to high flows exceeding 70 cfs, a time extension will be granted equal to time delayed due to flows recorded as exceeding that level."

CONSTRUCTION DRAWING SET

17. Delete Sheets CS-105, CS-109, CD-501, CD-502, CD-506, CD-507, CD-508, and CG-101 of the Contract Drawings and replace with respective revised sheets provided in Attachment H.

QUESTIONS AND RESPONSES

Responses to questions received on or before August 26th are provided below. Responses are provided *in italics* following each question addressed.

18. Question #1 – If the river flow rate exceeds the allowable flow rate, would work have to stop and would that hinder the possibility of applying for a time of year restriction waiver?

    Section 35 10 70 – Control of Water (Part 3.1.C) of the Contract Documents addresses measures to be taken by the Contractor when river flow rates exceed normal flow conditions and the expectations related to contract time extensions. Additionally, higher river flow rates are not expected to hinder the possibility of applying for a time of year restriction waiver, but a waiver is subject to approval by the relevant regulatory agencies.

19. Question #2 – Is this project completely grant funded?

    Approximately half of the project is being funded by the NOAA (through the National Fish and Wildlife Foundation) and the North and South River Watershed Association, while the remaining half of the project is paid for by local/community funding and/or financial contributions from the Town of Marshfield.

20. Question #3 – Are there structures present upstream that may artificially cause increased flow down the river?

    The South River has numerous tributaries that contribute flow to it such as Furnace Brook, Harlow Brook, Philips Brook, and Keene Brook. There are approximately 11 non-jurisdictional dams, 7 low and/or significant hazard dams, and a few former and active cranberry bogs located upstream of the project site along the South River and its tributaries.

    The Duxbury Bogs is understood (but not guaranteed) to be one of the only active cranberry bog operations that still exist along the South River. Cranberry harvesting season generally begins in mid-September, reaches its peak in mid- to late October, and is typically over by November 15. As a result, it appears that it is likely that only flow released from the Duxbury Bogs could affect flows at the Project Site in the mid-September to November timeframe. This bog, however, is located approximately 5.3 miles upstream of the Project Site where released flows would be at least partially attenuated by the time it reaches the Project Site. The Contractor could coordinate with the owner of Duxbury Bogs to confirm when it intends to alter flows during the harvesting season.

    It is also anticipated that flow will not be significantly impacted by flow/stop log manipulation at the jurisdictional and non-jurisdictional dams given the amount of attenuation that will likely occur due to wide floodplain and wetland areas that exist between the dams and Project Site. Of the seven (7) low and/or significant hazard dams, four (4) are owned and maintained by the Town of Duxbury (Garside Reservoir Dam, Petersons Saw Mill Dam, Boys & Girls Club Dam #1, and the Temple Street Dam). The Contractor shall communicate/coordinate with the Town of Duxbury to confirm any annual operations that it may conduct that would impact river flows.

21. Question #4 – Please clarify the time of year (TOY) restrictions.

Refer to Section 1.3 B of the revised specification Section 01 41 00 – Regulatory Requirements provided in Attachment C for a table summarizing the applicable TOY restrictions. Because these TOY restrictions would significantly limit the period where in-river work could be performed to between November 15th and February 1st, it is the Town's intent to request waivers so that in-river work can be performed after the upstream migration period and through the typical low-flow period of July 15th through November 15th. Massachusetts DMF has stated that it would support allowing in-river work to start on July 15th since electrofishing monitoring studies conducted in this region of the South River terminate prior to July 1st and as long as flow diversion through the lagoon and newly installed 30" HDPE lagoon outlet pipe was complete before the start of the downstream migration period (September 1st).

22. Question #5 – Upon authorization, is the Town readily prepared to proceed with construction? Will there be enough time for contractors to install the cofferdam and apply for a TOY waiver prior to November 15?

The time of year restrictions currently imposed by the Army Corps of Engineers and the Massachusetts Division of Marine Fisheries apply to in-river construction activities. It is anticipated that out-of-river activities could be conducted outside of the current TOY restrictions. One of the first activities that must occur (besides site clearing/demolition and installation of appropriate erosion control measures) is the replacement of the lagoon outlet structure and outlet pipe to the river channel. This new structure and pipe will be used for flow diversion and downstream migration during Phase 1 of construction. Since the majority of this work would be considered out-of-river and not affect fish passage, TOY restrictions would not apply. The Town is ready to proceed with construction upon award of the contract.

23. Question #6 – Has a cost estimate been prepared for this project?

The opinion of construction cost is estimates a range between $1.4 to $1.6 million for the base bid items (excludes the cost of the alternate bid items).

24. Question #7 – Will there be funding for the alternate bid items?

The Town is pursuing funding for the alternate bid items and expects to award this work to the successful bidder prior to demobilization associated with the base bid project. Bidders shall prepare and submit alternate bid pricing accordingly.

25. Question #8 – Is the water level meter in the river channel accurate?

The 11-foot mark on the water level staff gauge upstream of the lagoon inlet channel equates to El. 9.89 feet (NAVD88). The 12-foot mark on the water level staff gauge upstream of the Main Street Bridge equates to El. 4.42 feet

(NAVD88). The Town has observed that during nor'easters, water typically takes 3 to 4 hours to reach its maximum water level and that it takes the River approximately 3 to 4 days to recede to its normal water level after the rainfall event; it is expected that actual durations will differ from those stated herein and the Contractor may not rely on this observation in preparing its bid or conducting its work.

There are two staff gauges in the river channel: one just upstream of the lagoon inlet channel and the other at the upstream side of the Main Street Bridge.

26. Question #9 – Will change orders be permitted if work is delayed due to a rise in water level?

For work delayed due to high water levels, change orders for a time allowance may be permitted provided the Contractor has developed and implemented its water control provisions in accordance with its accepted water control submittal and other contract requirements. There will be no additional payment for costs associated with protection during, and recovery from, high water levels at the site.

27. Question #10 – Please clarify the allowable work area flow rate.

The allowable flow rate to be allowed to pass through the lagoon during Phase 1 of construction is 70 cubic feet per second (cfs). This is approximately equivalent to the combined maximum flow rate that the new 30-inch HDPE lagoon outlet pipe can pass (approximately 45 cfs) and the existing waterwheel channel can pass (approximately 25 cfs) while still limiting the headpond elevation in the River to El. 9.5 feet or less.

28. Question #11 – Are trees to be removed?

Trees not designated to be protected within the project's limit of disturbance shall be removed. Refer to sheets CS-103 and CS-104 of the construction drawings for tree protection callouts in addition to tree and vegetation clearing limits within the limit of disturbance.

29. Question #12 – How is the construction going to work with the fish passage set up and the February 1 Time of Year restriction?

The Town intends to pursue and secure waivers from the Massachusetts Department of Marine Fisheries (MassDMF) and regulatory agencies to allow for the construction of the nature-like fishway to occur just after the upstream migration season and during the low-flow period of July 1st through October 31st. During this timeframe which also includes the majority of the downstream migration period, river flow and aquatic organisms will be diverted through the lagoon (via the lagoon inlet channel) and its new outlet structure/30-inch discharge pipe to the downstream river channel.

30. Question #13 – What are the bidder qualifications for fishway construction?

Refer to Section 00 45 13 – Qualifications of Bidder Form, in the Contract Documents for fishway construction qualifications.

31. Question #14 – The specification calls out for the log frames to be made from aluminum, however the drawings CD-502 and CD-506 state Stop Log Channel Mounted Grooves to be constructed of formed Stainless Steel. Can you please clarify what material is to be used?

Gate frames shall be fabricated of Type 316 stainless steel, as indicated in Section 33 37 00 – Flow Control Structures provided in Attachment F.

ISSUED BY: _____ **Date: 9/6/24**
Engineer's Signature

END OF ADDENDUM NO. 1

Attachment A

Pre-Bid Meeting
Sign-In Sheet

FUSS & O'NEILL

PRE-BID MEETING SIGN-IN SHEET
SOUTH RIVER FISH PASSAGE AND
VETERANS MEMEORIAL PARK IMPROVEMENTS PROJECT
TOWN OF MARSHFIELD
11:00 A.M. – Friday, August 16, 2024
Veterans Memorial Park - Marshfield, MA

Name	Company/Address	Phone Number	Email
Nick Hall	ET+L Corp 873 Great Rd, Stow, MA	978-897-4353	nhall@etlcorp.com
Andrew Lambert	ET+L Corp 873 Great Rd Stow, MA	978-897-4353	alambert@etlcorp.com
Jake Glod	2 Centennial Dr. #40, Peabody, MA	401-480-8485	Jglod@Suncoeco.com
David Smith	PA Landers, Inc 351 Winter St Hanover, MA	Cell (508) 209-1690	dsmith@palanders.com
Dan Galante	T Ford Company 124 Tenney St. Georgetown, MA 01833	508-726-4086	dan@tford.com
Kaitlyn Jillson	Robert B. Our Co.	978-895-5115	Kjillson@robertbour.com
Sam Speakman	Speakman Ex. LLC	508-432-5565	sam@speakmanexcavating.com

FUSS & O'NEILL

PRE-BID MEETING SIGN-IN SHEET
SOUTH RIVER FISH PASSAGE AND
VETERANS MEMEORIAL PARK IMPROVEMENTS PROJECT
TOWN OF MARSHFIELD
11:00 A.M. – Friday, August 16, 2024
Veterans Memorial Park - Marshfield, MA

Name	Company/Address	Phone Number	Email
Shawn Flynn	Flynn Ent	617 823 9/22	Shawn@Flynnwork.com
Henry Dupont	GroundBreakers Const	774-265-7343	Henr.Dupont71@gmail.com
Graham Johnson	Northern Construction Service	413-289-1230	gjohnson@northernconstruction-corp
SAMANTHA MURPHY	DANDEL CONSTRUCTION	781-364-4577	SAM@DANDELINC.COM
DEREK DELPRETE	DANDEL CONSTRUCTION	781-726-1406	Derek@DANDELINC.com
Robert Amendolara	Luciano Excavation	401-330-6259	ramendolara@l-einc.com
William c Finn	T O M	781-254-5086	WFINNCFA@VERIZONNET

FUSS & O'NEILL

PRE-BID MEETING SIGN-IN SHEET
SOUTH RIVER FISH PASSAGE AND
VETERANS MEMEORIAL PARK IMPROVEMENTS PROJECT
TOWN OF MARSHFIELD
11:00 A.M. – Friday, August 16, 2024
Veterans Memorial Park - Marshfield, MA

Name	Company/Address	Phone Number	Email
Alex Mansfield	North + South Rivers W.A.	617-571-9962	alex@NSRWA
Mike Pieczek	Hi-VOLTAGE ASSOC, SCITUATE MA	(781) 838-2259	hivoltage2@hotmail.com
Charlie Swanson	Town of Marshfield	781 834 5575 (2)	cswanson@townofmarshfield.org
Carmine Bruno	TOWN/PARK CAR TAKEN	781-200-9545	ghia3@me.com.
ROD PROCACCINO	TOWN ENG	781-389-1374 cell	rprocaccino@townofmarshfield.org
Katie Cretella	Fuss + O'Neill	(401)533-5989	Katie.cretella@fando.com
Nils Wiberg	Fuss + O'Neill Inc	(401)533-5979	nils.wiberg@fando.com

Attachment B

Updated Division 00 Specifications

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION 00 41 00 - BID FORM

CONTRACT IDENTIFICATION:

South River Fish Passage and
Veterans Memorial Park Improvements Project
Marshfield, MA

ARTICLE 1 – BID RECIPIENT

1.1 This Bid shall be submitted to:

Town Administrator
Marshfield Town Hall
870 Moraine Street
Marshfield, MA 02050

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

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.1 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 calendar days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of the Town of Marshfield.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.1 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 which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____

B. Bidder attended the mandatory Pre-Bid Conference, has examined 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 structures.

E. 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.

F. 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.

G. 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.

H. 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.

I. 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.

ARTICLE 4 – FURTHER REPRESENTATIONS

4.1 Bidder further represents that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding;

D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over the Town of Marshfield; and

E. Bidder has compiled with all laws of the Commonwealth of Massachusetts relating to taxes and is in good standing in the Commonwealth of Massachusetts.

ARTICLE 5 – BASIS OF BID

5.1 Bidder will complete the Work in accordance with the Contract Documents for the following lump sum and unit bid prices:

A. The Total Contract Base Bid Price shall include, but not be limited to, construction of a nature-like fishway and adjacent improvements depicted under Phase 1 of the South River Fish Passage and Veterans Memorial Park Improvements Project, based on the following lump sum prices. The Total Contract Base Bid Price shall also include an allowance for police detail costs/fee reimbursements associated with Phase 1 of construction.

SOUTH RIVER FISH PASSAGE AND
VETERANS MEMORIAL PARK IMPROVEMENTS PROJECT
CONTRACT BASE BID ITEMS

Item No.	CONTRACT ITEM AND UNIT PRICE (WORDS AND FIGURES)	Unit	Opinion of Quantity	Computed Total in Figures
1	PHASE 1 - MOBILIZATION at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
2	PHASE 1 - GENERAL REQUIREMENTS at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
3	PHASE 1 - DEMOBILIZATION at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
4	PHASE 1 - SITE CLEARING AND DEMOLITION at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____

Item No.	CONTRACT ITEM AND UNIT PRICE (WORDS AND FIGURES)	Unit	Opinion of Quantity	Computed Total in Figures
5	PHASE 1 - TEMPORARY TRAFFIC CONTROL AND PROTECTION OF PUBLIC at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
6	PHASE 1 - TEMPORARY EROSION AND SEDIMENTATION CONTROLS at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
7	PHASE 1 - CONTROL OF WATER at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
8	RIVER CHANNEL/LAGOON DREDGING at the per Cubic Yard Unit Price of _____ Dollars and _____ Cents ($)	CY	800	$ _____
9	NATURE-LIKE FISHWAY CONSTRUCTION at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____

Item No.	CONTRACT ITEM AND UNIT PRICE (WORDS AND FIGURES)	Unit	Opinion of Quantity	Computed Total in Figures
10	STONE WALL CONSTRUCTION/RECONSTRUCTION at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
11	LAGOON INLET AND OUTLET WEIRS/LAGOON POOL OUTLET/WATER WHEEL OUTLET WEIR/ AND WATER CONTROL STRUCTURES at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
12	WATER WHEEL BYPASS SYSTEM at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
13	PHASE 1 - ELECTRIC SYSTEM IMPROVEMENTS at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
14	PHASE 1 - SITE RESTORATION at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____

Item No.	CONTRACT ITEM AND UNIT PRICE (WORDS AND FIGURES)	Unit	Opinion of Quantity	Computed Total in Figures
15	ALLOWANCE NO. 1 – PHASE 1 - POLICE DETAIL COST/FEE REIMBURSEMENT in the amount of $5,000.00	ALL	1	$ 5,000.00

CONTRACT BASE BID PRICE

For purposes of bid comparison, the Contract Base Bid Price shall be stated below as the direct sum of the Contract Base Bid Prices and Allowance listed above.

$ _____ (Amount in Figures)

_____ (Amount in Words)

B. The following Alternate Bid Prices, which include but are not limited to lagoon, access, and site safety improvements depicted under Phase 2 of the South River Fish Passage and Veterans Memorial Park Improvements Project, will be added to the project's total Contract Base Bid Price if authorized by the Project Owner.

ALTERNATE BID PRICE ITEM 1

Contract Item No.	CONTRACT ITEM AND UNIT PRICE (WORDS AND FIGURES)	Unit	Opinion of Quantity	Computed Total in Figures
ALT-1.1	PHASE 2 – SECONDARY SERVICE IMPROVEMENTS at the per Lump Sum Price of _____Dollars and _____ Cents ($)	LS	1	$ _____
ALT-1.2	ALLOWANCE NO.2 – PUBLIC UTILITY RELOCATION COST/FEE REIMBURSEMENT in the amount of $30,000.	LS	1	$ 30,000

TOTAL CONTRACT ALTERNATE 1 BID PRICE

For purposes of bid comparison, the Contract Alternate Bid Price shall be stated below as the direct sum of the Alternate Bid Price 1.1 through 1.2 listed above.

$ _____ (Amount in Figures)

_____ (Amount in Words)

ALTERNATE BID PRICE ITEM 2

Contract Item No.	CONTRACT ITEM AND UNIT PRICE (WORDS AND FIGURES)	Unit	Opinion of Quantity	Computed Total in Figures
ALT-2.1	PHASE 2 - MOBILIZATION at the per Lump Sum Price of _____Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.2	PHASE 2 – GENERAL REQUIREMENTS at the per Lump Sum Price of _____Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.3	PHASE 2 - DEMOBILIZATION at the per Lump Sum Price of _____Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.4	PHASE 2 - SITE CLEARING AND DEMOLITION at the per Lump Sum Price of _____Dollars and _____ Cents ($)	LS	1	$ _____

Contract Item No.	CONTRACT ITEM AND UNIT PRICE (WORDS AND FIGURES)	Unit	Opinion of Quantity	Computed Total in Figures
ALT-2.5	PHASE 2 - TEMPORARY TRAFFIC CONTROL AND PROTECTION OF PUBLIC at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.6	PHASE 2 - TEMPORARY EROSION AND SEDIMENTATION CONTROLS at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.7	PHASE 2 - CONTROL OF WATER at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.8	LAGOON SUPPLEMENTAL WATER SUPPLY SYSTEM at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.9	PHASE 2 - ELECTRIC SYSTEM IMPROVEMENTS at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____

Contract Item No.	CONTRACT ITEM AND UNIT PRICE (WORDS AND FIGURES)	Unit	Opinion of Quantity	Computed Total in Figures
ALT-2.10	CLAY LINER at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.11	TIMBER PEDESTRIAN BRIDGES AND WALKWAYS at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.12	STONE WALL CONSTRUCTION/ RECONSTRUCTION at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____
ALT-2.13	REPLACE MISSING STONE WALL STONES at the per Square Foot Unit Price of _____ Dollars and _____ Cents ($)	SF	100	$ _____
ALT-2.14	CHINK/REPOINT STONE WALL at the per Square Foot Unit Price of _____ Dollars and _____ Cents ($)	SF	500	$ _____
ALT-2.15	PHASE 2 - SITE RESTORATION at the per Lump Sum Price of _____ Dollars and _____ Cents ($)	LS	1	$ _____

Contract Item No.	CONTRACT ITEM AND UNIT PRICE (WORDS AND FIGURES)	Unit	Opinion of Quantity	Computed Total in Figures
ALT-2.16	ALLOWANCE NO. 3 – PHASE 2 POLICE DETAIL COST/FEE REIMBURSEMENT in the amount of $5,000.00	ALL	1	$ 5,000.00

TOTAL CONTRACT ALTERNATE 2 BID PRICE

For purposes of bid comparison, the Contract Alternate Bid Price shall be stated below as the direct sum of the Alternate Bid Price 2.1 through 2.16 listed above.

$ _____ (Amount in Figures)

_____ (Amount in Words)

ARTICLE 6 – TIME OF COMPLETION

6.1 Bidder agrees that the Work will be substantially complete within the below stated periods after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions.

A. Base Bid: 240 calendar days.

B. Alternate Bid Price Item 1: 60 additional calendar days.

C. Alternate Bid Price Item 2: 180 additional calendar days.

D. Substantial completion for the Project shall include, but not be limited to, construction of all bridge and water access structures and roadway, including removal of all temporary cofferdam(s) and flow bypass conveyances resulting in restoration of normal and unimpeded through the nature-like fishway and lagoon as indicated on the Drawings.

6.2 Bidder agrees that work will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 270 calendar days after the date when the Contract Times commence to run.

A. Contract Time will be extended as noted above for each additional Alternate Bid Price Item authorized by the Owner.

B. Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract Times.

ARTICLE 7 – ATTACHMENTS TO THIS BID

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

A. Required Bid security in the form of Bid Bond (00 43 13)

B. Bid Certification (BC-1 through BC-3)

C. Legal Certifications (LC-1)

D. Qualifications of Bidder (00 45 13)

E. Equal Employment Opportunity Forms (certification forms EEO-5, -8 and -10 shall be submitted with the bid; certification forms EEO-9, -11, -12 and -13, with additional copies from respective subcontractors as warranted, shall be submitted by the lowest and second-lowest bidders within five calendar days of bid opening)

ARTICLE 8 – DEFINED TERMS

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

ARTICLE 9 – BID SUBMITTAL

9.1 This Bid submitted by:

If Bidder is:

AN INDIVIDUAL

Name (typed or printed): _____

By: _____
(SEAL)

(Individual's signature)

Doing business as: _____

Business address: _____

_____

Phone No.: _____ FAX No.: _____

A PARTNERSHIP

Partnership Name: _____
(SEAL)

By: _____

(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Business address: _____

_____

Phone No.: _____ FAX No.: _____

A CORPORATION

Corporation Name: _____
(SEAL)

State of Incorporation: _____

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

By: _____

(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____

(Signature of Corporate Secretary)

Business address: _____

_____

Phone No.: _____ FAX No.: _____

Date of Qualification to do business is _____.

A JOINT VENTURE

Joint Venturer Name: _____

(SEAL)

By: _____

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

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone No.: _____ FAX No.: _____

Joint Venturer Name: _____
(SEAL)

By: _____

(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

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.)

SUBMITTED on _____, 20____.

State Contractor License No. _____

Attachment C

Updated Division 01 Specifications (Including Payment Items)

SECTION 01 22 19 – PAYMENT ITEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section describes the measurement and payment for the Work to be completed under each item on the Bid Form. The descriptions may not reference all of the associated Work. Work specified but not designated as a separate Bid Item is considered incidental to all Bid Items. The Contractor shall review all work associated with each work item and shall have no claim for being unfamiliar with the requirements of these specifications.

1. All work items described herein, including in measurement and payment descriptions or otherwise, do not state all requirement of the work stated in the Contract Documents; all such descriptions shall be inclusive of all incidental work for respective items, as stated in the Contract Documents.
2. This Section addresses general measurement and payment requirements for:
    a. Contract Base Bid Items
    b. Unit Price Bid Items
    c. Alternate Bid Items

B. Related Sections of the Specifications include the following:
1. Divisions 01 through 49 Sections for detailed procedural, material, and installation requirements associated with the Work of each payment item.

C. Related Requirements in the Specifications:
1. Division 01 Section "Contract Modification Procedures"

1.3 DEFINITIONS

A. Payment Items: Contractor's distribution of the Contract Sum through listed work items, as outlined in this Specification, reviewed, and accepted by the Engineer.

1. Each item is specified to include a defined scope of services. However, not all materials, labor, equipment, or services of a payment item are guaranteed to be listed or specified.
2. Include costs associated with items of work required to complete the defined scope of services within the appropriately specified payment item.
3. Payment items include all necessary materials, plus cost for delivery, installation, applicable fees and taxes, administrative over-site, tools, labor, incidentals, overhead, and profit.

4. Field-directed bid items not reflected on the Drawings will only be incorporated into the project if selected and authorized in writing by the Owner. Costs associated with field-directed bid items shown on the Drawings (including but not limited to the field-directed placement of boulders within the roughened channel/riffle section with low-flow channel downstream of the nature-like fishway) shall be included under the Contract Base Bid Price.

5. Unit bid price items shall be paid only as accepted and where accepted prior to the completion of the respective work.

6. All work described in the Contract Documents shall be included in the payment items described herein.

B. Unit Price: An amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services identified in the Contract Documents.

C. Lump Sum: When used as an item of payment, means complete payment for the work prescribed for that portion of the Work under the item, or all work prescribed in the Contract, as the case may be.

1. Lump sum payment items are groupings of the Work as determined by the Owner only for the Owner's convenience. Such listings of payment items shall establish the minimum level of detail for the Schedule of Values.

2. The Schedule of Values shall further include the breakdown of each lump sum bid item that appears in the Agreement and shall include the Contractor's verified quantities it used in preparing its bid. If accepted by the Engineer, this breakdown will be used in approximating percentages of completion of the lump sum bid items during the processing of payment applications.

D. Provide: Procure, fabricate, sample/test, deliver, place/install, adjust, correct and replace if needed all products or materials to be incorporated into all temporary and permanent elements of the Work in accordance with the Contract Documents.

E. Complete and In Place: When used in the measurement and payment provisions, means the completion of the contract item, including the fabrication, testing, reporting, furnishing, installation, adjustment and correction of all products and materials to be incorporated into the Work including all equipment, tools, labor, health and safety requirements, and work incidental thereto, in accordance with all provisions stated in the Contract Documents.

1.4 PROCEDURES

A. To ensure payment items are balanced, Mobilization/Demobilization for the base bid shall be limited to no more than five (5) percent of the total bid price for the base bid. Such limit will not prohibit the Contractor from seeking payment for documented expenditures (i.e., invoices or cancelled checks) in excess of this amount under other bid items during project startup and mobilization.

B. Unit price items, lump sum items and alternate unit price items include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

C. Measurement and Payment: Refer to the Sections 3.1 herein for methods of measurement and payment.

D. Notify Engineer at least 72-hours prior to the time at which necessary measurements must be taken. Notification must be in advance of obscuring pay item; do not proceed until such measurements have been taken in the presence of the Resident Project Representative.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF CONTRACT BASE BID ITEMS

A. The payment items listed below include references to Specification Sections of work to be completed under the payment item, however not all Sections of related work are guaranteed to be listed.

B. Base Bid Item No. 1 – Phase 1 - Mobilization

1. Work associated with this item will be paid for at the stated price including respective portions of work under all specifications necessary to initiate Contractor's activities at the project site.

    a. All or portions of the Contract Requirements and Division 01 specifications, as applicable.

    b. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to complete the work associated with the mobilization of materials, personnel, and equipment to the project site to complete work associated with the Contract Base Bid Items. Also includes posting all required temporary and permitting signage. The bid amount for this item shall not exceed 3% of the Total Contract Base Bid Price.

2. Measurement: This item will not be measured for payment but will be pro-rated with the Contractor's progress of work as accepted by Engineer.

3. Payment: Phase 1 - Mobilization will be paid for on a Lump Sum basis. When 1% of the total original contract amount is earned from other Contract Base Bid Items, 50% of the amount for Phase 1 - Mobilization will be paid. When 5% of the total original contract amount is earned from other Contract Base Bid Items, the remaining 50% for Phase 1 - Mobilization will be paid.

C. Base Bid Item No. 2 – Phase 1 - General Requirements

1. Work associated with this item will be paid for at the stated price including respective portions of work under all specifications necessary to sustain Contractor's activities at the project site.

    a. All or portions of the Contract Requirements and Division 01 specifications, as applicable.

    b. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for Contractor's general requirements to complete the work, including insurance, bonds, administrative and general requirements, meetings, schedules (including, but not limited to, construction

schedules, submittal schedules, and schedule of values), temporary facilities and controls for field office trailers and support utilities (including associated permits, fees and electrical/communication utility connection and usage costs), securing local permits as required, and all other measures not specified elsewhere and miscellaneous costs associated with the Work including incidentals not covered by other payment items. The bid amount for this item shall not exceed 5% of the Total Contract Base Bid Price.

c. Payment of invoiced costs by utility owners for permanent services will be made under Alternate Price Sub-Item ALT-1.2: Allowance No. 2 – Public Utility Relocation Cost/Fee Reimbursement.

d. Also includes other incidental items such as obtaining necessary remaining permits, field and laboratory testing, construction survey layout, and project record drawings/mapping.

2. Measurement: This item will not be measured for payment but will be pro-rated with the Contractor's progress of work as accepted by Engineer.

3. Payment: Phase 1 - General Requirements will be paid for on a Lump Sum basis. Contractor will be paid 40% upon completion of phase 1 - mobilization, 30% upon earning 50% of the total base bid contract value, and the remaining 30% upon completion of phase 1 - demobilization from the site as accepted by the Engineer.

D. Base Bid Item No. 3 – Phase 1 - Demobilization

1. Work associated with this item will be paid for at the stated price including respective portions of work under all specifications necessary to conclude Contractor's activities at the project site.

a. All or portions of the Contract Requirements and Division 01 specifications, as applicable.

b. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for demobilization of materials, personnel, and equipment from the project site. Also includes restoring all incidental areas inside or outside the project limits damaged by Contractor's activities or traffic control to existing condition or better including construction access ways (e.g., temporary staging and storage areas) and restoring and establishing a satisfactory stand of vegetation in non-hardscape areas affected by construction. The bid amount for this item shall not exceed 2% of the Total Contract Base Bid Price.

2. Measurement: This item will not be measured for payment but will be paid as a lump sum unit price bid item.

3. Payment: Phase 1 - Demobilization will be paid for on a Lump Sum basis, complete and in place. Phase 1 - Demobilization shall be considered complete when the Contractor has achieved final completion of the work and removed all equipment and materials from the site.

E. Base Bid Item No. 4 – Phase 1 - Site Clearing and Demolition

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

a. All or portions of Division 01 specifications, as applicable.

b. Section 02 41 13 Selective Demolition

c. Section 31 10 00 Site Clearing

d. Section 31 20 00 Earth Moving

e. Section 31 50 00 Excavation Support and Protection

f. Section 35 01 70 Control of Water

g. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for demolition, handling, transport and disposal of items to be removed and disposed within the Phase 1 base bid limits as indicated on Contract Drawings; remove and dispose of concrete fishway and associated stone masonry walls, including storing for reuse existing stone masonry stones and off-site disposal of reinforced concrete; removing and disposing existing dam/spillway boulder step structure to enable construction of the nature-like fishway structure, including storing for reuse existing stone masonry stones and off-site disposal of reinforced concrete; clearing, grubbing and tree removal within the project limit of disturbance; remove and storing (on-site) existing water wheel; remove and dispose of existing timbers lining the lagoon inlet; removing timber rail fence and avian barrier screen; remove and replace walkways in conflict with Phase 1 construction (e.g. required to install drainage, electric, and lagoon utilities; remove and dispose existing 18-inch HDPE pipe and inlet structure); Selectively demolish and reconstruct sections of stone masonry walls as required to complete proposed work where indicated within Phase 1 limits on Contract Drawings; screening and stockpiling topsoil where such materials are to be proposed for reuse on completed areas where depicted on the Contract Drawings and as directed by the Engineer. Includes protecting existing structures and vegetation to remain within and adjacent to work areas; and repairing any damage to such features resulting from the Contractor's operations.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in performing and completing respective work items associated with this bid item.

3. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

F. Base Bid Item No. 5 – Phase 1 - Temporary Traffic Control and Protection of Public

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

a. All portions of Division 01 specifications, as applicable.

b. Section 01 55 26 Traffic Control

c. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for installation, maintenance and removal of all temporary pavement markings, impact attenuators, concrete barriers, construction barricades, drums, advanced warning and traffic signs, cones, lights, temporary traffic signing, including associated costs for electrical utility and land-based or wireless communication connections and services, flaggers, and other products and materials required for the control and protection of the traveling public

and working personnel throughout construction as indicated within the Contract Documents or as directed by the engineer. Any traffic control devices which are lost, stolen, destroyed, or deemed unacceptable while in use shall be replaced without additional compensation. All materials, labor, and equipment necessary to complete the work shall be considered as incidental to the construction and be included in the lump sum price. This item is for work completed under the base bid.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in performing and completing respective work items associated with this bid item.

3. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

    a. Payment of invoiced costs for police details will be made under Bid Price Item No. 15 - Allowance No. 1 – Phase 1 Police Detail Cost/Fee Reimbursement.

G. Base Bid Item No. 6 – Phase 1 - Temporary Erosion and Sedimentation Controls

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

    a. All or portions of Division 01 specifications, as applicable, including:

    b. Section 01 57 13 Temporary Erosion and Sedimentation Control

    c. Section 31 20 00 Earth Moving

    d. Section 32 92 00 Site and Wetland Restoration

    e. Section 35 01 70 Control of Water

    f. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for installing, maintaining, and removing and disposing all temporary erosion and sedimentation control measures and practices for completion of all Base Bid work associated with the project. Such measures include, but are not limited to, biodegradable fiber rolls, construction entrances, and temporary construction dewatering basins.

    g. Also includes removing and disposing of all accumulated sediment off-site and establishing temporary vegetation in areas to remain dormant for extended periods as indicated on the Contract Drawings.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in establishing, maintaining and restoring all temporary and erosion control measures and practices required for completion of work.

3. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

H. Base Bid Item No. 7 – Phase 1 - Control of Water

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

    a. All or portions of Division 1 specifications, as applicable.

b. Section 31 20 00 Earth Moving

c. Section 31 50 00 Excavation Support and Protection

d. Section 35 01 70 Control of Water

e. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for controlling surface and groundwater within project Base Bid work areas through the furnishing, installation, operation, maintenance, and removal of temporary water control measures including cofferdams, steel sheeting, and other appurtenances as indicated on the Contract Drawings for Normal Water Control; temporary protection of work area measures for Flood Water Control conditions (i.e. flood water flow in excess of Normal Water Control conditions); groundwater/surface water pumps and temporary dewatering areas; and other water control measures and appurtenances such as surface and subsurface dams, flow diversions, special linings for erosion protection (including temporary liner for lagoon and lagoon inlet channel, pipes, barriers, prefabricated sediment containment devices, pumps, and watertight seals.

f. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to furnish and install temporary geomembrane liner placed over the excavated lagoon in accordance with the Contract Documents and as directed by the engineer.

g. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to furnish and install lagoon outlet control structure (including stop log controls), 30" HDPE lagoon outlet pipe, and other required components in accordance with the Contract Documents and as directed by the engineer.

h. All other Control of Water work required by Alternative Bid Item No. 2 work will not be included within this lump sum price and will be paid for under Alternate Bid Item No. 2.7 – Phase 2 - Control of Water.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in performing and completing respective work items associated with this bid item.

3. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

I. Base Bid Item No. 8 – Phase 1 - River Channel/Lagoon Dredging

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

a. All or portions of Division 1 specifications, as applicable.

b. Section 31 10 00 Site Clearing

c. Section 31 20 00 Earth Moving

d. Section 35 10 70 Control of Water

e. Includes, but is not limited to: Preliminary and final surveys of lagoon and river channel dredge areas; dredging, testing, transportation, and stockpiling of dredge

material within temporary staging area as indicated on the Contract Drawings and/or as directed by the Engineer. This item includes all dredging completed within the lagoon and river channel located within the project limits. Also includes transportation to and/or re-used in an onsite location identified within project limits or final disposal area identified by the town. Includes all labor, materials, equipment, survey and positioning, tools, and all other incidentals required to complete the work.

2. Measurement: The amount of material dredged, stockpiled, dewatered, transported and/or reused will be determined by a calculation of volume when comparing the Contractor pre and post survey elevations or as determined by the Engineer. The calculation will be performed by using the average end area method with cross-sections taken every 20-feet.

3. Payment: Payment for this bid item will be made on a unit price per cubic yard of dredge material reused onsite or transported offsite, complete and accepted by the Engineer.

J. Base Bid Item No. 9 – Nature-Like Fishway Construction

1. Work associated with this item will be paid for at the stated Lump Sum Bid Price including, but not limited to, work under the following:

   a. All or portions of Division 1 specifications, as applicable.

   b. Section 31 20 00 Earth Moving

   c. Section 35 10 70 Control of Water

   d. Section 35 79 13 Nature-Like Fishway

   e. Includes, but is not limited to: Excavating/grading existing river channel bed and riverbank areas for construction of the fishway structure and downstream roughened channel/riffle section (with low-flow channel), including handling, furnishing, storing and placing all materials for use in constructing the fishway, boulder riffles, pools, roughened channel/riffle section, and riverbank slope stabilization measures within the river reach of the proposed fishway (placing stones to the required grades and elevations, installing biodegradable fiber roll/vegetated coir fascine).

   f. Includes, but is not limited to: placing excavated native stable channel bottom material from the natural river channel in the downstream roughened channel/riffle section with low flow channel. Work associated with this item also includes installation of random boulder placement within the downstream riffle as directed by the engineer.

   g. Includes, but is not limited to: excavating, furnishing, and installing soil-filled stone/cobble streambed channel protection within the fishway including incidental materials including, but not limited to existing streambed sand/gravel/cobble material or imported riprap stone as indicated on the Contract Drawings; and furnishing and installing native boulders to repair eroded river channel and to protect existing stone masonry walls.

   h. Includes, but is not limited to furnishing and installing suitable backfill material for finalized construction of the grassed peninsula.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

3. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

K. Base Bid Item No. 10 – Stone Wall Construction/Reconstruction

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

   a. All portions of Division 1 specifications, as applicable

   b. Section 04 43 00 Stone Masonry

   c. Section 31 20 00 Earth Moving

   d. Section 31 50 00 Excavation Support and Protection

   e. Section 35 10 70 Control of Water

   f. Reconstruct Stone Wall includes, but is not limited to, the following:

      i. Retaining a qualified Historic Mason for the oversight, submittal preparation; and execution of all work under this Item;

      ii. Preparation of submittals, including photographs, shop drawings, and mockups for review and approval as required prior to the execution of work under this Item;

      iii. Constructing/Rebuilding stone masonry walls laid in dry or mortared joints, as indicated on the Contract Drawings or where directed by the Engineer;

      iv. All appurtenant work as specified, indicated on the Contract Drawings, or otherwise required for the complete and accepted execution of Reconstruction stone wall, including but not limited to: controlled dismantling, protection and storage of existing wall stones, reclamation of fallen stones from the adjacent channel, provision of replacement stone materials as required, excavation for reconstruction work including installation of compacted base, provision of excavation support and protection; installation of filter fabric, and backfilling and compacting.

      v. Includes incidental materials and labor to: reconstruct stone masonry walls, construct new stone masonry walls protect existing features within and adjacent to stone wall reconstruction areas and repair any damage to such features resulting from the Contractor's operations; provide, maintain, reset as needed, and remove water control system at active work areas; provide additional water control measures, personal, equipment, and other measures as required during high flow and heavy rainfall events; and restore disturbed areas with stable grass vegetation and erosion and sedimentation controls.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

3. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

L. Base Bid Item No. 11 – Lagoon Inlet and Outlet Weirs/Lagoon Pool Outlet/Water Wheel Outlet Weir/and Water Control Structures

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

   a. All or portions of Division 1 specifications, as applicable.

   b. 02 41 13 Selective Demolition

   c. 03 30 00 Cast-In-Place Concrete

   d. 31 11 13 Formation of Subgrade

   e. 31 20 00 Earth Moving

   f. 33 37 00 Flow Control Structures

   g. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to furnish and install concrete lagoon inlet structure with stop log controls, concrete lagoon outlet weir with stop log controls, concrete water wheel outlet weir with stop gate, concrete lagoon pool outlet weir with stop log controls, concrete water wheel outlet weir with stop gate, low-flow water wheel channel and associated foundation systems, associated material and compaction testing, and all other incidentals required to finish the work in accordance with the Contract Documents and as directed by the Engineer.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

3. Payment: – Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

M. Base Bid Item No. 12 – Water Wheel Bypass System

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

   a. All or portions of Division 1 specifications, as applicable.

   b. 02 41 13 Selective Demolition

   c. 31 11 13 Formation of Subgrade

   d. 31 20 00 Earth Moving

   e. 33 37 00 Flow Control Structures

   f. 33 40 00 Water Bypass Piping

   g. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to furnish and install precast concrete inlet structure, precast concrete outlet structure with pond skimmer grate, HDPE piping, ductile iron blowoff pipe/valve and all other incidentals required to finish the work in accordance with the Contract Documents and as directed by the Engineer.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

3. Payment: – Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

N. Base Bid Item No. 13 – Phase 1 - Electric System Improvements

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

   a. All or portions of Division 1 specifications, as applicable.

   b. Section 26 05 33 Conduit for Electrical System

   c. Section 31 20 00 Earth Moving

   d. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to furnish and install, complete, and ready for cable and control system placement all utility conduits as shown on the Contract Drawings including electric duct banks, pump power/control conduits, fittings, handholes, terminations, grounding materials, and power riser poles. Also, it includes required inspections and coordination with respective utility company owners to determine specific utility requirements for work related to this Project, providing the Utility Companies with any information necessary for the Utility Companies to perform their work, and preparing and filing requests for service with Utility Companies.

   e. All other work required to install power wiring, meter installation from the secondary service riser pole to shed will not be included within this lump sum price and will be paid for under Alternate Bid Item No. 1.1 – Phase 2 – Secondary Service Improvements

   f. All work required to install power/control wiring, control panel installation for the cistern pumps will be paid for under Alternate Bid Item No. 2.9– Electric System Improvements.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

3. Payment: – Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

O. Base Bid Item No. 14 – Phase 1 - Site Restoration

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

   a. All or portions of Division 1 specifications, as applicable

   b. Section 31 01 00 Site Restoration and Plantings

   c. Section 32 72 00 Wetland Restoration

d. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to construct/restore the floodplain restoration area, lower riverbank stabilization area, riverbank stabilization area, upper riverbank restoration area, and staging/storage areas within the Base Bid project limits with plantings and seed mixtures as indicated on the Contract Drawings. Such restoration measures also includes other vegetative site features to their original condition (or better) that were damaged, disrupted or displaced by Base Bid construction activities as well as establishing, maintaining and protecting satisfactory vegetation for one year from the date of seeding and planting.

e. All other restoration work required to restore Alternative Bid work will not be included within this lump sum price and will be paid for under Alternate Bid Item No. 2.14 – Phase 2 - Site Restoration.

2. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

3. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

P. Base Bid Item No. 15 - Allowance No. 1 - Phase 1 - Police Detail Cost/Fee Reimbursement

1. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

a. All or portions of Division 1 specifications, as applicable

b. Section 01 55 26 Traffic Control

c. Includes, but is not limited to: Marshfield Police Department fees incurred by the project for the control and protection of the traveling public and working personnel throughout construction as required by the Contract Documents.

2. Measurement: This item will not be measured for payment.

3. Payment: Reimbursement of costs (with no overhead, profit or other markup) under this allowance will be made based on invoices generated by the Marshfield Police Department. At contract closeout, any funds remaining from the allowance will be credited to the Owner by a balancing Change Order.

3.2 LIST OF ALTERNATE BID ITEMS

A. Alternate Bid Item No. 1

1. Work associated with this item will be paid for at the combined prices stated in Alternate Bid Item No. 1.1 through Alternate Bid Item No. 1.2. All work described below will be completed as part of Alternate Bid Item No. 1:

2. Alternate Bid Item No. 1.1 – Phase 2 – Secondary Service Improvements

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All or portions of Division 1 specifications, as applicable.

ii. Section 26 05 00 Selective Demolition for Electrical

iii. Section 26 05 19 Low-Voltage Electrical Power Conductors and Cables

iv. Section 26 05 26 Grounding and Bonding for Electrical Systems

v. Section 26 05 33 Boxes for Electrical Systems

vi. Section 26 05 53 Identification for Electrical Systems

vii. Section 26 09 00 Controls and Instrumentation

viii. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to furnish and install, complete, and ready for operations the secondary service from the secondary electrical riser pole to the new shed main/meter, as shown on the Contract Drawings including exterior load center, main/meter, and power wire and cable. Also, it includes required inspections, testing, and coordination with respective utility company owners to determine specific utility requirements for work related to this Project, providing the Utility Companies with any information necessary for the Utility Companies to perform their work, and preparing and filing requests for service with Utility Companies.

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

c. cting respective items associated with this bid price item.

d. Payment: – Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

3. Alternate Bid Item No. 1.2 – Allowance No. 2 – Public Utility Relocation Cost/Fee Reimbursement

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All or portions of Division 1 specifications, as applicable.

ii. Includes, but is not limited to: Public utility owner fees incurred by the project associated with the new permanent relocation of utilities shown on the Contract Drawings

b. Measurement: This item will not be measured for payment.

c. Payment: – Reimbursement of costs (with no overhead, profit or other markup) under this allowance will be made based on invoices generated by respective utility owners. At contract closeout, any funds remaining from the allowance will be credited to the Owner by a balancing Change Order.

B. Alternate Bid Item No. 2

1. Work associated with this item will be paid for at the combined prices stated in Alternate Bid Item No. 2.1 through Alternate Bid Item No. 2.16. All work described below will be completed as part of Alternate Bid Item No. 2:

2. Alternate Bid Item No. 2.1 – Phase 2 – Mobilization

a. Work associated with this item will be paid for at the stated price including respective portions of work under all specifications necessary to initiate Contractor's activities at the project site.

i. All or portions of the Contract Requirements and Division 01 specifications, as applicable.

ii. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to complete the work associated with the mobilization of materials, personnel, and equipment to the project site to complete work associated with Alternate Bid Item No. 2. Also includes posting all required temporary and permitting signage. The bid amount for this item shall not exceed 3% of the Total Alternate Bid Item No. 2 Price.

b. Measurement: This item will not be measured for payment but will be pro-rated with the Contractor's progress of work as accepted by Engineer.

c. Payment: Mobilization will be paid for on a Lump Sum basis. When 1% of the total original Alternate Bid Item No. 2 amount is earned from other Alternate Bid Sub-Items, 50% of the amount for Mobilization will be paid. When 5% of the total original Alternate Bid Item No. 2 amount is earned from other Alternate Bid Sub-Items the remaining 50% for Mobilization will be paid.

3. Alternate Bid Item No. 2.2 – Phase 2 - General Requirements

a. Work associated with this item will be paid for at the stated price including respective portions of work under all specifications necessary to sustain Contractor's activities at the project site.

i. All or portions of the Contract Requirements and Division 01 specifications, as applicable.

ii. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for Contractor's general requirements to complete the Alternate Bid Item No. 2 work, including insurance, bonds, administrative and general requirements, meetings, schedules (including, but not limited to, construction schedules, submittal schedules, and schedule of values), temporary facilities and controls for field office trailers and support utilities (including associated permits, fees and electrical/communication utility connection and usage costs), securing local permits as required, and all other measures not specified elsewhere and miscellaneous costs associated with the Alternate Bid Item No. 2 Work including incidentals not covered by other Alternate Bid Item No. 2 Sub-Items. The bid amount for this item shall not exceed 5% of the Total Alternate Bid Item No. 2 Price.

iii. Payment of invoiced costs by utility owners for permanent services will be made under Alternate Bid Item ALT-1.2: Allowance No. 2 – Public Utility Relocation Cost/Fee Reimbursement.

iv. Also includes other incidental items such as obtaining necessary remaining permits, field and laboratory testing, construction survey layout, and project record drawings/mapping.

b. Measurement: This item will not be measured for payment but will be pro-rated with the Contractor's progress of work as accepted by Engineer.

c. Payment: Phase 2 - General Requirements will be paid for on a Lump Sum basis. Contractor will be paid 40% upon completion of phase 2 - mobilization, 30% upon earning 50% of the total Alternate Bid Item No. 2 contract value, and the remaining 30% upon completion of phase 2 - demobilization from the site as accepted by the Engineer.

4. Alternate Bid Item No. 2.3 – Phase 2 - Demobilization

   a. Work associated with this item will be paid for at the stated price including respective portions of work under all specifications necessary to conclude Contractor's activities at the project site.

      i. All or portions of the Contract Requirements and Division 01 specifications, as applicable.

      ii. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for demobilization of materials, personnel, and equipment from the project site associated with completing work under Alternate Bid Item No. 2. Also includes restoring all incidental areas inside or outside the project limits damaged by Contractor's activities or traffic control to existing condition or better including construction access ways (e.g., temporary staging and storage areas) and restoring and establishing a satisfactory stand of vegetation in non-hardscape areas affected by construction under Alternate Bid Item No. 2. The bid amount for this item shall not exceed 2% of the Total Alternate Bid Item No. 2 Price.

   b. Measurement: This item will not be measured for payment but will be paid as a lump sum unit price bid item.

   c. Payment: Phase 2 - Demobilization will be paid for on a Lump Sum basis, complete and in place. Phase 2 - Demobilization shall be considered complete when the Contractor has achieved final completion of the work under Alternate Bid Item No. 2 and removed all equipment and materials from the site.

5. Alternate Bid Item No. 2.4 – Phase 2 - Site Clearing and Demolition

   a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

      i. All or portions of Division 01 specifications, as applicable.

      ii. Section 02 41 13 Selective Demolition

      iii. Section 31 10 00 Site Clearing

      iv. Section 31 20 00 Earth Moving

      v. Section 31 50 00 Excavation Support and Protection

      vi. Section 35 01 70 Control of Water

      vii. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for demolition, handling, transport and disposal of items to be removed and disposed within the Alternate Bid Item No. 2 limits as indicated on Contract Drawings; clearing, grubbing and tree removal within the Phase 2 project limit of disturbance; installing timber rail fence with aviary screen; Selectively demolish and reconstruct sections of stone masonry walls as required to complete proposed work where indicated on

Contract Drawings, screening and stockpiling topsoil where such materials are to be proposed for reuse on completed areas where depicted on the Contract Drawings and as directed by the Engineer. Includes protecting existing structures and vegetation to remain within and adjacent to work areas; and repairing any damage to such features resulting from the Contractor's operations.

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in performing and completing respective work items associated with this bid item.

c. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

6. Alternate Bid Item No. 2.5 – Phase 2 - Temporary Traffic Control and Protection of Public

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All portions of Division 01 specifications, as applicable.

ii. Section 01 55 26 Traffic Control

iii. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for installation, maintenance and removal of all temporary pavement markings, impact attenuators, concrete barriers, construction barricades, drums, advanced warning and traffic signs, cones, lights, temporary traffic signing, including associated costs for electrical utility and land-based or wireless communication connections and services, flaggers, and other products and materials required for the control and protection of the traveling public and working personnel throughout construction as indicated within the Contract Documents. Any traffic control devices which are lost, stolen, destroyed, or deemed unacceptable while in use shall be replaced without additional compensation. All materials, labor, and equipment necessary to complete the work shall be considered as incidental to the construction and be included in the lump sum price. This item is for work completed under Alternate Bid Price Item No. 2

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in performing and completing respective work items associated with this bid item.

c. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

i. Payment of invoiced costs for police details will be made under Alternate Bid Price Item No. 2.17 - Allowance No. 3 – Phase 2 Police Detail Cost/Fee Reimbursement.

7. Alternate Bid Item No. 2.6 – Phase 2 - Temporary Erosion and Sedimentation Controls

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All or portions of Division 01 specifications, as applicable, including:

ii. Section 01 57 13 Temporary Erosion and Sedimentation Control

iii. Section 31 01 00 Site Restoration and Plantings

iv. Section 31 20 00 Earth Moving

v. Section 35 01 70 Control of Water

vi. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for installing, maintaining, and removing and disposing all temporary erosion and sedimentation control measures and practices for completion of all Alternate Bid Item No. 2 work associated with the project. Such measures include, but are not limited to, biodegradable fiber rolls, construction entrances, and temporary construction dewatering basins.

vii. Also includes removing and disposing of all accumulated sediment off-site and establishing temporary vegetation in areas to remain dormant for extended periods as indicated on the Contract Drawings.

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in establishing, maintaining and restoring all temporary and erosion control measures and practices required for completion of work.

c. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

8. Alternate Bid Item No. 2.7 – Phase 2 - Control of Water

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All or portions of Division 1 specifications, as applicable.

ii. Section 31 20 00 Earth Moving

iii. Section 31 50 00 Excavation Support and Protection

iv. Section 35 01 70 Control of Water

v. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required for controlling surface and groundwater within project Alternate Bid Item No. 2 work areas through the furnishing, installation, operation, maintenance, and removal of temporary water control measures including cofferdams, steel sheeting, and other appurtenances as indicated on the Contract Drawings for Normal Water Control; temporary protection of work area measures for Flood Water Control conditions (i.e. flood water flow in excess of Normal Water Control conditions); groundwater/surface water pumps and temporary dewatering areas; and other water control measures and appurtenances such as surface and subsurface dams, flow diversions, special linings for erosion protection, pipes, barriers, prefabricated sediment containment devices, pumps, and watertight seals.

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in performing and completing respective work items associated with this bid item.

c. Payment: Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

9. Alternate Bid Item No. 2.8 – Lagoon Supplemental Water Supply System

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All or portions of Division 1 specifications, as applicable.

ii. 02 41 13 Selective Demolition

iii. 03 40 00 Precast Concrete Structures

iv. 31 20 00 Earth Moving

v. 31 11 13 Formation of Subgrade

vi. 33 41 00 Subdrainage

vii. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to furnish and install precast cistern, PVC discharge pipe, perforated cistern underdrain, underdrain cleanout and all other incidentals required to finish the work in accordance with the Contract Documents and as directed by the Engineer.

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

c. Payment: – Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

10. Alternate Bid Item No. 2.9– Phase 2 - Electric System Improvements

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All or portions of Division 1 specifications, as applicable.

ii. Section 26 05 00 Selective Demolition for Electrical

iii. Section 26 05 19 Low-Voltage Electrical Power Conductors and Cables

iv. Section 26 05 26 Grounding and Bonding for Electrical Systems

v. Section 26 05 33 Conduits for Electrical Systems

vi. Section 26 05 33 Boxes for Electrical Systems

vii. Section 26 05 53 Identification for Electrical Systems

viii. Section 26 09 00 Controls and Instrumentation

ix. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to furnish and install, complete,

and ready for operations all remaining utility work, not completed within the Base Bid and Alternate Bid Item No. 1, as shown on the Contract Drawings including submersible pump, level transmitters, distribution load center, time controllers, combination starters, system control panels, power and control wire and cable to cisterns/fountain. Removal and disposal of existing systems within the park shed. Also, it includes required inspections, testing, and coordination with respective utility company owners to determine specific utility requirements for work related to this Project, providing the Utility Companies with any information necessary for the Utility Companies to perform their work, and preparing and filing requests for service with Utility Companies.

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

c. items associated with this bid price item.

d. Payment: – Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

11. Alternate Bid Item No. 2.10 – Clay Liner

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All or portions of Division 1 specifications, as applicable.

ii. 02 41 13 Selective Demolition

iii. 31 20 00 Earth Moving

iv. 31 23 23 Compacted Clay Liner

v. 32 11 13 Formation of Subgrade

vi. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to furnish and install impermeable lagoon clay liner separation fabric, native mineral sediemnt and all other incidentals required to finish the work in accordance with the Contract Documents and as directed by the Engineer.

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this bid price item.

c. Payment: – Payment for this bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

12. Alternate Bid Item No. 2.11 – Timber Pedestrian Bridges and Walkways

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All portions of Division 1 specifications, as applicable

ii. Section 02245 - Control of Water

iii. Section 02260 - Excavation Support and Protection

iv. Section 02300 - Earthwork

v. Section 06135 - Timber Bridge Structures

vi. Includes, but is not limited to: Furnishing timber pedestrian bridge structures and walkways as depicted on the Contract Drawings. Includes incidental materials and labor to protect existing features within and adjacent to timber pedestrian bridge replacement areas/walkway construction areas and repairing any damage to such features resulting from the Contractor's operations;

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this alternate bid item.

c. Payment: Payment for this alternate bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

13. Alternate Bid Item No. 2.12 – Stone Wall Construction/Reconstruction

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

b. the following:

i. All portions of Division 1 specifications, as applicable

ii. Section 04 43 00 Stone Masonry

iii. Section 31 20 00 Earth Moving

iv. Section 31 50 00 Excavation Support and Protection

v. Section 35 10 70 Control of Water

vi. Reconstruct Stone Wall includes, but is not limited to, the following:

a) Retaining a qualified Historic Mason for the oversight, submittal preparation; and execution of all work under this Item;

b) Preparation of submittals, including photographs, shop drawings, and mockups for review and approval as required prior to the execution of work under this Item;

c) Constructing/Rebuilding stone masonry walls laid in dry or mortared joints, as indicated on the Contract Drawings or where directed by the Engineer;

d) All appurtenant work as specified, indicated on the Contract Drawings, or otherwise required for the complete and accepted execution of Reconstruction stone wall, including but not limited to: controlled dismantling, protection and storage of existing wall stones, reclamation of fallen stones from the adjacent channel, provision of replacement stone materials as required, excavation for reconstruction work including installation of compacted base, provision of excavation support and protection; installation of filter fabric, and backfilling and compacting.

e) Includes incidental materials and labor to: reconstruct stone masonry walls, construct new stone masonry walls protect existing features within and adjacent to stone wall reconstruction areas and repair any damage to such features resulting from the Contractor's operations; provide, maintain, reset as needed, and remove water control system at active work areas; provide additional water control measures, personal, equipment, and other measures as required during high flow and heavy rainfall events; and restore disturbed areas with stable grass vegetation and erosion and sedimentation controls.

c. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this alternate bid price item.

d. Payment: Payment for this alternate bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

14. Alternate Bid Item No. 2.13 – Replace Missing Stone Wall Stones

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All portions of Division 1 specifications, as applicable

ii. Section 04 43 00 Stone Masonry

iii. Section 35 10 70 Control of Water

iv. Replace Missing Stone Wall Stones includes, but is not limited to, the following:

a) Retaining a qualified Historic Mason for the oversight, submittal preparation; and execution of all work under this Item;

b) Preparation of submittals, including photographs, shop drawings, and mockups for review and approval as required prior to the execution of work under this Item;

c) Replace missing stone wall stones as indicated on the Contract Drawings or where directed by the Engineer, using stones reclaimed from the river channel, and where required approved stone materials furnished by the Contractor and delivered/installed at the site.

d) Includes incidental materials and labor to: reset missing stones, protect existing features within and adjacent to stone wall reconstruction areas and repair any damage to such features resulting from the Contractor's operations.

b. Measurement: As measured per each square foot of exposed vertical wall face damaged and subject to reconstruction, measured from the bottom to the top of wall at each point along the length of the repair area, prior to initiation of any repair work under this item.

i. Such measurement shall be by the Contractor in the presence of the Engineer, notification for which shall be at least 72-hours prior to such measurement.

ii. All such survey measurements shall be clearly depicted on a scaled site plan, with supporting computations provided in electronic (spreadsheet) or otherwise

in hard copies, and preconstruction photographs as requested by the Engineer. All plans and computations shall be certified as accurate by an Officer of the Contractor's corporation and transmitted for the Engineer's review and recommendation for payment.

iii. Areas repaired or otherwise temporarily dismantled outside areas depicted on the Contract Drawings for repair, or otherwise not instructed in writing by the Engineer, shall not be included in any measurement, and where the Engineer determines that such area(s) have been included in any measurement, such correction as deemed appropriate by the Engineer shall be applied under its recommendation for payment.

c. Payment: Replace Missing Stone Wall Stones will be paid for by the square foot of vertical void area damaged and to be repaired, as accepted, complete in place.

15. Alternate Bid Item No. 2.14 – Chink/Repoint Stone Wall

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All portions of Division 1 specifications, as applicable

ii. Section 04 43 00 Stone Masonry

iii. Section 35 10 70 Control of Water

iv. Chink/Repoint Stone Wall includes, but is not limited to, the following:

a) Retaining a qualified Historic Mason for the oversight, submittal preparation; and execution of all work under this Item;

b) Preparation of submittals, including photographs, shop drawings, and mockups for review and approval as required prior to the execution of work under this Item;

c) Chinking of any voids greater than four inches in any two dimensions with approved stone materials as indicated on the Contract Drawings or where directed by the Engineer.

d) Removing deteriorated mortar, soil, debris and biological growth from surfaces of stones and furnishing/installing mortar in open stone masonry joints within limits of work depicted. Includes incidental materials and labor to: repoint stone walls, protect existing features within and adjacent to stone wall reconstruction areas and repair any damage to such features resulting from the Contractor's operations.

b. Measurement: As measured per each square foot of exposed vertical wall face damaged and subject to reconstruction, measured from the bottom to the top of each point along the length of the repair area, prior to initiation of any repair work under this item.

i. Such measurement shall be by the Contractor in the presence of the Engineer, notification for which shall be at least 72-hours prior to such measurement.

ii. All such survey measurements shall be clearly depicted on a scaled site plan, with supporting computations provided in electronic (spreadsheet) or otherwise in hard copies, and preconstruction photographs as requested by the Engineer. All plans and computations shall be certified as accurate by an Officer of the

Contractor's corporation and transmitted for the Engineer's review and recommendation for payment.

iii. Areas repaired or otherwise temporarily dismantled outside areas depicted on the Contract Drawings for repair, or otherwise not instructed in writing by the Engineer, shall not be included in any measurement, and where the Engineer determines that such area(s) have been included in any measurement, such correction as deemed appropriate by the Engineer shall be applied under its recommendation for payment.

c. Payment: Chink Wall/Repoint Stone Wall will be paid for by the square foot of vertical wall face damaged and to be chinked/repointed, as accepted, complete in place.

16. Alternate Bid Item No. 2.15 – Phase 2 – Site Restoration

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All or portions of Division 1 specifications, as applicable

ii. Section 31 01 00 – Site Restoration and Plantings

iii. Includes, but is not limited to: All products, materials, equipment, tools, labor, overhead and profit, and incidentals required to restore Alternate Bid Item No. 2 construction activities including but not limited to temporary on-site construction staging/stockpile/storage areas, temporary construction access routes, and areas of Veterans Memorial Park disturbed within project limits with seed mixtures as indicated on the Contract Drawings. Such restoration measures also includes restoring other vegetative site features to their original condition (or better) that were damaged, disrupted or displaced by Alternate Bid Item No. 2 construction activities as well as establishing, maintaining and protecting satisfactory vegetation for one year from the date of seeding and planting.

b. Measurement: As measured by the Contractor and accepted by the Engineer, pro-rated with the Contractor's progress of work in constructing respective items associated with this alternate bid item.

c. Payment: Payment for this alternate bid item will be made on a Lump Sum basis based on a percentage of completion as estimated from measurements made by the Contractor and accepted by the Engineer.

17. Alternate Bid Item No. 2.16 – Allowance No. 3 – Phase 2 Police Detail Cost/Fee Reimbursement

a. Work associated with this item will be paid for at the stated price including, but not limited to, work under the following:

i. All or portions of Division 1 specifications, as applicable

ii. Section 01 55 26 Traffic Control

iii. Includes, but is not limited to: Marshfield Police Department fees incurred by the project for the control and protection of the traveling public and working personnel throughout construction of Alternate Bid Item No. 2 as required by the Contract Documents.

b. Measurement: This item will not be measured for payment.

c. Payment: Reimbursement of costs (with no overhead, profit or other markup) under this allowance will be made based on invoices generated by the Marshfield Police Department. At contract closeout, any funds remaining from the allowance will be credited to the Owner by a balancing Change Order.

END OF SECTION

SECTION 01 41 00 - REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 CODES, AUTHORITIES, REGULATORY AGENCIES, AND INDUSTRY REFERENCES

A. The Contractor shall be solely responsible to conduct its operations in a manner that meets all local, state and federal regulations including, but not limited to, Town of Marshfield. MA DEP, MassDOT, US Army Corps of Engineers, USEPA, OSHA and other labor and equipment licensing requirements.

B. Where references are made on Drawings or Specifications to codes, they shall be considered an integral part of the Contract Documents as minimum standards. Nothing contained in the Contract Documents shall be so construed as to be in conflict with any law, bylaw or regulation of the municipal, state, federal or other authorities having jurisdiction.

C. Perform Work in compliance with the following authorities:

1. Utility Company (e.g. Eversource, Verizon etc.).

D. Perform Work in compliance with the following agencies:

1. Massachusetts Department of Environmental Protection (MA DEP)
2. OSHA Code of Federal Regulations
3. Massachusetts Department of Transportation (MassDOT)
4. Massachusetts Executive Office of Labor and Workforce Development (EOLWD))
5. All federal, state, and local clean air, clean water, water rights, resource recovery, and solid waste disposal standards and the Federal Endangered Species Act, and the Occupational Safety and Health Acts
6. Environmental Protection Agency (EPA)
7. U.S. Army Corps of Engineers (ACOE)

1.3 PERMITTING

A. At no additional expense to the Owner, file for and obtain necessary licenses and permits, including fees, for any interim phases for construction, and be responsible for complying with any Federal, State, County, and Municipal Laws, Codes, regulations applicable to the performance of the Work, including, but not limited to, any laws or regulations requiring the use of licensed Subcontractors to perform parts of the Work.

B. Time of Year Restrictions

1. The following table summarizes applicable time of year restrictions for the Project as currently imposed by the applicable permitting agencies.

Permit	TOY Restriction	Agency Comment
US Army Corps of Engineers	1. Alewife, blueback herring, sea lamprey, American shad, rainbow smelt, and American eel February 1 to November 15	
Chapter 91	1. Adult diadromous fish spawning periods February 1 to July 15 2. Juvenile diadromous fish emigration September 1 to November 15 3. No in-water, silt-producing, and noise-producing activities, including, but not limited to dredging, shall occur during the above TOY restrictions	A TOY incursion request to start work as soon as July 1 with the appropriate BMPs in place would be supported.
The Commonwealth of Massachusetts Division of Marine Fisheries	1. Adult diadromous fish spawning periods February 1 to July 15 2. Juvenile diadromous fish emigration September 1 to November 15	A TOY incursion request to start work as soon as July 1 with the appropriate BMPs in place would be supported. If a gravity-fed bypass channel is installed to divert flow and provide uninterrupted flow around the worksite prior to September 1, then a waiver may be granted for the Fall TOY period (September 1 to November 15).
The Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs	TOY restrictions for all work, as required by applicable regulatory agencies will be enforced, unless an incursion into the TOY restriction is granted.	

1.4 INSPECTION AND CERTIFICATIONS

A. Arrange inspection and obtain Certificates of approval from applicable authorities having jurisdiction. Furnish certificate in accordance with Conditions of the Contract.

B. Notify and coordinate for all inspections of the work. Allow enough time to maintain progress of the work.

1.5 PERFORMANCE

A. Should Contractor knowingly perform any Work that does not conform with the requirements of applicable codes, ordinances, regulations, or standards, without given prior written notice to Engineer and obtaining required variance, etc. from the governing body, Contractor shall assume full responsibility thereof and shall bear all costs involved in correcting such non-complying Work. Costs shall include but not be limited to all fines, inspection costs, mitigation costs, repair costs, damages, design and management fees in addition to the cost of removal and replacement of the work of all trades involved.

B. All equipment operators and workers performing work at the Project Site shall hold the appropriate Commonwealth of Massachusetts licenses for their responsibilities.

C. Contractor shall provide a 'Competent Person', as defined by the US Department of Labor Occupational Safety & Health Administration (OSHA), at the Project Site at all times when work is being conducted.

D. Contractor and all subcontractor and vendors working at the Project Site shall have completed the OSHA ten (10) hour construction safety program for its on-site employees.

E. All required licenses and/or certificates for work being performed shall be copied and supplied to the Owner prior to beginning work by each contractor, subcontractor or vendor employee conducting work at the site. All required licenses and/or certificates for work being performed shall be in the possession of the person(s) while performing the work at the Project Site.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.

1.3 SUBMITTALS

A. Instruction Program: Submit two (2) copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. At completion of training, submit two (2) complete training manuals for Owner's use.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: An individual or individuals experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

1. Instructor(s) to be thoroughly familiar with operation, integration, maintenance requirements and emergency procedures for the complete mechanical, electrical and instrumentation subsystems comprising the facility. Instructor(s) shall be knowledgeable and familiar with the specific piece of equipment or device and its proper operating and maintenance procedures.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections.

1. Training program elements shall include but not be limited to operation and maintenance of the following treatment system components:

a. Water Control Gate Structures

b. Water Wheel Auxiliary Water Supply Systems

c. Lagoon Supplemental Water Supply System

2. Training program shall also address the following site safety and operation elements:

a. Electrical Site Safety Systems (GFCI, disconnects, emergency stops)

b. Slip/Fall Hazards and Protective Devices

c. Pinch Point, Entanglement and Entrainment Hazards and Protective Devices

d. Routine Inspection, Maintenance and Adjustments

e. Lockout/Tagout

f. Treatment System Channel Sediment Removal

g. Seasonal Considerations

h. Site Security and Public Protection

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

a. System, subsystem, and equipment descriptions

b. Operating standards

c. Regulatory requirements

d. Equipment function

e. Operating characteristics

f. Limiting conditions

g. Performance curves

2. Documentation: Review the following items in detail:
   a. Emergency manuals
   b. Operations manuals
   c. Maintenance manuals
3. Emergencies: Include the following, as applicable:
   a. Instructions on meaning of warnings, trouble indications, and error messages
   b. Instructions on stopping
   c. Shutdown instructions for each type of emergency
   d. Operating instructions for conditions outside of normal operating limits
   e. Sequences for electric or electronic systems
   f. Special operating instructions and procedures
4. Operations: Include the following, as applicable:
   a. Startup procedures
   b. Equipment or system break-in procedures
   c. Routine and normal operating instructions
   d. Regulation and control procedures
   e. Control sequences
   f. Safety procedures
   g. Instructions on stopping
   h. Normal shutdown instructions
   i. Operating procedures for emergencies
   j. Operating procedures for system, subsystem, or equipment failure
   k. Seasonal and weekend operating instructions
   l. Required sequences for electric or electronic systems
   m. Special operating instructions and procedures
5. Adjustments: Include the following:
   a. Alignments
   b. Checking adjustments
   c. Noise and vibration adjustments
   d. Economy and efficiency adjustments
6. Troubleshooting: Include the following:
   a. Diagnostic instructions

b. Test and inspection procedures

7. Maintenance: Include the following:
   a. Inspection procedures
   b. Types of cleaning agents to be used and methods of cleaning
   c. List of cleaning agents and methods of cleaning detrimental to product
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance
   f. Procedures for routine maintenance
   g. Instruction on use of special tools
8. Repairs: Include the following:
   a. Diagnosis instructions
   b. Repair instructions
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions
   d. Instructions for identifying parts and components
   e. Review of spare parts needed for operation and maintenance

PART 3 - EXECUTION

3.1 DEMONSTRATION

A. Upon completion of all system components, certification of systems by the respective manufacturer's field service representatives, and acceptance by the Engineer, the full system test shall be conducted to demonstrate the full automatic functionality of the Project. This test shall cover all systems and components contained under the Contract Documents.

3.2 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

B. Set up instructional equipment at instruction location.

3.3 INSTRUCTION

A. Engage a qualified instructor(s) to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
   1. Instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner with at least fourteen days' advance notice.

END OF SECTION

Attachment D

Updated Division 04 Specifications

SECTION 04 43 00 – STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies the following:

1. Repairing and reconstructing existing stone masonry walls, constructing new stone masonry walls, laid in dry or mortared joints.

2. Preliminary cleaning, including removing plant growth adjacent to and within stone masonry walls.

B. Related Sections include the following:

1. Section 31 20 00 "Earth Moving"

1.2 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed stone wall systems similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1.3 PERFORMANCE REQUIREMENTS

A. Stone masonry repairs shall incorporate stones located within immediately adjacent channel/lagoon sections and be supplemented as required by imported stone matching the shape, texture, colors and patina of existing stones, be constructed with recessed mortar joints except where existing fully mortared joints exist (as determined from Pre-Construction Conference with the Engineer).

B. Pre-Construction Conference: The Contractor shall conduct a preconstruction conference at the project site with the Engineer to review existing site conditions.

C. Prevent water from entering the work area by utilizing cofferdams, sandbags, or other measures.

1.4 SUBMITTALS

A. Photographs. Submit photographs which indicate proposed limits of stone masonry reconstruction, and shape and size of existing stone structures.

B. Shop Drawings:

1. Work plan indication the general sequence of wall construction and repairs and intended methods and procedures.

2. Replacement and salvaged stone, showing relation of existing to new units.

a. Provide locations within the site where the salvaged stone will be obtained.

b. Source of replacement stone, including photos of existing walls and photos of replacement stones for comparison and approval.

3. Mortar Mix Design and all associated products required to produce the mix.

C. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Stone Repair: Prepare sample areas for each type of stone indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than approximately 48 inches in least dimension. Erect sample areas in existing structures unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

a. Replacement stone: Incorporated at replacement stone into at least 20% of the mockup surface area.

b. Mortar: Incorporated into at least 20% of the mockup.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Qualification Data: For restoration specialists including field supervisors and restoration workers.

1.5 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Engage an experienced stone restoration firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience installing standard unit masonry or new stone masonry is not sufficient experience for stone restoration work.

1. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that stone restoration and cleaning work is in progress. Supervisors shall not be changed during Project except for causes beyond control of restoration specialist firm.

2. Restoration Worker Qualifications: Persons who are experienced and specialize in restoration work of types they will be performing.

B. Restoration Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.

C. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

D. Cleaning and Repair Appearance Standard: Cleaned and restored areas are to have an integral appearance with existing as viewed from 20 feet away by Engineer. Perform additional general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

E. Pre-Construction Conference: Conduct conference at the site.

1. Review methods and procedures related to stone restoration and cleaning including, but not limited to, the following:

    a. Construction Schedule: Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.

    b. Materials, material application, sequencing, tolerances, and required clearances.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver replacement stone units to Project site strapped together in suitable packs or pallets or in heavy-duty crates.

1.7 PROJECT CONDITIONS

A. Weather Limitations for Stone Placement: Proceed with installation only when existing and forecasted weather conditions permit stone restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

1. For work requiring mortar, comply with the following:

    a. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

        1) Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

    b. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

B. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

C. Stain Prevention: Immediately remove mortar, concrete and soil to prevent them from staining the face of stone masonry.

PART 2 - PRODUCTS

2.1 STONE MATERIALS

A. Stone: Provide replacement stone of variety, color, texture, grain, veining, finish, size, and shape to match existing stone and is acceptable to the Engineer.

1. Provide stone that is hard, durable, resistant to weathering action, reasonably fine grained, and free from structural defects that would impair its strength or durability. Capable of being cut to lines and surfaces, either plain or curved, as may be required.

2. Stone segments repaired with cement or other materials will be rejected.

3. For existing stone that exhibits a range of colors, texture, grain, veining, finishes, sizes, or shapes, provide stone that proportionally matches that range rather than stone that matches an individual color, texture, grain, veining, finish, size, or shape within that range.

B. Cutting New Stone: Avoid cutting stone to the greatest extent possible. Only cut stone when it is absolutely necessary to complete the work.

C. Salvaged Stone: Obtain salvaged stone from the site.

1. Clean off residual soil, debris, and mortar if present.

2.2 MORTAR

A. Furnish the following as needed for production mortar where needed for the restoration of existing mortared stone masonry

1. Portland cement and potable water. Unless the engineer allows an alternate, use either type I, IS, I(SM), or IP portland cement.

2. Masonry cement conforming to ASTM C 91, type S.

3. Hydrated lime conforming to ASTM C 207.

4. Aggregate: ASTM C 144 and as follows:

a. For pointing mortar, use aggregate graded with 100 percent passing No. 16 sieve.

5. Sand.

a. Use sand uniformly graded from coarse to fine conforming to the following gradation requirements:

SIEVE PERCENT PASSING BY WEIGHT

No. 8	95-100
No. 100	25 maximum
No. 200	10 maximum

B. Water: Potable.

C. Use mortar for laying the stone and pointing composed of 3 parts sand for mortar and one part of any one of the following materials, by volume: masonry cement, a mixture of 50 percent portland cement and 50 percent masonry cement, or a mixture of 50 percent portland cement and 50 percent hydrated lime.

D. Use a machine to mix the mortar unless the engineer allows otherwise. Prepare machine-mixed mortar in an engineer-approved mixer and mix not less than 1 1/2 minutes. If preparing hand-mixed mortar, mix the sand and cement thoroughly in a clean, tight mortar box until uniform in color, then add clean water in a quantity that forms a stiff paste. Do not use mortar mixed longer than 30 minutes or that develops its initial set. .

E. Pigments: Provide pigment as needed to match the color of the existing mortar.

1. Use only pigments with a record of satisfactory performance in stone masonry mortar.

2.3 CLEANING MATERIALS

A. Water: Potable.

B. Stiff bristle brushes and brooms.

2.4 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D 1073, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

D. Mineral Filler: ASTM D 242, rock or slag dust, hydraulic cement, or other inert material.

PART 3 - EXECUTION

3.1 GENERAL

A. Repair, reconstruct or construct stone masonry walls in the location and to the dimensions indicated or as directed.

B. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Check adjacent areas, and stream bed and downstream locations for any stones missing from the walls and structures. Inform Engineer of shaped stones that appear to have been displaced from existing stone masonry walls and structures.

1. Upon approval of the Engineer, remove stones and check for size and fit in existing structures. Stones that will not be used must be returned to their original location.

3.3 SETTLING OF STONE MASONRY, GENERAL

A. Arrange stones in uncoursed rubble pattern with joint widths within tolerances indicated. Insert small stones into spaces between larger stones as needed to produce joints as uniform in width as practical.

3.4 STONE MASONRY WALL REMOVAL AND RECONSTRUCTION

A. Remove stone masonry from the walls requiring restoration and reconstruction in a top down manner. Remove stone to the extent necessary to reconstruct or restore the wall.

1. Salvage stones from structure and protect from damage during reconstruction.

2. Do not remove stones from the site.

B. Support and protect remaining stonework that surrounds or is adjacent to area of removed stone. Maintain adjoining construction in an undamaged condition.

C. Notify Engineer of unforeseen detrimental conditions including voids, cracks, bulges, and loose units.

D. Remove in an undamaged condition whole stone units.

1. Remove loose particles and soil from stone by cleaning with hand chisels, brushed, and water.

2. Store stone for reuse. Store off ground, on skids, and protected from weather.

3. Deliver cleaned stone not required for reuse to Owner.

E. Inspect wall footings with Engineer when expose, prior to proceeding with wall construction.

1. Engineer to approve of wall footings prior to wall reconstruction.

F. Clean stones before resetting in stone masonry wall. Reset stones to previous locations and in appropriate order.

1. Provide new stones where existing stones are missing. Replace damaged stone with other removed stone and salvaged stone in good quality, wherever possible, or with new replacement stone matching existing stone, including size.

G. Lay stone to line and in courses to match existing. Use large, selected stones for bottom or foundation courses.

1. Mortaring. Clean and thoroughly saturate stone with water before setting in fresh mortar bed. Do not drop or slide stone over the wall. Provide spot-mortar as indicated on the Contract Drawings.

H. Face Joints: 1-1/2 inch width, maximum.

I. Ensure that stone bears at not less than three separate points on underlying courses.

J. Chink open joints with spalls, fitted to take firm bearing on top and bottom surfaces.

3.5 STONE MASONRY WALL CONSTRUCTION

A. Perform dressing or shaping of stone before laying stone in wall. No dressing or hammering that will loosen stone will be permitted after placement.

B. Roughly square and dress stones at angles or at ends of walls to the required lines.

C. Lay stones in courses, roughly leveled up. Use large, selected stones for bottom or foundation courses with bearing beds parallel to the natural bed of the material.

1. Mortaring. Clean and thoroughly saturate stone with water before setting in fresh mortar bed. Do not drop or slide stone over the wall. Provide spot-mortar as indicated on the Contract Drawings.

D. Face Joints: 1-1/2 inch width, maximum.

E. Ensure that stone bears at not less than three separate points on underlying courses.

F. Chink open joints with spalls, fitted to take firm bearing on top and bottom surfaces.

3.6 CLEANING

A. Water Wash: Use cold potable water, brushes and brooms to remove soil and debris.

3.7 ADJUSTING AND CLEANING

A. Remove damaged stones, defective joints, and stone that does not match approved samples.

B. After mortar is thoroughly set and cured, clean stone masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

3.8 EXCESS MATERIALS AND WASTE

A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.

B. Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches in greatest dimension.

2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."

3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other waste, and legally dispose of off Owner's property.

END OF SECTION

Attachment E

Updated Division 26 Specifications

SECTION 26 09 00 - CONTROLS AND INSTRUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes controls and instrumentation requirements to integrate the Lagoon level control system to maintain a specific level, supplementing this by operating the cistern pump based on permissible lagoon and river levels.

B. The System Master Control Panel (hereby referred to as the SMCP) shall act as an interface between the various electrical control and instrumentation components for level controls.

C. A touch screen user operator interface, located on the SMCP, shall enable the operators to manage, monitor, operate, and record various functions of the level control system. Remote communication from the system control panel (Allen Bradley CompactLogix platform) shall be via Ethernet/IP.

D. Contractor-Supplied control and instrumentation system components shall include the following:

1. SMCP Programmable Logic Controller (PLC) and components
2. SMCP operator interface terminal (OIT)
3. Level Transmitters
4. Electrical enclosure
5. Associated Control Components: Switches, pushbuttons, light modules, relays, fuses, control power transformers, and connection terminals.
6. Transient Voltage Surge Suppression (TVSS)

E. System integrator shall be Aaron Associates, or approved equal.

1.3 RELATED SECTIONS

1. Division 26 Sections for electrical materials and methods requirements.

1.4 DEFINITIONS

A. E/C SI: Electrical/Controls System Integrator. An experienced installer who is the Project integrator responsible for electrical and systems configuration, to ensure a fully functionally and properly operating system.

1.5 SUBMITTALS

A. Product Data: List of components for control and instrumentation, including dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes. Attach copies of Submittals for affected products.

B. Shop Drawings for the following:

1. Ladder logic diagram for PLC program. Coordinate settings with engineer.

2. Schematic point to point number coded wiring diagrams for panel power and controls showing circuit(s), number coded terminals, conductor number coding, device elements, associated equipment and a panel layout diagram showing the physical location of the device elements within the electrical enclosure.

3. Complete bill of materials of components including manufacturer's cut-sheets, model number, and specifications.

C. As-built drawings for the following:

1. Ladder logic diagram, tag database, I/O listing, communication port configurations, and chassis layout for PLC control scheme. Provide two electronic copies on a recordable compact disk (CDR).

2. Operator Interface screen printouts. Provide two electronic copies with tag descriptions on a recordable compact disk (CDR).

3. Sequence of operation documentation following the successful completion of acceptance testing and all applicable changes. Operations shall include startup, shutdown, interlocks, and alarming functions for the PLC logic and OIT procedures.

4. Schematic point to point number coded wiring diagrams for panel power and controls showing circuit(s), number coded terminals, conductor number coding, device elements, associated equipment and a panel layout diagram showing the physical location of the device elements within control panels and enclosures.

5. Bill of materials of components including manufacturer's cut-sheets, model number, and specifications.

D. Manufacturer's Installation, Operation and Maintenance manuals for all pieces of equipment provided.

E. Warranties:

1. Manufacturer's: Two years from date of Final Completion.

F. Spare parts list.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An installer with 5 years minimum experience who is the electrical/controls system integrator or an authorized representative of the E/C SI or of equipment manufacturer for installation and startup of equipment required for this Project.

B. Manufacturer Qualifications: A firm experienced in manufacturing items similar to that specified for this Project and with a record of successful in-service performance, acceptable to the Engineer.

1.7 COORDINATION

A. The E/C SI shall coordinate features of distribution equipment, control panel, overcurrent protection devices, and controls & instrumentation components to form an integrated electrical power and control system.

B. The E/C SI shall accept single source responsibility and provide all labor, materials, services, equipment and transportation necessary for the complete and operational control system (including controls and associated hardware, all enclosures and panels, and instrumentation) and integration with the power distribution, and mechanical/electrical components of the project.

PART 2 - PRODUCTS

2.1 SMCP PROGRAMMABLE LOGIC CONTROLLER (PLC)

A. Available Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated into the Work include the following:

1. Programmable Logic Controller(PLC):

a. Allen Bradley CompactLogix; Rockwell Automation.

B. Unit shall be a microprocessor-based device programmable using ladder logic. Unit shall be capable of performing the same function as conventional relays, timer, counters, drum sequencers, arithmetic, and other special functions necessary to perform required control functions.

C. Design: Solid state, modular, and field expandable, allowing the system to be tailored to meet the application. Include capacity to allow for expansion of system by addition of hardware and software.

D. PLC shall include but not to be limited to: a processor module (CPU) with integrated Ethernet/IP communication port, power supply, input/output modules, software for applications programming, operator interface system diagnostics, communications, and data acquisition.

E. Central Processing Unit (CPU)

1. The CPU shall read the inputs, perform all system logic, conduct on-line diagnostics, and control the outputs. Diagnostics will include memory checks, communications monitoring, I/O bus monitoring, watchdog timing, and user program validation.

2. The CPU shall be a self-contained unit and will provide ladder rung program execution and support remote or local programming. The CPU will provide I/O scanning and inter-processor and peripheral communication functions.

3. The CPU shall give visual indication by illuminating an indicator when no fault is detected and an indicator when a fault is detected.

4. The main CPU front panel shall include an RJ-45 connector for connection to an Ethernet/IP network including other PLCs and peripheral support devices. The CPU shall have lighted indicators including, but not limited the following:
    a. Program or Run mode of the CPU
    b. The run/fault status of the CPU
    c. State of the I/O adapters
    d. Battery Condition
5. The CPU shall have a minimum of 750 kB of user memory. A removable flash memory card device shall be available for program and archived data storage. The CPU shall be capable of executing 6 simultaneous tasks.
6. Program functions shall include standard functions: contacts, coils, timers, counters, math functions, (add, subtract, multiply, divide) shift registers, bit, and word operations; and advanced functions: floating point math calculations including integer to floating point conversion, floating point to integer conversion, add, subtract, multiply, divide, square root, compare, trigonometric functions, CPU password protection and data logging.
7. Program functions shall include PID closed loop and cascaded PID loop control. The PID loop shall perform:
    a. Output tracking for bump-less transfer between auto and manual mode.
    b. Reset windup limiting.
    c. Process variable alarming.
    d. Output preloading or bias.
    e. Adjustable-rate filtering.
8. The CPU shall include an integral real-time clock, backed up by an internal lithium or long term type battery, which can be accessed from the control program. The clock shall include functions for time of day (year, month, day, hour, minute, second, and day of the week), alarm, and operation hours counter.
9. The CPU shall permit changing ladder program and data values while running.
10. The CPU shall permit the addition of application specific instructions, created in a high level language, to augment the standard instruction set.

F. Power Supply:

1. The programmable controller shall operate in compliance with a nominal electrical service of 24V DC ±5%

G. Input and Output Modules:

1. All field wiring shall be to a removable terminal block which will permit pre-wiring of the module, or removal and replacement of a module without disturbing the field wiring or any other I/O modules.
2. All discrete I/O wiring shall be minimum No 14 AWG, RHW-2, 600 volt.
3. All modules shall be enclosed in rugged plastic, or metallic housings.

4. All modules shall conform to ANSI C37.90a Standard surge withstand capability.

5. Input and output modules shall have faceplates, which will be marked or labeled in accordance with the Contract Drawings.

6. All digital input and output modules shall be 24V DC and have 16 circuits per module.

7. Inputs shall be optically isolated to protect bus circuits from transients and surges. Light emitting diodes, one adjacent to each pair of input terminals shall be provided to indicate a closed contact, conducting transistor switch; a low positive logic level, or DC voltage "on" conditions.

8. All DC output circuits shall be rated for 0.5 amperes at 24 V and AC output circuits shall be rated for 1 ampere at 120 V AC minimum. Dry contact output contacts shall be rated for 2 amperes at 120 V AC minimum. Isolation voltage shall be 500 V AC rms. minimum between any set field terminals and any other set or earth ground. Light emitting diodes shall be provided adjacent to each pair of output terminals for on status indication.

9. The analog input modules shall have a maximum of eight differential channels per module and will accept 4-20 mA DC, 1 to 5 V DC and 0 to 10 V DC inputs from field mounted transmitters. Common mode input protection of 30 V DC minimum shall be provided. Input signal conversion shall be a minimum of 15-bit resolution.

10. Analog output modules shall have a maximum of eight differential channels per module and shall convert 16-bit data words into proportional, 4-20 mA DC analog output signals. Output load drive capability shall be 500 ohms minimum for each output. Accuracy shall be 0.5 percent of full scale output span.

H. PLC Programming:

1. The programming format shall be traditional relay ladder diagram. Structured text, Function block diagram and sequential function block programming shall also be possible.

2. Run Mode editing of existing rungs, as well as addition of new rungs shall be possible.

3. Timer instructions shall include selectable time bases in increments of 1.0 second and 10 milliseconds. The timing range of each timer shall be from 0 to 32,767 increments. It shall be possible to program and display separately the timer's preset and accumulated values.

4. The programmable controller shall store data in the following formats:

   a. Single integer numbers ranging from -32,767 to 32,767.

   b. Floating point numbers conforming to IEEE floating point format.

   c. Double Integer numbers ranging from -2,147,483,648 to 2,147,483,647

   d. Strings.

5. Programming of the PLC shall use the Allen Bradley RSLogix 5000. A Personal Computer (PC) will be required for programming of the PLC. When connected to the PLC and 'online', the programming software shall provide a visual representation of the ladder logic overlaid with continuously updated data from the PLC.

6. I/O scanning (known as Request Packet Interval, or RPI) shall be user adjustable.

7. Programming shall allow up to 6 tasks (programs) to be executed simultaneously, with one executing continuously and the other 5 either event triggered, or triggered periodically based on user preferences.
8. The system shall be 'tag based' with the added capability of utilizing ladder rung comments.
9. Programming shall include or allow the following:
    a. Full on-line and off line capabilities from one integrated software package.
    b. Hot Keys: Keys for short cut to software functions.
    c. File Management: Create, Delete, rename, and merge program files.
    d. Memory Map: Display processor memory usage.
    e. Data Monitor: Display the contents of data files.
    f. Save and Restore: Save processor memory files to disk; restore processor memory files from disk.
    g. I/O Configuration: Configure I/O modules.
    h. General Utility: Display general system information and clear faults.
    i. Forcing: Force I/O on and off.
    j. Display I/O module health status.
    k. Password Protection: Allow up to eight password protected levels of functionality with each level increasing the capability to monitor, troubleshoot, and program.

2.2 SMCP OPERATOR INTERFACE TERMINAL (OIT)

A. Display:
1. 12.1" diagonal color TFT (Thin Film Transfer) LCD display with 65K colors
2. 800 x 600 pixel resolution
3. 260 NITS display brightness, 50,000 hour average backlight lifetime, user replaceable

B. Communications Interface
1. Serial PLC interface (RS-232/422/485)
2. Ethernet 10/100 Base-T port
3. USB port B (program/download) and USB port A (USB device options)

C. Memory
1. 40 MB project memory
2. CompactFlash card slot

D. 24 VDC powered, 110 VAC power adapter

E. Audio Line Out, stereo - requires amplifier and speaker(s)

F. 0 to 50°C (32 to 122°F) operating temperature range

G. NEMA 4/4X, IP-65

2.3 LEVEL TRANSMITTERS

A. Three level sensors are required: River level, lagoon level and cistern pump chamber level.

B. Emerson/Rosemount 3408 level transmitter non-contacting radar.

C. Communication protocol: 4 – 20mA

D. Range: 30 meters

E. Accuracy: ± 0.04 inches

F. Temperature range: -76ºF to 392ºF (-60ºC to 200ºC).

G. Cable: Provide adequate cable lengths from sensor locations to transmitter located in utility building. Provide 10' extra length for each cable.

H. Mounting: Provide 36" min. 316 S. S. cantilever bracket mounting of transmitters.

2.4 ELECTRICAL ENCLOSURE

A. Enclosure: NEMA 12, 12-gage steel.

1. Seams: Continuously welded and ground smooth, no holes or knockouts.
2. Gasket: Seamless foam-in-place type.
3. Latching Mechanism: 3-point, operated by oil-tight key-locking handle.
4. Finish: White polyester powder inside with ANSI 61 gray polyester powder outside finish over phosphatized surfaces. Optional panels are white.
5. Provide drawing pouch.

2.5 ASSOCIATED CONTROL PANEL COMPONENTS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified. When one model number is specified in the following paragraphs, it is intended to establish the level of quality required for the product. Other manufacturers and models equal to that listed will be accepted.

1. Eaton Corp.; Cutler-Hammer Products
2. Square D; Group Schneider
3. Allen Bradley; Rockwell Automation
4. Siemens Automation
5. Phoenix Contact
6. Or Approved Equal

2.6 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

1. DIN rail unit to be mounted inside the control panel.
2. 120 V, 20 amp, single phase, 2 wire + ground.
3. 100 k per phase peak surge current capacity, 47-63 Hz line frequency, 65 kAIC A/C rating.
4. Status indication: 1-green LED, Form C contacts.
5. Less than 0.5 nsec response time.
6. All modes of protection: L-N, L-L, L-G, N-G.

2.7 DC Uninterruptable Power Supply (UPS)

1. Shall have 12 Amp-hour battery (not DIN rail mounted).
2. Shall be DIN rail mounted.
3. Shall be 95% efficient.
4. Shall have remote shut-down capabilities.
5. Shall have a user configurable buffer (battery operation) time dependant on loading conditions.
6. Shall periodically conduct presence, quality tests on battery and report any faults via SPDT relay.
7. Shall have over-current protection and temperature dependant charge management to maximize battery life.

PART 3 - EXECUTION

3.1 CONTROL LOGIC/SEQUENCE OF OPERATION

A. General

1. The Lagoon Level Control System will be controlled via the SMCP, and screen control panel.
2. Level Transmitter Operation:
   a. The level transmitters shall provide a continuous analog signal to the SMCP. Based on level set points these shall allow for the Cistern Pump to operate.

B. System Overview

1. All timer and counters settings, operational and alarm set points, and miscellaneous adjustments shall be finalized during application software development and system startup. All settings shall be easily adjustable from a local operator interface, located on the front of the panel. Modifications of these settings from the interface shall be password protected.
2. The operator interface shall enable the operator to change the level transmitter set points for the operation of Cistern Pump. All set points adjustments shall require an operator password.
3. The operator interface shall display all textual alarm/fault messages, including, but not limited to: river level, lagoon level and cistern pump level and pump status.

4. The level transmitters can be removed from the SMCP logic through a "maintenance bypass" virtual switch. The switch shall be software created and displayed on the operator interface terminal.
5. Program timing settings, faults, and variables are to be cleared with a RESET pushbutton.
6. The SMCP will monitor the RUN status for the motors. This shall be accomplished by Run contact from motor starter.

C. Convey status points to the OIT, including the following:
1. System ON/OFF.
2. Instrument analog scaled signals for river, lagoon and cistern.
3. Screen Run Status
4. Cistern Pump Run Status
5. Power Supply/UPS Status

D. Convey alarm points to the OIT, including the following:
1. Instrument analog signal out of range for the level transmitters.
2. High Lagoon Level Alarm
3. High River Level Alarm
4. Low, Cister Chamber Level alarm
5. Screen Control Panel Fault

3.2 DEMONSTRATION AND TRAINING

A. The E/C SI shall train Owner's maintenance personnel to adjust, operate, and maintain systems.
1. Training Aid: Use the approved final versions of operation and maintenance manuals as training aids.
2. Training sign-in sheet: Provide training sheet to include operator names, signatures, training date/time, and comments.
3. Schedule training with Owner and Engineer, with at least seven days' advance written notice.
4. Provide step-by-step operational sheets for turning on, powering up equipment (PLC) and shutting down the equipment. Operational sheets shall include startup, normal, shutdown, and alarm modes of operation.
5. Provide step-by-step procedural instructions for responding to "alarm" lights.

3.3 FIELD QUALITY CONTROL

A. Correct deficiencies, make necessary adjustments, and retest. Verify that specified requirements are met.

B. Reports: Written reports of tests and observations. Record defective materials and workmanship and unsatisfactory test results. Record repairs and adjustments.

C. The control panel will be manufactured with quality workmanship. Wrap wires and harnesses and wire-tie as appropriate. All conductors shall be numbered.

D. Secure external controls and instrumentation within the panel by terminal strips. The terminals will contain a numbering strip for identification of wires.

3.4 CLEANING

A. Cleaning: Clean equipment and devices internally and externally using methods and materials recommended by manufacturers, and repair damaged finishes.

END OF SECTION

Attachment F

Updated Division 33 Specifications

SECTION 33 37 00 – FLOW CONTROL STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Aluminum Stop Logs and Stainless Steel Frames
2. Aluminum Stop Gate and Stainless Steel Frame
3. Lifting Devices

B. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete"
2. Division 31 Section "Earth Moving"

1.3 SUBMITTALS

A. Delegated-Design Submittal: For stop log, stop gate and frame structures indicated to comply with respective performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Provide the following to confirm compliance with this specification for the aluminum stop log and frames:
    a. Complete description of all materials including the material thickness of all structural components of the stop logs, guide frames and stop log lifter.
    b. Installation drawings showing all details of construction, details required for installation, dimensions and anchor bolt locations.
    c. Maximum bending stress and deflection of the stop logs under the maximum design head.
    d. The location of the company headquarters and the location of the principal manufacturing facility. Provide the name of the company that manufactures the equipment if the supplier utilizes an outside source.
2. Provide the following to confirm compliance with this specification for the stop gate and frame:
    a. Complete description of all materials including the material thickness of all structural components of the frame and slide.

b. Installation drawings showing all details of construction, details required for installation, dimensions and anchor bolt locations.

c. Maximum bending stress and deflection of the slide under the maximum design head.

d. The location of the company headquarters and the location of the principal manufacturing facility. Provide the name of the company that manufactures the equipment if the supplier utilizes an outside source.

B. Product Data:

1. Stop logs and frames (including all lifting devices, fittings and hardware appurtenances)

2. Stop gate and frame (including lifting devices and other hardware appurtenances)

3. Manual operator

C. Shop Drawings; Include plans, elevations, details, loading calculations, and attachments for the following:

1. Stop logs and frames

2. Stop gate and frame

3. Stop gate and stop log lifting devices

D. Manufacturer's qualifications

E. For Information Only.

1. Material Certificates: Certify all materials utilized for gate, stop logs and frames meet respective specification criteria.

2. Provide comprehensive engineering analysis and delegated design of the stop gate, stop logs, and frames; including plans, sections and details, analysis data and calculations signed and sealed by a professional engineer registered in the Commonwealth of Massachusetts.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. All of the equipment specified under this Section shall be furnished by a single manufacturer with a minimum of 20 years experience designing and manufacturing water control gates. The manufacturer shall have manufactured water control gates for a minimum of 100 projects.

2. All of the equipment specified under this Section shall be furnished by a single manufacturer with a minimum of 20 years experience designing and manufacturing stop logs. The manufacturer shall have manufactured stop logs for a minimum of 100 projects.

B. Standard Specifications: Shall mean the most recent version of the "Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition", and Supplemental Specifications (March 31, 2024).

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store structures in direct sunlight.

B. Protect all products and materials from dirt and damage.

C. Handle structures according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Notify Engineer not less than 7 days in advance of construction of stop gate, stop logs and frames and installation.

PART 2 - PRODUCTS

2.1 STOP LOGS AND FRAMES

A. Stop logs shall be Series 500 aluminum stop logs as manufactured by Whipps, or approved equal.

B. GENERAL

1. Stop log frame assemblies shall be fabricated of 316 stainless steel as specified herein and have the characteristics and dimensions shown on the Contract Drawings.
2. Leakage shall not exceed 0.05 gpm/ft of wetted seal perimeter.
3. The stop logs shall be provided with a continuous resilient seal along the bottom and both sides. The guide frames shall not incorporate seals.
4. Stop logs shall be of the height as shown in the Contract Drawings and they shall be designed to function properly when stacked in any order.
5. Stop logs shall be designed to drop into place under their own weight without any downward pressure necessary. Stacking stop plates are not acceptable in lieu of stop logs.
6. All structural components of the stop logs shall be fabricated of aluminum and shall have adequate strength to prevent distortion during normal handling, during installation and while in service.
7. All structural components of the guide frames shall be fabricated of stainless steel and shall have adequate strength to prevent distortion during normal handling, during installation and while in service.
8. All welds shall be performed by welders with AWS certification.
9. Finish: Mill finish on stainless steel. All stainless steel in contact with concrete shall be field coated with a heavy coat of bitumastic paint if recommended by the manufacturer. Welds shall be cleaned to provide a uniform finish.
10. Materials:
    a. Frame Guides and Invert: Type 316 Stainless Steel
    b. Stop Logs: 6061-T6 Aluminum

c. Lip Seal: Urethane, EPDM or Neoprene ASTM D-2000

d. Anchor Studs, Fasteners and Nuts: Stainless Steel, Type 316, ASTM A276

C. FRAME GUIDES

1. The frame guides or grooves and invert member shall be constructed of stainless steel with a minimum thickness of 1/4-inch.

a. Frame design shall allow for embedded mounting with stainless steel anchor bolts and grout.

b. An invert member shall be provided across the bottom of the guides. The invert member shall be of the flushbottom type.

c. Frame mounted seals are not acceptable.

D. STOP LOGS

1. The stop logs shall be constructed of extruded aluminum shapes with a minimum thickness of 5/16-inch.

a. Each stop log shall be 6 inches tall unless otherwise indicated on the Contract Drawings.

b. Maximum bending stress shall not exceed 7600 psi at the maximum operating head.

c. Adequate drainage shall be provided for each stop log.

d. Two slots shall be provided in the top of each stop log for removal and installation via the stop log lifting devices.

e. Each stop log shall be outfitted with an identification tag indicating the manufacturer, width of the opening and maximum head rating at a minimum. Additional tags shall be included on each stop log that indicate "dry side" and "wet side". Tags shall be welded to each log.

E. SEALS

1. Each stop log shall be outfitted with a continuous resilient lip seal along the bottom and both sides to restrict leakage in accordance with the requirements listed in this specification.

a. The continuous lip seal shall be constructed of urethane or rubber and shall be mechanically retained to the stop log.

b. The lip seal shall be activated by a combination of the weight of the stop log and the differential water pressure, which pushes the seal against the inside of the groove assembly.

c. Stop logs that utilize rubber "J" seals or "P" seals are not acceptable.

F. STOP LOG LIFTING DEVICE

1. Two stop log lifting devices shall be provided for each different guide frame width.

a. The lifting devices shall be constructed of aluminum and shall be outfitted with UHMW guide bars and stainless steel fasteners.

b. The lifting devices shall be provided with lifting hooks designed to engage the slots in the top of the stop logs. A lanyard release will be incorporated into the design.

c. The lifting devices shall be capable of installing and removing all stop logs of the same width whether they are installed or at the operating floor level.

G. ANCHOR BOLTS

1. Anchor bolts shall be provided by the stop log manufacturer for mounting the guide frames.

a. Quantity and location shall be determined by the stop log manufacturer.

b. If epoxy type anchor bolts are provided, the stop log manufacturer shall provide the studs and nuts.

c. Anchor bolts shall have a minimum diameter of 1/2-inch.

2.2 STOP GATE AND FRAME

A. Aluminum stop gate shall be Series 501 Aluminum Stop Gate as manufactured by Whipps, or approved equal.

B. GENERAL

1. Gate shall be as specified herein and have the characteristics and dimensions shown on the Contract Drawings.

2. Leakage shall not exceed 0.1 gpm/ft of wetted seal perimeter in seating head and unseating head conditions.

3. The gate shall utilize self-adjusting seals. Adjustable wedges or wedging devices are not acceptable.

4. All structural components of the stop gate shall be fabricated of aluminum having a minimum thickness of 1/4-inch and shall have adequate strength to prevent distortion during normal handling, during installation and while in service.

5. All welds shall be performed by welders with AWS certification.

6. Finish: Mill finish on aluminum stop gate. All stainless steel in contact with concrete shall be field coated with a heavy coat of bitumastic paint if recommended by the manufacturer. Welds shall be cleaned to provide a uniform finish.

7. Materials:

a. Frame Guides and Invert: Type 316 Stainless Steel

b. Slide and Stiffeners: 6061-T6 Aluminum

c. Anchor Studs, Fasteners and Nuts: Stainless Steel, Type 316, ASTM A276

d. Invert Seal: Neoprene ASTM D-2000 or EPDM

e. Seat/Seal and Facing: Ultra-High Molecular Weight Polyethylene ASTM D4020

C. FRAME

1. The frame guides and invert member shall be constructed of stainless steel with a minimum thickness of 1/4-inch.

    a. Frame design shall allow for embedded mounting or mounting directly to a wall with stainless steel anchor bolts and grout. Mounting style shall be as shown on the Contract Drawings.

    b. A rigid invert member shall be provided across the bottom of the guides. The invert member shall be of the flushbottom type.

D. SLIDE AND LIFTING ASSEMBLY

1. The slide and reinforcing stiffeners shall be constructed of aluminum plate with a minimum thickness of 1/4-inch.

    a. The slide shall not deflect more than 1/360 of the span or 1/16 inch, whichever is smaller, under the maximum design head.

    b. Reinforcing stiffeners shall be welded to the slide and mounted horizontally.

    c. The lifting handle and assembly shall be constructed of the following:

        1) Galvanized steel angles welded to the back of the stop gate with a 1" diameter schedule 40 pipe lifting handle as shown on the Contract Drawings.

        2) 3-foot long, horizontal galvanized steel square sign post welded to the angles on the back of the stop gate as shown on the Contract Drawings.

        3) 45-inch long galvanized steel sign posts mounted/anchored to the downstream side of the water wheel outlet weir concrete support channels as shown on the Contract Drawings.

        4) Two 5- to 6-inch long stainless steel removable anchor pins that will fit into the sign post perforations.

E. SEALS

1. All gates shall be provided with a self-adjusting seal system to restrict leakage in accordance with the requirements listed in this specification.

2. seal system to restrict leakage in accordance with the requirements listed in this specification.

    a. All gates shall be equipped with UHMW polyethylene seat/seals to restrict leakage and to prevent metal to metal contact between the frame and slide.

    b. All stop gates shall be provided with a resilient seal to seal the bottom portion of the gate. The seal shall be attached to the invert member of the frame or the bottom of the slide and it shall be held in place with stainless steel attachment hardware.

    c. The seal system shall be durable and shall be designed to accommodate frequent operation without loosening or suffering damage.

d. All seals must be bolted or otherwise mechanically fastened to the frame or slide. Arrangement with seals that are force fit and/or held in place with adhesives are unacceptable.

e. The seals shall be mounted so as not to obstruct the water way opening.

f. Gates that utilize rubber "J" seals or "P" seals are not acceptable.

F. ANCHOR BOLTS

1. Anchor bolts shall be provided by the gate manufacturer for mounting the gates.

a. Quantity and location shall be determined by the gate manufacturer.

b. If epoxy type anchor bolts are provided, the gate manufacturer shall provide the studs and nuts.

c. Anchor bolts shall have a minimum diameter of 1/2-inch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Stop Logs and Frame Structures

1. Installation of the stop logs, guide frames and appurtenances shall be done in a workmanlike manner. It shall be the responsibility of the Contractor to handle, store and install the equipment specified in this Section in strict accordance with the manufacturer's recommendations.

2. The Contractor shall review the installation drawings and installation instruction prior to installing the guide frames.

3. The guide frames shall be installed in a true vertical plane, square and plumb.

B. Stop Gate and Frame Structure

1. Installation of the gates and appurtenances shall be done in a workmanlike manner. It shall be the responsibility of the Contractor to handle, store and install the equipment specified in this Section in strict accordance with the manufacturer's recommendations.

2. The Contractor shall review the installation drawings and installation instruction prior to installing the gates.

3. The gate assemblies shall be installed in a true vertical plane, square and plumb.

4. The Contractor shall fill the void between the gate frame and the wall with non-shrink grout as shown on the installation drawing and in accordance with the manufacturer's recommendations.

3.2 FIELD TESTING

A. Stop Logs and Frame Structures

1. After installation, all stop logs shall be field tested in the presence of the Engineer to ensure that all items of equipment are in full compliance with this Section. The stop logs shall be inserted into the guide frames to confirm that they operate in accordance with the specification. Each stop log assembly shall be water tested by the Contractor, at the discretion of the Engineer, to confirm that leakage does not exceed the specified allowable leakage.

B. Stop Gate and Frame Structure

1. After installation, all gates shall be field tested in the presence of the Engineer and Owner to ensure that all items of equipment are in full compliance with this Section. Each gate shall be cycled to confirm that they operate without binding, scraping, or distorting.

END OF SECTION

SECTION 33 40 00 – WATER BYPASS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, MassDOT Standard Specifications for Highways and Bridges, and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipes and fittings.
2. Precast Concrete Structures.

B. Related Sections:

1. Division 2 Section "Site Clearing"
2. Division 3 Section "Earth Moving"

1.3 DEFINITIONS

A. FRP: Fiberglass-reinforced plastic.

B. HDPE: High-density polyethylene plastic.

C. RCP: Reinforced concrete pipe.

D. PVC: Polyvinyl chloride.

1.4 QUALITY ASSURANCE

A. Standard Specifications: Shall mean the most recent version of the "Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition", and Supplemental Specifications (March 31, 2024).

1.5 SUBMITTALS

A. Product Data/Certificates: For each type of product indicated.

1. Pipes and fittings.
2. Precast concrete structures
   a. Lagoon outlet control structure

b. Precast concrete inlet structure
c. Precast concrete outlet structure

3. Castings.

B. Shop Drawings:
1. All precast concrete structures: Include plans, elevations, sections, details, frames, covers, and grates.

C. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

D. Profile Drawings: Show system piping in elevation. Draw profiles at horizontal scale of not less than 1 inch equals 50 feet and vertical scale of not less than 1 inch equals 5 feet. Indicate manholes and piping. Show types, sizes, materials, and elevations of other utilities crossing system piping.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic pipe, fittings, and structures in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle precast overflow structures and manholes according to manufacturer's written rigging instructions.

1.7 PROJECT CONDITIONS

A. Site Information: Research public utility records and verify existing utility locations prior to construction.

PART 2 - PRODUCTS

2.1 HDPE PIPE AND FITTINGS:

A. AASHTO M294 (for pipes 12-inches and larger), Type S, with smooth interior and annular exterior corrugations for couplings.

1. Water-tight Couplings: AASHTO M294, corrugated, matching pipe and fittings to form water-tight joints.

2. All appurtenances shall be provided by the same manufacturer and designed for the application and pipe that is installed.

3. Pipe shall be joined using an integral bell & gasketed spigot joint meeting AASHTO M294. The joint shall be water-tight and gaskets shall meet the requirements of ASTM D3212. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

4. Fittings shall conform to ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the water-tight joint performance requirements of ASTM 2306.

2.2 PVC PIPE AND FITTINGS

1. Pipe: ASTM D 1785, [Schedule 80 PVC, with plain ends for solvent-cemented joints.
2. Fittings: ASTM D 2467, Schedule 80 PVC, socket type.

2.3 DUCTILE -IRON PIPE AND FITTINGS

A. Mechanical-Joint Piping:

1. Pipe: AWWA C151, with bolt holes in bell.
2. Standard Fittings: AWWA C110, ductile or gray iron, with bolt holes in bell.
3. Compact Fittings: AWWA C153, with bolt holes in bells.
4. Glands: Cast or ductile iron, with bolt holes and high-strength, cast-iron or high-strength, low-alloy steel bolts and nuts.
5. Gaskets: AWWA C111, rubber, of shape matching pipe, fittings, and glands.

2.4 GATE VALVE

A. AWWA, Cast-Iron Gate Valves:

1. Nonrising-Stem, Resilient-Seated Gate Valves:
    a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
        1) Standard: AWWA C515.
        2) Minimum Pressure Rating: 200 psig.
        3) End Connections: Mechanical joint.
        4) Interior Coating: Complying with AWWA C550.

B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

2.5 LAGOON OUTLET CONTROL STRUCTURE

A. Shall be 2' x 4' drop inlet, Model SRP-DI24, as manufactured by Scituate Companies or approved equal

1. Stop Logs: As specified on the Contract Drawings.
2. Cover/Grate: Aluminum access hatch, Model H24481507 by ECJO or approved equal.
3. Steps: Individual FRP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of structure to finished grade is less than 48 inches.
4. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.

2.6 PRECAST CONCRETE INLET STRUCTURE

A. Structure: Shall be as shown on the Contract Drawings and meet the following requirements

1. Description: ASTM C 913; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
3. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
4. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
5. Steps: Individual FRP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
6. Grate: 5'x5' double door aluminum hatch, Model H60601701 by EJCO or approved equal.
7. Primary Debris Screen: Model LSQ-48 by trashrack.com or approved equal.
8. Stainless Steel Perforated Screen: McHichols perforated metal screen with 3/8" diameter holes or approved equal.

2.7 PRECAST CONCRETE OUTLET STRUCTURE

A. Structure: Shall be as shown on the Contract Drawings and meet the following requirements

1. Description: ASTM C 913; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
3. Joint Sealant: ASTM C 990, bitumen or butyl rubber.

4. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.

5. Steps: Individual FRP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.

6. Grate: Round pond skimmer grate (model LFR-48 by trashrack.com or approved equal)

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Division 02 Section "Earth Moving."

3.2 PIPES AND FITTINGS

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install gravity-flow, non-pressure drainage piping according to the following:

1. Install piping pitched down in direction of flow.

2. Install HDPE piping according to ASTM D 2321.

3. Install PVC cellular-core piping according to ASTM D 2321 and ASTM F 1668.

4. Install ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.

2. Join corrugated PE piping according to ASTM D 3212 for push-on joints.

3. Join PVC cellular-core piping according to ASTM D 2321 and ASTM F 891 for solvent-cemented joints.

3.4 PRECAST CONCRETE STRUCTURES

A. General: Install complete with appurtenances and accessories indicated.

B. Install Precast Concrete Structures in accordance with Section 201 of the MassDOT Standard Specifications.

1. Install in locations and to the lines, grades, dimensions, and design indicated on the Contract Drawings.

2. Set atop a layer of compacted gravel borrow as indicated on the Contract Drawings.

C. Set covers and grates to the elevations indicated on the Contract Drawings. Set covers and grates of precast structures in full mortar beds.

D. This work shall be performed under dry conditions when there is no flow being conveyed through the pipes and when no rain is forecasted to occur throughout the duration of installation.

3.5 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

3.6 FIELD QUALITY CONTROL

A. Drainage Piping and Structures:

1. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.

2. In large, accessible piping, brushes and brooms may be used for cleaning.

3. Place plug in end of incomplete piping at end of day and when work stops.

4. Flush piping between structures to remove collected debris, if required by authorities having jurisdiction.

5. Defects requiring correction include:

a. Alignment: Less than full diameter of inside of pipe is visible between structures.

b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.

c. Damage: Crushed, broken, cracked, or otherwise damaged piping.

d. Infiltration: Water leakage into piping.

e. Exfiltration: Water leakage from or around piping.

6. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

7. Reinspect and repeat procedure until results are satisfactory.

3.7 CLEANING

A. Clean interior of piping and structures of dirt and superfluous materials. Flush with water.

END OF SECTION

Attachment G

Updated Division 35 Specifications

SECTION 35 10 70 – CONTROL OF WATER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:

1. Temporary water control measures including cofferdams and water bypass conveyances (Water Control System) for Normal Water Control and Flood Water Control including design and sequencing, construction, installation, maintenance, and removal of temporary protective facilities and appurtenances required to convey surface water beyond or around project work areas and to dewater/divert groundwater seepage into work areas. Temporary measures and appurtenances may include but are not limited to:

   a. surface and subsurface dams (including cofferdams);

   b. flow diversions;

   c. special linings for erosion protection;

   d. pipes;

   e. dewatering sumps;

   f. pumps;

   g. barriers;

   h. dewatering areas and sedimentation pools;

   i. prefabricated sediment containment devices; and

   j. watertight seals.

2. Safe conveyance of water and flood flows.

3. Protection of existing structures and features, constructed improvements, work in progress, and downstream areas during significant rainfall and high water.

B. Construct Water Control System in phases as required to bypass flow around active work area(s), to maintain a minimum stream flow in upstream and downstream watercourses, and to protect adjacent properties and structures.

C. Control of water shall assure the overall safety of the site, project personnel and equipment, constructed improvements, work in progress and downstream properties, which may be affected by sudden releases of flood flows. This could include bringing manpower, equipment and materials to the site as necessary to prevent damage or failure resulting from significant rainfall.

D. The Contractor shall be solely responsible for controlling water in the project area. Alternative methods are acceptable only with prior written approval by the Engineer.

E. The amount of runoff resulting from significant rainfall events vary depending on numerous factors including, but not limited to, the following:

1. The degree of saturation of the soils in the watershed which will be affected by the amount of recent rainfall which has fallen;
2. The amount of snow cover in the watershed which could melt with rainfall and add to stream flows;
3. The amount of water in the river and/or impoundment prior to any rainfall event;
4. The response time of the watershed which depends on the amount of impervious cover, the size and the amount of storage available within the watershed; and
5. The impact of the bypass methods on downstream areas.

F. RELATED SECTIONS

1. Division 03 Section "Cast-in-Place Concrete"
2. Division 03 Section "Grout"
3. Division 31 Section "Earth Moving"

1.3 DEFINITIONS

A. Conveyance Structures: Temporary systems for conveying or by-passing water flows from cofferdammed areas to the downstream river channel without overtopping the temporary upstream and downstream cofferdam system(s) or other abutting properties/structures during normal river flows.

B. Cofferdammed Area: Work area(s) within the river channel that are protected from river flows following construction of temporary cofferdam(s).

1.4 QUALITY ASSURANCE

A. Standard Specifications: Shall mean the most recent version of the "Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition", and Supplemental Specifications (March 31, 2024).

1.5 SUBMITTALS

A. Submittals For Information

1. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by cofferdamming/water bypass operations.

B. Material Certificates: Indicating compliance with requirements indicated. Prepare separate reports for each type and application off-site soil/rock materials.

C. Product Data: Cutsheets, product literature, specifications sheets or other detailed information indicating product sizing, performance characteristics, loading capacities, anchoring requirements, care and maintenance requirements, and other information relative to materials of construction and

methods of operation for all products and materials incorporated into cofferdamming and water bypass/dewatering systems.

1.6 PERFORMANCE REQUIREMENTS

A. General

1. Design, furnish, install, monitor, and maintain cofferdam(s), water bypass conveyances and groundwater dewatering measures (Water Control System) capable of supporting and resisting hydrostatic and hydrodynamic pressures, flood flows and groundwater seepage rates.

a. Furnish, install, test, operate, monitor, and maintain Water Control System of sufficient scope, size, and capacity to adequately divert water around active project work areas.

b. Continuously monitor and maintain Water Control System material, equipment and operations to minimize suspension of sediment or other soil materials in the river, minimize erosion of channel beds and riverbanks, and protect adjacent structures, features, and properties to remain undisturbed.

c. Remove Water Control System in a controlled fashion when no longer required for construction.

d. Construct, operate and maintain Water Control System without damaging existing structures to remain or adjacent properties.

2. Prevent induction danger to persons and other living resources and damage or blockage by debris including trees, branches and other debris.

a. Debris entrained by the cofferdam or conveyances shall be removed and disposed off-site promptly.

3. Evaluate need for larger minimum capacity due to Project factors including construction duration and risk of damage to constructed features as work progresses.

4. Include controls to protect living resources adjacent to the site and in the downstream watercourse.

B. Minimum Capacity of Conveyance Structures for Normal Flow Conditions: The conveyance of by-pass flows for Phase 1 of construction shall be designed, at minimum, to convey approximately 70 cubic feet per second (cfs) without overtopping cofferdam systems. Once Phase 1 of construction is complete, all flow can pass through the River while Phase 2 improvements are completed. Approximately 180 cfs can pass through the nature-like fishway without overtopping the Phase 2 lagoon inlet cofferdam.

C. Flood Water Control Measures:

1. Contractor shall have materials and measures readily available for rapid implementation upon the threat or occurrence of flood water flow in excess of Normal Water Control flows.

2. In the event that flow in the river rises to within 6-inches of top of cofferdam and is expected to keep rising, the Contractor shall:

a. remove all equipment and personnel from the work area;

b. and shall furnish and deploy materials and measures within the work area as required in order to protect erodible areas from erosion and also to protect components of existing structures to remain or newly installed structures from damage as a result of increased flood flows.

D. Location and Materials on Contract Drawings: The locations and materials for Water Control System cofferdam and water bypass provisions shown on the Contract Drawings are for reference only.

1. The Contractor shall determine its manner of constructing, maintaining and removing its cofferdams and conveyances meeting performance requirements contained herein.

2. Layout cofferdam(s) to provide adequate clearances in all directions as required for execution of work to be performed within the river channel, including room for pumps and suction/discharge lines, bypass pipes, open channels and siphons, and construction operations.

3. All materials used in the cofferdam system must be clean and free of contaminants, debris and trash or other materials that may pollute the river.

a. No material may be used in the cofferdam or by-pass systems that may be harmful to plant growth or aquatic life.

b. All materials shall be stable when subjected to expected river flows such that they will not migrate within the river channel and not be removable in its entirety following construction of downstream river channel modifications.

c. If a liner is used it shall be a continuous, flexible, liner membrane that provides a complete barrier to river flows when positioned. Liners shall extend adequately into the upstream and transverse river channel sections and be anchored in place to provide a complete, firm seal during the work when exposed to hydrostatic/hydrodynamic pressures of the overlying standing/flowing water column.

4. Alternative water control methods will be considered, providing proposed methods conform to applicable local, state and federal codes; will not require an extension of contract time; and will not result in increase of construction costs.

a. The Engineer is not obligated to accept alternative methods and may impose additional requirements as condition of acceptance.

E. Contractor may allow limited water flows in the areas of work, provided the magnitude of flows and character of channel bottom does endanger site workers, equipment or materials and does not pollute or otherwise cause an excessive increase in turbidity in the downstream watercourse as compared to concurrent turbidity levels in the upstream watercourse.

a. Contractor shall only allow equipment into the river that is in good condition and does not have oil, grease, fuel or other materials on its surface that may damage or pollute the river.

1) All equipment shall be equipment with spill control materials (e.g., booms, dry absorbent) that can be deployed immediately in the event of a release of such materials.

2) All equipment shall be inspected each day prior to entering the river channel for surface materials; if observed such materials shall be completely cleaned and removed from the equipment prior to entering the river channel.

3) The Engineer may, at its sole discretion, direct the Contractor to remove equipment from the river channel that is leaking fluids or is otherwise polluting the water or channel bottom material. The Contractor shall address such conditions causing pollution to the satisfaction of the Engineer prior to resuming with in the river channel.

b. The Engineer will monitor turbidity in the downstream watercourse throughout the project duration to evaluate turbidity levels and whether such levels are excessive.

c. If the Engineer determines that Contractor's activities are resulting in an excessive increase of turbidity, the Contractor shall suspend work causing such conditions and adjust operations, equipment, materials, activities or locations as required to reduce turbidity levels to acceptable levels.

d. The Engineer shall be solely responsible for evaluating and determining what constitutes an excessive increase of turbidity levels in the watercourse. Such means may include use of real-time turbidity monitoring equipment to evaluate upstream and downstream levels.

1.7 PROJECT CONDITIONS

A. Protect aquatic life within impoundment areas and upstream/downstream watercourses. Incorporate additional controls during drawdown and dewatering.

B. Maintain aquatic base flow rates in water course channels downstream of the project site. If flow in river is less than base flow rate, allow in-flows to exit directly downstream.

PART 2 - PRODUCTS

A. General: Provide materials that are either new or in serviceable condition, and manufactured for the intended use in control of water at the site.

B. Sand: Clean, inorganic, well-graded, granular material with 100 percent passing a 1-inch (2.54 cm) sieve.

C. Sandbags: Burlap or polypropylene.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall take actions necessary to assure the safety and protection of the construction area and downstream areas during any periods of significant rainfall or upon the threat or occurrence of flood water flows. This shall include bringing manpower, equipment and materials to the site necessary to resist damage or failure as a result of a significant rainfall or flood water flows. The Contractor may need to man the job site 24 hours a day during such events to assure timely response to problems which may develop.

B. Do not begin work within downstream work areas until Water Control System materials and equipment are in place and operating as intended such that water levels in active work areas have been lowered to achieve water depths that do not cause excessive sedimentation or otherwise

endanger site workers, equipment, constructed features, or adjacent properties, structures and features.

C. If Contractor is prevented from completing work due to high flows exceeding 70 cfs for Phase 1 and 180 cfs for Phase 2, a time extension will be granted equal to time delayed due to flows recorded as exceeding that level.

1. The Contractor shall remain responsible for protecting its work and adjacent properties, structures and features throughout any such period.

3.2 PREPARATION

A. Investigate and verify existing conditions at the site.

B. Evaluate type of protective facility, appurtenances, and measures required for development of Water Control Plan.

3.3 PROTECTION

A. Since water level is dependent on the flow in the contributing watershed, water level can be expected to vary. The potential for major flood events is always a possibility. Ensure safety of dam and downstream areas.

1. Provide additional erosion control measures or other modifications or reinforcement of the system to manage resulting increases in water surface elevations and water flows without damage or risk of failure to the site and constructed channel modifications, temporary cofferdam and water conveyances, materials/equipment, adjacent properties and existing structures and features, adjacent wetland resources and adjacent roadway.

3.4 INSTALLATION

A. Install temporary cofferdam(s) in accordance with the Water Control Plan. The cofferdam(s) shall be installed during the specified low flow period, during dry weather and controlled conditions, and maintained throughout the construction period to ensure respective components function as intended to protect adjacent properties, wetland resources and downstream work areas. Pumps may be required within cofferdam areas to achieve and maintain dewatered conditions. All pumped discharge from within cofferdammed areas must pass through silt bags, or other acceptable treatment practices, to remove suspended sediment prior to being discharged to the downstream river channel.

3.5 MAINTENANCE

A. Monitor water control system daily. Promptly correct seepage, breakage, or other evidence of movement to ensure that temporary cofferdam(s) and water bypass conveyances remain stable and functioning as intended.

B. Maintain siphons or pumps as necessary to maintain dewatered conditions within cofferdammed areas sufficient for completion of work and placement proposed materials under safe, controlled conditions.

C. Maintain personnel and equipment on-site during periods of heavy rainfall, flood watches, flashflood watches and flood warnings to mitigate potential damage during flood events.

D. Monitor dewatering and by-pass systems continuously and provide additional measures as needed to control resulting increases in water surface elevations and water flows, and to convey flood flows to downstream channel reaches, without damage or risk of failure to the Water Control System.

E. Provide additional materials, equipment and manpower, as required, to resist damage to or failure of temporary water conveyance measures and existing and proposed features including the raceway channel and adjacent walls and structures.

F. Protect adjacent structures from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by cofferdamming and water bypass operations.

G. Promptly repair damages to adjacent areas or structures caused by Water Control System activities.

3.6 FISH PASSAGE TEST FLOW DIVERSIONS

A. Contractor shall temporarily divert test flows through modified river channel sections where the rock ramp fishway has been constructed to proposed lines and grades, to allow observation and measurement of such flows by the Engineer for purposes of verifying hydraulic performance of such features to assure adequate and suitable flow conditions for project targeted passage species.

1. Contractor shall coordinate such operations with the Engineer, including scheduling and notification at least fourteen (14) days prior to diversion of test flows.

2. Contractor shall conduct a total of up to two (2) test flow diversions as requested by the Engineer for verification of flows and velocities within the structure at or as near, as can be practicably generated, minimum, normal, and maximum design operating conditions for the fishway structure.

    a. The purpose of the first diversion test within each phase of construction will be to confirm that interstitial spaces within the rock ramp stone armor layer and joints between raised weirs were adequately packed/chinked with fill material to minimize seepage. The purpose of the second diversion test, if determined necessary due to excessive seepage, will be to confirm that corrective modifications executed by the Contractor reduce seepage to a level approved to be adequate by the Engineer and Contract Owner. Flow through each phase of the constructed rock ramp fishway shall be achieved by removing a portion of the upstream cofferdam to allow flow to pass through the work area.

3. Test flows shall be no less than 9 cubic feet per second (CFS), and occur during a normal working weekday hours, extending over a minimum 12-hour period, to allow observation and measurements of flows by the Engineer and Project Partners. If upstream river flows cannot sustain such test flows at the time of testing, the Contractor shall schedule such test flows on a date, acceptable to the Engineer, where such flows are provided by the upstream watercourse.

4. Contractor shall provide Engineer information on conveyance flow, elevations and headwater/tailwater conditions as required for calculation of actual flow rate(s) during the test diversions.

5. Contractor shall make such adjustments to constructed channel features (e.g., excavation of additional rock material, modifications to rock grade control weirs, etc.) as directed by the Engineer to achieve required depth and flow velocity parameters established by the Engineer during project design throughout the section of the river within the project limits.

6. Contractor shall restore cofferdamming and water bypass conveyance provisions following completion of test flows, if/as required for completion of adjustments to constructed channel features.

3.7 DRAWDOWN AND REMOVAL

A. Upon completion of all work in the downstream channel, completely remove temporary cofferdam(s) and water bypass conveyances in a controlled manner to restore river flows through completed portion(s) of the rock ramp fishway in a controlled manner to prevent damage to constructed features (e.g., scour, shifting/movement of placed rock, dry hydrants, etc.) and existing features to remain.

B. Remove water control systems when permanent construction has progressed sufficiently to accommodate hydrostatic pressures and stabilization measures proposed within the river and along its banks are complete

1. Repair or replace adjacent work or existing features damaged or displaced by construction operations at no additional cost.

3.8 ALTERNATIVE METHODS

A. The Contractor may propose alternative methods for control of water, for consideration by the Engineer. The proposed alternative method(s):

1. Shall conform to all applicable local, State and Federal codes and regulations and permits.

2. Shall not require an extension of the Contract time.

3. Shall not result in an increase in Contract costs.

4. Shall not cause excessive turbidity in downstream watercourse.

5. Shall safely convey flood flows around work areas.

6. Shall not damage or otherwise cause damage to the adjacent properties, structures or features, including trees and other natural resources.

B. The Engineer is not obligated to accept alternative methods and may impose additional requirements as a condition of acceptance of any alternative method proposed by the Contractor.

3.9 EMERGENCY NOTIFICATION

A. In the event that significant flood flows endanger the site, adjacent properties, structures or downstream areas, the Contractor shall immediately notify the Engineer and the Marshfield Police Departments.

END OF SECTION

Attachment H

Revised Drawing Sheets

MATCHLINE 'A' SEE THIS SHEET

BURIED ELECTRICAL SERVICE CONDUITS FROM NEW METER/MAIN ON SHED TO UTILITY POLE; REMOVE/REPLACE BIT. PAVED WALKWAY AS REQUIRED;

SECONDARY ELECTRICAL RISER POLE

CLEARING LIMIT (TYP.)

POOL BOTTOMS AND BANKS FORMED WITH NATIVE STABLE STONE/COBBLES INFILLED WITH NATIVE SEDIMENT AND INTERSPERSED SMALL/MEDIUM BOULDERS (TYP.)

G08-03-03 N/F LEGACY TEAM, LLC

BOULDER RIFFLE #2

BOULDER RIFFLE #3

FLOODPLAIN RESTORATION AREA (TYP.)

12" DIA. BIODEGRADABLE FIBER ROLL/VEGETATED COIR FASCINE (TYP.)

BOULDER RIFFLE #1

BOULDER RIFFLE #4

BURIED BOULDERS TO FORM WEIR CUTOFF (TYP.)

RIVERBANK STABILIZATION AREA (TYP.)

REMOVE 12" TREE

LOWER RIVERBANK RESTORATION AREA

BOULDER RIFFLE #5

BOULDER GRADE CONTROL WEIR WITH 2.0-FOOT WIDE NOTCH TOP OF BOULDER EL.=7.75 NOTCH INV. EL.=6.38

PROTECT EXIST. STORM DRAIN OUTFALL (INV. EL.=5.52)

5'x5' PRECAST CONCRETE INLET STRUCTURE CREST INV. EL. 6.5 (4'wx2.5'h) 12" HDPE OUTLET PIPE INV. 3.75

DOWNSTREAM ENERGY DISSIPATION POOL

BRUSH CLEARING LIMIT

G08-03-01 N/F TOWN OF MARSHFIELD CONSERVATION COMMISSION

REPAIR/ RECONSTRUCT STONE MASONRY WALL ALONG RIVERBANK (PER STRUCTURAL INSPECTION AND ASSESSMENT)

LAGOON

STOP LOG CONTROL (INV. EL.=7.50±); INSTALL STOP LOGS TO EL. 9.00

PUMP

ALT 2 - LT#2

6' DIA. PRECAST CISTERN, SUBMERSIBLE PUMP AND 2" PVC DISCHARGE PIPE (OUTLET INV. EL. 9.0±)

LEVEL TRANSMITTER (LT#1)

6' DIA. PRECAST CISTERN, AND 2" PVC DISCHARGE PIPE (OUTLET INV. EL. 9.0±)

NATIVE BOULDERS TO REPAIR ERODED RIVER CHANNEL AND PROTECT EXISTING STONE MASONRY WALLS

ROUGHENED CHANNEL/RIFFLE SECTION WITH LOW-FLOW CHANNEL; RIFFLE/ROUGHENED CHANNEL BOTTOM FORMED WITH NATIVE STABLE CHANNEL BOTTOM MATERIAL (COBBLES, GRAVEL AND 3-6" CRACKED STONE WITH INTERSPERSED SMALL BOULDERS) TO PROVIDE SMELT SPAWNING HABITAT.

RANDOM BOULDER PLACEMENT WITHIN RIFFLE TO BE FIELD-DIRECTED DURING CONSTRUCTION (TYP.)

REPLACE EXISTING LAGOON INLET CHANNEL TIMBER WALLS WITH STONE MASONRY WALLS

12" HDPE PIPE

TIMBER RAIL FENCE WITH AVIARY SCREEN

1.75' WIDE LOW-FLOW CHANNEL U/S INV. EL.=6.91 D/S INV. EL.=6.71

REPAIR/RECONSTRUCT STONE MASONRY WALL ALONG RIVERBANK (PER STRUCTURAL INSPECTION AND ASSESSMENT)

8" HDPE BLOWOFF PIPE WITH VALVE INV.=5.75

WATER WHEEL OUTLET WEIR WITH STOP GATE (INV. EL.=6.91)

ALT 2 - LT#3

LOAD CENTER

6' WIDE LAGOON OUTLET WEIR WITH STOP LOG CONTROLS (INV. EL.=7.38)

REMOVE EXISTING BRIDGE AND REPLACE WITH 16-FOOT LONG ADA-ACCESSIBLE TIMBER PEDESTRIAN BRIDGE (BRIDGE No. 1 DECK EL.=10.50)

GRASSED PENINSULA AND ADA-ACCESSIBLE PERVIOUS WALKWAY ENCOMPASSED BY NEW MORTARED STONE MASONRY WALLS TOP OF WALL EL.=9.40±

MAIN/METER

POWER CONDUIT TO FOUNTAIN

6" PERFORATED CISTERN UNDERDRAIN INV. EL.=3.0

4' DIA. PRECAST CONCRETE OUTLET STRUCTURE WITH POND SKIMMER GRATE GRATE EL. 6.50 8" HDPE BLOWOFF PIPE INV. 3.75 12" HDPE INLET PIPE INV. 3.75

4' WIDE REINFORCED PERVIOUS ADA-ACCESSIBLE WALKWAY (TYP.); SLOPES SHALL NOT EXCEED 5%

FLOATING FOUNTAIN WITH STAINLESS STEEL DEBRIS/FISH SCREEN

LAGOON POOL OUTLET STRUCTURE WEIR CREST/INV. EL. 6.00 STOP LOGS TO EL. 9.00 (MAX.)

14' LONG ADA-ACCESSIBLE TIMBER PEDESTRIAN BRIDGE (BRIDGE NO. 2 DECK EL.=10.05)

SELECTIVELY DEMOLISH AND RECONSTRUCT SECTION OF STONE MASONRY WALL AS REQUIRED TO CONSTRUCT LAGOON POOL OUTLET STRUCTURE

RECONSTRUCT/REPAIR/REPOINT STONE MASONRY WALL PER "STONE MASONRY WALL REPAIR/LAGOON LINER PLAN"

4' WIDE STOP LOG CONTROL INV. EL. 5.00 STOP LOG SET TO EL. 9.00

BURIED ELECTRICAL SERVICE CONDUITS FROM NEW METER/MAIN ON SHED TO UTILITY POLE; ROUTE CONDUITS OVER LAGOON OUTLET PIPE; REMOVE/REPLACE BIT. PAVED WALKWAY AS REQUIRED; ABANDON EXISTING SERVICE CONDUITS IN PLACE;

UNDERDRAIN CLEANOUT

REPAIR/REPOINT LAGOON MASONRY WALLS PER "STONE MASONRY WALL REPAIR/LAGOON LINER PLAN"

BURIED NEW ELECTRICAL SERVICE CONDUIT FROM PANEL IN SHED TO CISTERN PUMP; REMOVE/REPLACE BIT. PAVED WALKWAY AS REQUIRED; ROUTE CONDUIT OVER LAGOON OUTLET PIPE;

INSTALL IMPERMEABLE LINER WITHIN LAGOON BOTTOM AND COVER LINER WITH 6" LAYER OF NATIVE SAND/GRAVEL

REPLACE LAGOON OUTLET CONTROL STRUCTURE WITH 2'X4' PRECAST CONCRETE OUTLET STRUCTURE.

REPLACE EXISTING 18" RCP WITH 30" HDPE LAGOON OUTLET PIPE U/S INVERT EL.=5.00 D/S INVERT EL.=4.47 (EXIST.)

SCOUR APRON AT LAGOON OUTLET

MATCHLINE 'A' SEE THIS SHEET

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.	8/23/2024	ADDENDUM NO. 1	DRN/SDA	NSW
0.	8/2/2024	ISSUED FOR BIDDING	DRN/SDA	NSW

SEAL

SEAL

SCALE:
HORZ.: 1"= 10'
VERT.: N/A
DATUM:
HORZ.: MA NAD83
VERT.: NAVD88
10 5 0 10
GRAPHIC SCALE

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PROVIDENCE, RI 02908
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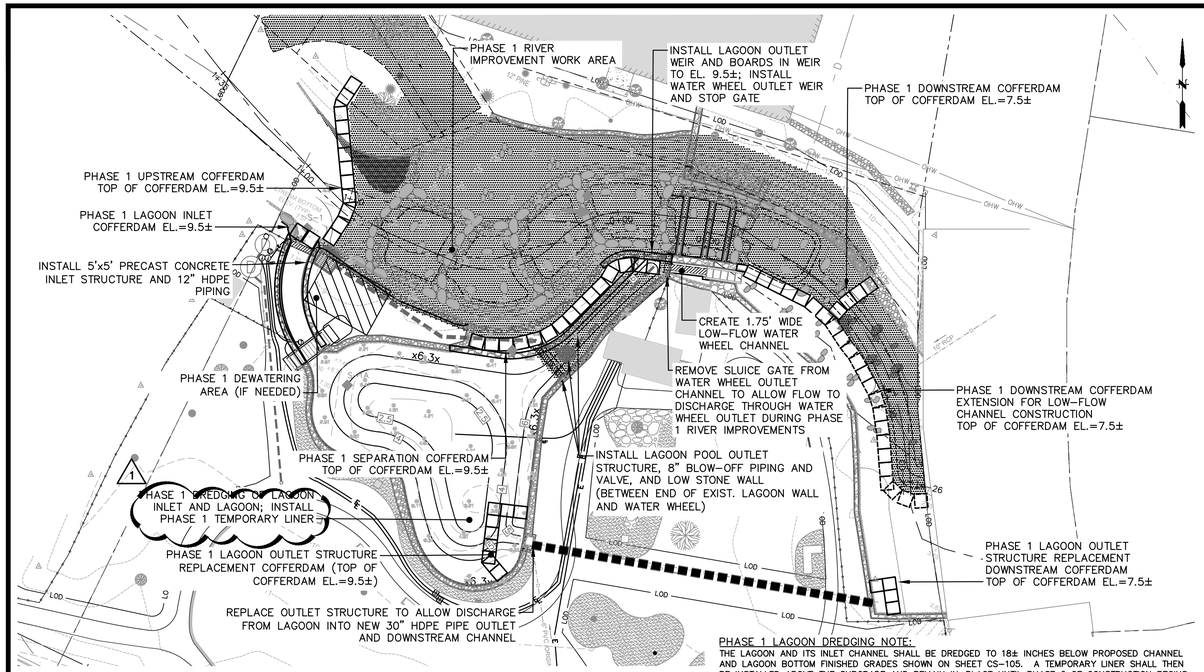
TOWN OF MARSHFIELD
DIVISION OF ECOLOGICAL RESTORATION
SOUTH RIVER FISH PASSAGE AND PARK
LAGOON IMPROVEMENTS PLAN
SOUTH RIVER FISH PASSAGE AND VETERANS MEMORIAL PARK IMPROVEMENTS PROJECT - CONTRACT NO. 2025-02
MARSHFIELD MASSACHUSETTS

PROJ. No.: 20180319.A23
DATE: AUGUST 2, 2024

CS-105
7 OF 21

File Path: J:\DWG\P20180319A23\Civil\Plan\20180319A23_STP01.dwg Layout: CS-105 Plotted: Fri, August 30, 2024 - 2:50 PM User: sean.arruda
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
MS VIEW: LAYER STATE:



PHASE 1 WATER CONTROL – RIVER RESTORATION IMPROVEMENTS

SCALE: 1"= 20'

PHASE 1 LAGOON DREDGING NOTE:
THE LAGOON AND ITS INLET CHANNEL SHALL BE DREDGED TO 18± INCHES BELOW PROPOSED CHANNEL AND LAGOON BOTTOM FINISHED GRADES SHOWN ON SHEET CS-105. A TEMPORARY LINER SHALL THEN BE INSTALLED ABOVE THE SUBGRADE AND REMAIN IN-PLACE UNTIL PHASE 2 OF CONSTRUCTION BEGINS. IT IS UNDERSTOOD THAT THERE MAY BE LOCATIONS DIRECTLY ALONG THE EXISTING LAGOON WALLS WHERE EXCAVATING TO 18-INCHES BELOW PROPOSED GRADE COULD POTENTIALLY UNDERMINE EXISTING FOUNDATIONS. IN THOSE LOCATIONS THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING, IMPLEMENTING, AND MAINTAINING TEMPORARY PROVISIONS AS REQUIRED TO MAINTAIN THE INTEGRITY AND STABILITY OF WALL SEGMENTS TO REMAIN.

WATER CONTROL SYSTEM NOTES

THE FOLLOWING NOTES ARE INTENDED TO SUPPORT THE WATER CONTROL CONSTRUCTION SEQUENCE AND CONCEPT AS DEPICTED ON THESE PLANS. IF THE CONTRACTOR OPTS TO USE A WATER CONTROL DESIGN AND SEQUENCE DIFFERENT THAN THAT SHOWN ON THESE PLANS, THE CONTRACTOR SHALL SUBMIT A WATER CONTROL AND PHASING PLAN FOR ACCEPTANCE BY THE ENGINEER PRIOR TO CONSTRUCTION.

1. PRIOR TO ANY LAND DISTURBANCE ACTIVITIES, THE CONTRACTOR MUST PHYSICALLY MARK THE LIMITS OF DISTURBANCE IN ACCORDANCE WITH THE PLANS APPROVED UNDER THE MARSHFIELD CONSERVATION COMMISSION'S ORDER OF CONDITIONS.
2. THE TEMPORARY COFFERDAMS AND BY-PASS STRUCTURES MUST BE INSTALLED DURING THE SEASONAL LOW FLOW PERIOD (I.E., THE PERIOD APPROXIMATELY BETWEEN JULY 15 THROUGH NOVEMBER 15) AND BE MAINTAINED TO ALLOW A DRY WORKING CONDITION (NO SEDIMENT PLUME) IN THE WATERCOURSE. SOIL DISTURBANCE IN THE WATERCOURSE MUST TEMPORARILY CEASE IN THE EVENT OF ANY ABNORMALLY HIGH STORMWATER RUNOFF EVENT IF A DRY WORKING CONDITION CANNOT BE MAINTAINED.
3. REMOVAL OF THE TEMPORARY COFFERDAMS MUST BE CONDUCTED SEQUENTIALLY TO CONTROL UPSTREAM DRAWDOWN TO NO MORE THAN SIX (6) INCHES PER DAY.
4. OBTAIN CONFIRMATORY ELEVATIONS OF THE RIVER CHANNEL AND LAGOON BOTTOMS ALONG THE PROPOSED ALIGNMENTS OF THE TEMPORARY COFFERDAMS AND DIVERSION PIPES TO VERIFY EXISTING CONDITIONS AND NORMAL COFFERDAM HEIGHTS PRIOR TO INSTALLATION.
5. WATER CONTROL MEASURES FOR PHASE 1 ARE INTENDED TO PROVIDE PROTECTION TO WORK AREAS FOR FLOWS UP TO APPROXIMATELY 70 CFS. THIS FLOW IS CONSIDERED TO BE THE UPPER LIMIT OF NORMAL FLOW CONDITIONS FOR THIS PHASE. WHILE THIS FLOW FALLS WITHIN THE RANGE OF MEAN NORMAL TO HIGHER SPRING FLOW CONDITIONS, IT IS ONLY 40% OF THE 2-YEAR FLOOD EVENT. IF FLOWS IN EXCESS OF 70CFS ARE EXPECTED; THE CONTRACTOR SHALL REMOVE EQUIPMENT AND PERSONNEL FROM THE PHASE 1 WORK AREA, ADEQUATELY STABILIZE EXISTING STRUCTURES TO REMAIN IN ADDITION TO NEWLY INSTALLED STRUCTURES/CONSTRUCTION FEATURES WITHIN THE PHASE 1 WORK AREA, AND ALLOW FOR THE TEMPORARY UPSTREAM OVERTOPPING OF THE COFFERDAM. WHILE THIS WILL RESULT IN A MINOR DELAY OF WORK, MATERIALS BEING INSTALLED WITHIN THE RIVER WORK AREA SHALL REMAIN STABLE. ONCE FLOWS IN THE RIVER SUBSIDE TO LESS THAN 70 CFS (AND BELOW THE ELEVATION OF THE TOP OF THE UPSTREAM COFFERDAM), THE WORK AREA CAN BE DEWATERED AND WORK CAN RESUME. 1
6. THE COFFERDAMS AND BYPASS PROVISIONS SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD TO ENSURE RESPECTIVE COMPONENTS FUNCTION AS INTENDED TO PROTECT ADJACENT PROPERTIES, WETLAND RESOURCES AND DOWNSTREAM WORK AREAS.
7. PROPOSED PHASE 1 AND 2 LAYOUTS SHOWN HEREON ARE APPROXIMATE ONLY AND IS INTENDED TO ONLY DEPICT RELATIVE PHASES OF WORK AND GENERAL WORK AREAS. REFER TO OTHER DRAWINGS FOR SPECIFIC WORK ACTIVITIES AND LIMITS

PHASE 1 – RIVER RESTORATION IMPROVEMENTS

1. MOBILIZE AND INSTALL TEMPORARY EROSION CONTROL MEASURES. REMOVE ALL STOP LOGS FROM THE EXISTING DAM'S SPILLWAY.
2. INSTALL PHASE 1 LAGOON OUTLET STRUCTURE REPLACEMENT UPSTREAM AND DOWNSTREAM COFFERDAMS AND REPLACE THE EXISTING OUTLET STRUCTURE AND DISCHARGE PIPE. THIS NEW OUTLET STRUCTURE AND DISCHARGE PIPE CAN CONVEY 45± CFS.
3. REMOVE THE WATER WHEEL AND STORE ON-SITE FOR RE-INSTALLATION FOLLOWING THE COMPLETION OF PHASE 2 IMPROVEMENTS. FLOW THROUGH THE WATER WHEEL CHANNEL MUST BE ALLOWED DURING THE ENTIRETY OF PHASE 1. THIS WATER WHEEL CAN CONVEY ±28 CFS WITHOUT OVERTOPPING.
4. CONSTRUCT PHASE 1 SEPARATION COFFERDAM TO EL. 9.5± AND PHASE 1 DOWNSTREAM COFFERDAM SYSTEM TO EL. 7.5± WITH EXCEPTION TO PORTION OF THE PHASE 1 DOWNSTREAM COFFERDAM THAT EXTENDS ACROSS THE RIVER CHANNEL. 1
5. BLOCK OFF FLOW INTO LAGOON AT INLET CHANNEL WITH TEMPORARY COFFERDAM AT INLET CHANNEL ENTRANCE. DEWATER LAGOON WITH NEWLY INSTALLED LAGOON OUTLET STRUCTURE AND DISCHARGE PIPE. COMPLETE DREDGING OF LAGOON INLET CHANNEL AND LAGOON TO PROPOSED SUBGRADE. INSTALL TEMPORARY LINER ALONG BOTTOM AND SIDES OF LAGOON INLET CHANNEL AND LAGOON. INSTALL 5'x5' PRECAST CONCRETE INLET STRUCTURE, 4' DIAMETER PRECAST CONCRETE OUTLET STRUCTURE WITH POND SKIMMER GRATE ALONG WITH INLET AND OUTLET PIPES, THE LAGOON POOL OUTLET STRUCTURE, AND PORTIONS OF THE NEW LAGOON WALLS WITHIN THE PHASE 1 PAY LIMITS. SLOWLY REMOVE TEMPORARY COFFERDAM AT INLET CHANNEL ENTRANCE AND INTRODUCE FLOW INTO LAGOON AFTER INSTALLATION OF TEMPORARY LINER.
6. CONSTRUCT PHASE 1 UPSTREAM RIVER CHANNEL COFFERDAM AND SECTION OF DOWNSTREAM COFFERDAM THAT EXTENDS ACROSS THE CHANNEL (TO EL. 9.5±) TO FULLY DIVERT FLOW INTO LAGOON. APPROXIMATELY 70± CFS OF FLOW CAN DISCHARGE THROUGH THE LAGOON INLET CHANNEL PRIOR TO OVERTOPPING THE UPSTREAM COFFERDAM (EL. 9.5±) AND THE RIVER'S NORTH BANK. IN THE EVENT THAT FLOW IN THE RIVER RISES TO WITHIN 6-INCHES OF TOP OF COFFERDAM AND IS EXPECTED TO KEEP RISING, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT AND PERSONNEL FROM THE WORK AREA; AND SHALL FURNISH AND DEPLOY MATERIALS AND MEASURES WITHIN THE WORK AREA AS REQUIRED IN ORDER TO PROTECT ERODIBLE AREAS FROM EROSION AND ALSO TO PROTECT COMPONENTS OF EXISTING STRUCTURES TO REMAIN, OR NEWLY INSTALLED STRUCTURES FROM DAMAGE AS A RESULT OF INCREASED FLOOD FLOWS. 1
7. REMOVE THE EXISTING DAM AND FISHWAY STRUCTURE TO THE LIMITS INDICATED, PROTECTING ADJACENT STRUCTURES TO REMAIN. DEPLOY AND OPERATE SUMP PUMPS AS NECESSARY TO MAINTAIN WORKING CONDITIONS SUITABLY PROTECTED FROM FLOWING OR STANDING WATER. DISCHARGE WATER PUMPED FROM SUMPS THROUGH SEDIMENT TREATMENT PRACTICES (SILT BAG, DEWATERING DISCHARGE CONTROL STRUCTURE).
8. CONSTRUCT RIVER IMPROVEMENTS FROM DOWNSTREAM TO UPSTREAM WITHIN THE PHASE 1 WORK AREA AS INDICATED INCLUDING, BUT NOT LIMITED TO, THE NATURE-LIKE RIFFLE-POOL FISHWAY, RECONSTRUCTION AND REHABILITATION OF STONE MASONRY WALLS, DOWNSTREAM ROUGHENED CHANNEL BED AND LOW-FLOW CHANNEL, GRASSED PENINSULA AND RIVER/LAGOON SEPARATION WALL, LAGOON OUTLET WEIR AND BLOWOFF PIPING DISCHARGE COMPONENTS (ON RIVER-SIDE OF WALL), RIVER CHANNEL/OVERBANK AREA GRADING AND BANK STABILIZATION PRACTICES. EXTEND DOWNSTREAM COFFERDAM (TOP OF COFFERDAM EL.=8.0±) TO SUPPORT CONSTRUCTION OF THE ROUGHENED CHANNEL BED AND LOW-FLOW CHANNEL, INCLUDING FIELD-DIRECTED PLACEMENT OF BOULDERS.
9. INSTALL LAGOON OUTLET WEIR WITH BOARDS IN WEIR TO EL. 9.5±; BOARDS MAY BE REMOVED FOLLOWING CONSTRUCTION IF FLOWS IN RIVER ARE EXPECTED TO EXCEED 70± CFS. OPENING THIS WEIR WILL ALLOW UP TO 50 CFS FROM LAGOON INTO PHASE 1 WORK AREA TO PROVIDE FLOOD RELIEF TO LAGOON IF NECESSARY. IF THIS OCCURS, THE PORTION OF THE DOWNSTREAM COFFERDAM THAT BISECTS THE RIVER WOULD NEED TO BE REMOVED TO ALLOW FLOW TO CONTINUE FLOWING DOWNSTREAM THROUGH WORK AREA.
10. UPON SUBSTANTIAL COMPLETION OF THE PROPOSED IN-RIVER IMPROVEMENTS, TEMPORARILY REMOVE A SECTION OF THE UPSTREAM AND DOWNSTREAM RIVER CHANNEL COFFERDAMS TO ALLOW A TEST FLOW OF APPROXIMATELY 9 CFS (MINIMUM FISH PASSAGE OPERATING CONDITION FLOW) TO PASS THROUGH THE RIVER CHANNEL AND NATURE-LIKE FISHWAY TO ALLOW OBSERVATION AND ASSESSMENT OF FISH PASSAGE CONDITIONS/SUITABILITY. 1
11. AFTER ACCEPTANCE OF NATURE-LIKE FISHWAY CONSTRUCTION, REMOVE PHASE 1 UPSTREAM AND DOWNSTREAM TEMPORARY COFFERDAMS. THE PHASE 1 SEPARATION COFFERDAM, HOWEVER, SHALL REMAIN IN PLACE.
12. RE-INSTALL LAGOON INLET COFFERDAM SUCH THAT ALL FLOW WILL BE DIRECTED THROUGH RIVER/FISHWAY. PERFORM RECONSTRUCTION OF LAGOON INLET CHANNEL WALLS AND NORTHERN LAGOON WALL (GRASSED PENINSULA SEPARATION WALL) THAT WILL FORM BORDER OF PENINSULA. INSTALL LAGOON INLET CHANNEL STRUCTURE AND CONCRETE INLET STRUCTURE AND WATER WHEEL HDPE AND DUCTILE IRON BYPASS PIPING (INCLUDING PRECAST CONCRETE OUTLET STRUCTURE IN LAGOON OUTLET CHANNEL WITH POND SKIMMER GRATE). TEMPORARILY CAP BYPASS PIPING. INSTALL STOP LOGS AT THE INLET TO THE LAGOON'S OUTLET STRUCTURE AND INSTALL WATER WHEEL SLUICE GATE AND LOW-FLOW CHANNEL IN WATER WHEEL CHANNEL FLOOR.
13. BACKFILL PENINSULA AND REMOVE PHASE 1 SEPARATION COFFERDAM. AT THIS POINT, THE PHASE 1 LAGOON INLET TEMPORARY COFFERDAM CAN BE REMOVED UNTIL PHASE 2 CONSTRUCTION COMMENCES.

PHASE 2 WATER CONTROL – LAGOON, ACCESS AND SITE SAFETY IMPROVEMENTS

SCALE: 1"= 20'

PHASE 2 – LAGOON, ACCESS AND SITE SAFETY IMPROVEMENTS

1. INSTALL UPSTREAM LAGOON INLET COFFERDAM TO EL. 9.5±, THE PHASE 2 SEPARATION COFFERDAM TO EL. 9.5±, AND THE PHASE 2 DOWNSTREAM COFFERDAM TO EL. 7.5±. IT IS ANTICIPATED THAT COFFERDAMS WILL BE CONSTRUCTED OF LARGE (BULK) SANDBAGS OR APPROVED EQUAL.
2. DEWATER THE LAGOON BY USE OF THE LAGOON'S OUTLET STRUCTURE. DEPLOY AND OPERATE SUMP PUMPS AS NECESSARY TO FURTHER DEWATER THE LAGOON AND MAINTAIN WORKING CONDITIONS SUITABLY PROTECTED FROM FLOWING OR STANDING WATER. DISCHARGE WATER PUMPED FROM SUMPS THROUGH THE DEWATERING AREA THAT INCLUDES SEDIMENT TREATMENT PRACTICES (E.G. SILT BAG, DEWATERING DISCHARGE CONTROL STRUCTURE, ETC.) PRIOR TO CONVEYANCE THROUGH THE LAGOON'S OUTLET STRUCTURE.
3. ONCE THE LAGOON IS DEWATERED, REMOVE TEMPORARY GEOMEMBRANE LINER OVER LAGOON BOTTOM.
4. CONSTRUCT SITE AND LAGOON IMPROVEMENTS PROPOSED WITHIN THE PHASE 2 WORK AREA AS SHOWN, INCLUDING BUT NOT LIMITED TO, SEDIMENT REMOVAL, PERMANENT LAGOON BOTTOM LINER, CHINKING/REPOINTING STONE MASONRY WALLS (INCLUDING REPLACING MISSING WALL STONES), SUPPLEMENTAL WATER SUPPLY CISTERNS WITH SUBMERSIBLE PUMP AND ASSOCIATED ELECTRICAL CONDUITS, ADA-ACCESSIBLE WALKWAYS AND PRE-FABRICATED BRIDGES, TIMBER RAIL FENCES, PRIMARY ELECTRICAL SERVICE SAFETY IMPROVEMENTS AND VEGETATIVE RESTORATION MEASURES.
5. REMOVE PHASE 2 COFFERDAMS AND RESTORE FLOW TO LAGOON. INSTALL STOP LOGS IN THE LAGOON OUTLET WEIR TO EL. 9.38 AND WITHIN THE THE LAGOON INLET AND POOL OUTLET STRUCTURE WEIRS TO EL. 9.00.
6. RESTORE ANY REMAINING DISTURBED AREAS WITHIN THE PHASE 1 AND 2 WORK AREAS AS INDICATED ON THE CONTRACT DOCUMENTS. RE-INSTALL THE WATER WHEEL AND OPEN SLUICE SUCH THAT BOTTOM OF SLUICE GATE IS 1-2 INCHES ABOVE FLOOR OF WATER WHEEL CHANNEL.
7. RESTORE AREAS DISTURBED BY TEMPORARY CONSTRUCTION ACCESS AND CONSTRUCTION TO PRE-CONSTRUCTION CONDITIONS.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.	8/23/2024	ADDENDUM NO. 1	DRN/SDA	NSW
0.	8/2/2024	ISSUED FOR BIDDING	DRN/SDA	NSW

SEAL

SEAL

SCALE:
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VERT.: N/A
DATUM:
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VERT.: NAVD88
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GRAPHIC SCALE

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TOWN OF MARSHFIELD
DIVISION OF ECOLOGICAL RESTORATION
WATER CONTROL AND CONSTRUCTION PHASING PLAN
SOUTH RIVER FISH PASSAGE AND VETERANS MEMORIAL PARK IMPROVEMENTS PROJECT - CONTRACT NO. 2025-02
MARSHFIELD MASSACHUSETTS

PROJ. No.: 20180319.A23
DATE: AUGUST 2, 2024

CS-109
11 OF 21

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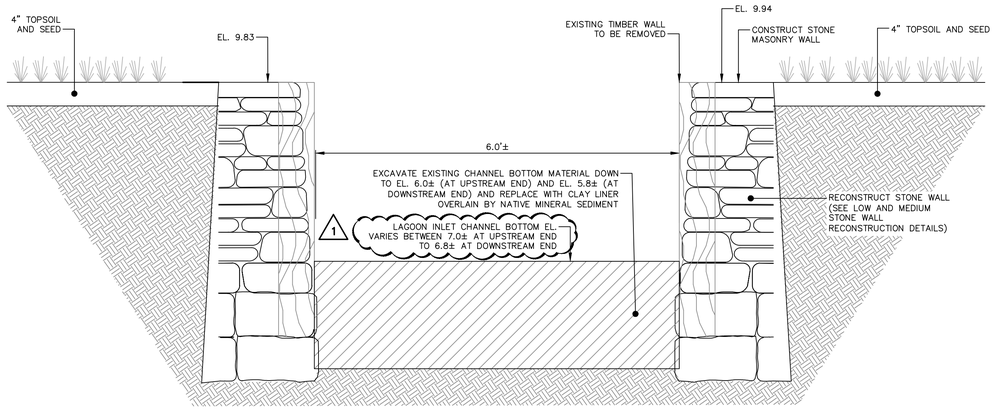


REPLACE EXISTING LAGOON INLET CHANNEL TIMBER WALLS WITH STONE MASONRY WALL

NOT TO SCALE

NOTES:

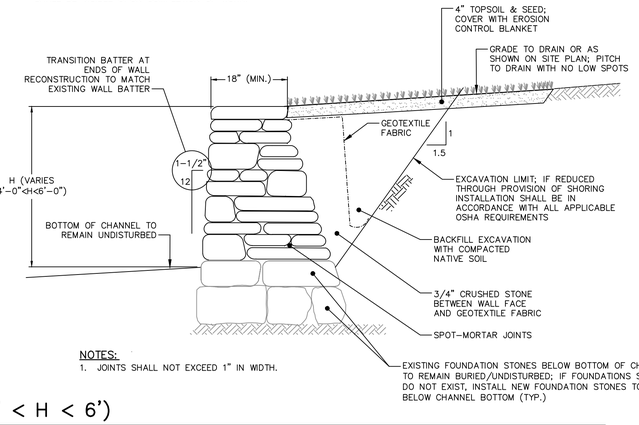
1. STAGGER VERTICAL JOINTS FROM COURSE TO COURSE SIX INCH MINIMUM HORIZONTALLY.
2. THE SIZE, COURSE, ORIENTATION, AND PLACEMENT OF STONES SHALL MATCH THE EXISTING STONES AND BLEND WITH ADJACENT WALL SECTIONS. THE CONTRACTOR SHALL TAKE PRECONSTRUCTION PHOTOGRAPHS OF THE COMPLETE SURFACE OF EACH WALL TO BE REPAIRED FOR ARCHIVAL AND COMPARISON PURPOSES.
3. GEOTEXTILE FABRIC SHALL BE AT LEAST 85 PERCENT BY WEIGHT OF PROPYLENE, ETHYLENE, ESTER, OR AMIDE. THE EDGES SHALL BE FINISHED TO PREVENT THE OUTER FIBER FROM PULLING AWAY FROM THE FABRIC. GEOTEXTILE FABRIC SHALL MEET THE FOLLOWING PHYSICAL REQUIREMENTS:

WIDE WIDTH TENSILE STRENGTH	ASTM D4595	2200 LBS/FT
GRAB TENSILE STRENGTH	ASTM D4632	325 LBS/FT
BREAK ELONGATION	ASTM D4632	15% MAX.
MULLEN BURST STRENGTH	ASTM D3786	750 PSI
PUNCTURE STRENGTH	ASTM D4833	140 LBS
UV RESISTANCE AFTER 500 HOURS	ASTM D4355	70%
APPARENT OPENING SIZE	ASTM D4751	50 US STD SIEVE
% OPEN AREA	CWO-22125-86	4%
PERMITTIVITY	ASTM D4491	35 GAL/MIN/SF

4. WALL RECONSTRUCTION CONSTRUCTION SEQUENCE:
   - A. INSTALL SECONDARY WATER CONTROL WITHIN WORK AREA.
   - B. REMOVE WOODY VEGETATION, INCLUDING STUMPS AND ROOTS, AS INDICATED ON THE SITE PLANS.
   - C. EXCAVATE BEHIND WALL AND DISASSEMBLE STONES, CLEAN AND STOCKPILE FOR REUSE. CONDUCT EXCAVATION AND STONE DISASSEMBLY SIMULTANEOUSLY IN ONE-FOOT INCREMENTS. HORIZONTAL LIMIT OF STONE DISASSEMBLY SHALL EXTEND PAST THE OUTERMOST LIMIT OF WALL RECONSTRUCTION AS REQUIRED TO RECONSTRUCT THE WALL IN STRUCTURALLY SOUND MANNER.
   - D. MONITOR GROUNDWATER, DEWATER, AND REMOVE ADDITIONAL ROOTS DURING EXCAVATION AS NECESSARY.
   - E. RESET STOCKPILED STONES; PLACE AND COMPACT BACKFILL IN ONE-FOOT INCREMENTS.
   - F. INSTALL FOUR-INCHES OF TOPSOIL AT TOP OF EXCAVATION AND SEED. DRESS TOPSOIL AND SEED OVER DISTURBED AREAS.
   - G. REMOVE DEBRIS AND SEDIMENT FROM CHANNEL.
   - H. DISASSEMBLE AND REMOVE WATER CONTROL, SANDBAGS, AND PIPES AND RESTORE AREA TO ORIGINAL GRADES AND CONDITIONS.
   - I. EXCAVATED MATERIALS SHALL BE PLACED IN A DESIGNATED LOCATION AND COVERED, OR OTHERWISE PROTECTED, AND ENCOMPASSED BY A STAKED STRAW WATTLE PERIMETER.
   - J. NOTIFY THE ENGINEER IMMEDIATELY IF ARCHEOLOGICAL ARTIFACTS ARE OBSERVED. COORDINATE WITH PROJECT ARCHEOLOGIST AND MASSACHUSETTS HISTORICAL COMMISSION TO PROTECT SUCH ARTIFACTS AND PROCEED WITH WORK ONLY AS DIRECTED.

SPOT-MORTAR NOTES:

1. SPOT-MORTAR JOINTS BETWEEN PLACED FOUNDATION STONES AND INTERIOR PORTIONS OF REPAIRED WALL.
2. MORTAR SHALL NOT BE PLACED IN FIRST COURSE ABOVE FOUNDATION STONES TO ENSURE FREE DRAINAGE.
3. MORTAR SHALL BE PLACED IN JOINTS ABOVE FIRST COURSE TO SECURE STONES IN PLACE WHILE ALLOWING FREE DRAINAGE. MORTAR SHALL NOT BE VISIBLE ON THE WALL FACE.
4. ALL MORTAR SHALL BE CAREFULLY REMOVED FROM EXPOSED JOINTS ON WALL FACE; NO MORTAR SHALL BE VISIBLE UPON COMPLETION OF WORK.



NOTES:

1. JOINTS SHALL NOT EXCEED 1" IN WIDTH.

RECONSTRUCT MEDIUM STONE WALL (4' < H < 6')

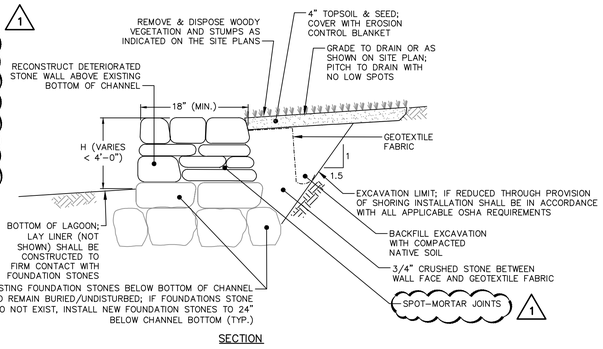
NOT TO SCALE

LOW STONE WALL REPAIR NOTES:

1. THE SIZE, COURSE, ORIENTATION, AND PLACEMENT OF STONES SHALL MATCH THE EXISTING STONES AND BLEND WITH ADJACENT WALL SECTIONS. THE CONTRACTOR SHALL TAKE PRECONSTRUCTION PHOTOGRAPHS OF THE COMPLETE SURFACE OF EACH WALL TO BE REPAIRED FOR ARCHIVAL AND COMPARISON PURPOSES.
2. GENERAL CHINK WALL/RESET MISSING STONE CONSTRUCTION SEQUENCE:
   - A. INSTALL SECONDARY WATER CONTROL WITHIN WORK AREA AS REQUIRED.
   - B. REMOVE WOODY VEGETATION INCLUDING STUMPS AND ROOTS.
   - C. EXCAVATE BEHIND WALL AND DISASSEMBLE STONES, CLEAN AND STOCKPILE FOR REUSE. CONDUCT EXCAVATION AND STONE DISASSEMBLY SIMULTANEOUSLY IN ONE-FOOT INCREMENTS. HORIZONTAL LIMIT OF STONE DISASSEMBLY SHALL EXTEND FIVE FEET PAST OUTERMOST LIMIT OF WALL RECONSTRUCTION OR UNTIL STRUCTURALLY SOUND SEGMENT OF WALL IS REACHED, WHICHEVER IS GREATER. VERTICAL LIMIT OF EXCAVATION SHALL EXTEND STRUCTURALLY SOUND FOUNDATION STONES.
   - D. LOCATE AND PROTECT EXISTING LINER AND UNDERDRAIN PIPE BEHIND EXISTING WALL FORMING THE PERIMETER OF THE LAGOON.
   - E. MONITOR GROUNDWATER AND DEWATER AS NECESSARY.
   - F. RESET STOCKPILED STONES, BACKFILL, AND COMPACT BACKFILL IN ONE-FOOT INCREMENTS. CHINK ANY VOIDS GREATER THAN 4" IN ANY TWO DIMENSIONS.
   - G. INSTALL TOPSOIL AND SEED.
   - H. REMOVE DEBRIS AND SEDIMENT FROM CHANNEL RESULTING FROM REPAIR.
   - I. DISASSEMBLE SECONDARY WATER CONTROL.

SPOT-MORTAR NOTES:

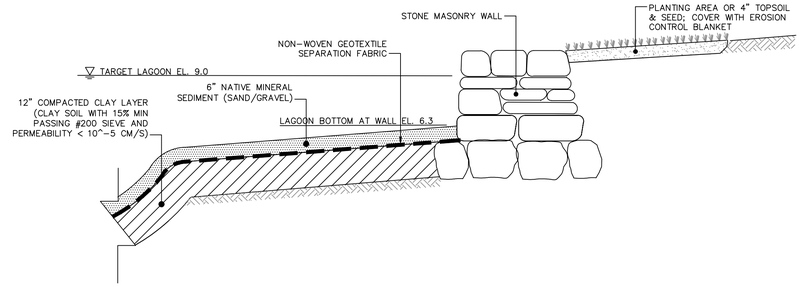
1. SPOT-MORTAR JOINTS BETWEEN PLACED FOUNDATION STONES AND INTERIOR PORTIONS OF REPAIRED WALL.
2. MORTAR SHALL NOT BE PLACED IN FIRST COURSE ABOVE FOUNDATION STONES TO ENSURE FREE DRAINAGE.
3. MORTAR SHALL BE PLACED IN JOINTS ABOVE FIRST COURSE TO SECURE STONES IN PLACE WHILE ALLOWING FREE DRAINAGE. MORTAR SHALL NOT BE VISIBLE ON THE WALL FACE.
4. ALL MORTAR SHALL BE CAREFULLY REMOVED FROM EXPOSED JOINTS ON WALL FACE; NO MORTAR SHALL BE VISIBLE UPON COMPLETION OF WORK.



SECTION

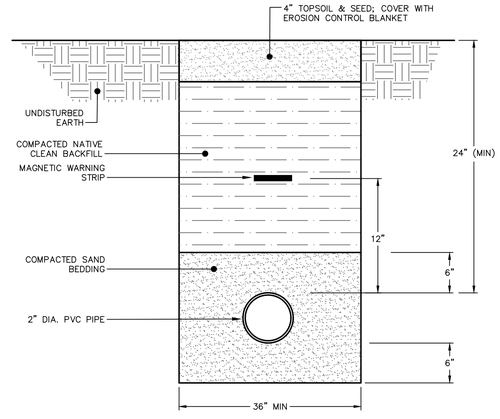
RECONSTRUCT/CONSTRUCT LOW STONE WALL (H < 4')

NOT TO SCALE



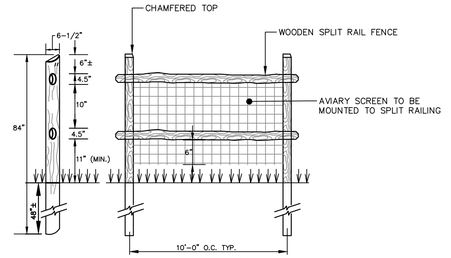
IMPERMEABLE LAGOON CLAY LINER

NOT TO SCALE



TYPICAL SUPPLEMENTAL WATER SYSTEM PUMP DISCHARGE PIPE TRENCH

NOT TO SCALE

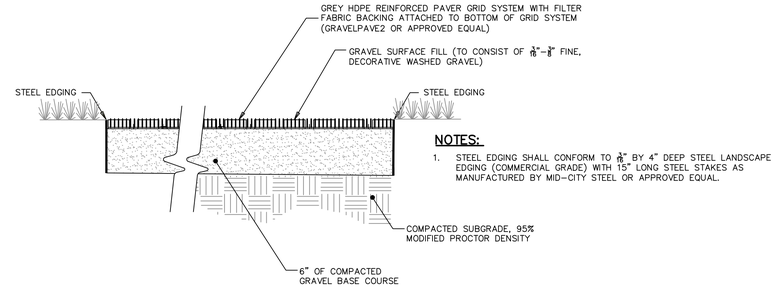


NOTES:

1. DIMENSIONS SHOWN ARE APPROXIMATE ONLY AND ARE ONLY INTENDED TO REFLECT APPROXIMATE DIMENSIONS. CONTRACTOR SHALL MATCH DIMENSIONS OF EXISTING RAILS AND FENCE POSTS AS NECESSARY.
2. FENCE RAILS AND POSTS SHALL CONSIST OF PRESSURE TREATED YELLOW PINE.
3. INSTALL GALVANIZED 2"x4" 105W WELDED WIRE MESH AVIARY SCREEN BETWEEN RAILS.

TIMBER RAIL FENCE

NOT TO SCALE



NOTES:

1. STEEL EDGING SHALL CONFORM TO 1/8" BY 4" DEEP STEEL LANDSCAPE EDGING (COMMERCIAL GRADE) WITH 15" LONG STEEL STAKES AS MANUFACTURED BY MID-CITY STEEL OR APPROVED EQUAL.

REINFORCED PERVIOUS ADA-ACCESSIBLE WALKWAY

NOT TO SCALE

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.	8/23/2024	ADDENDUM NO. 1	DRN/SDA	NSW
0.	8/2/2024	ISSUED FOR BIDDING	DRN/SDA	NSW

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317 IRON HORSE WAY, SUITE 204
PROVIDENCE, RI 02908
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TOWN OF MARSHFIELD
DIVISION OF ECOLOGICAL RESTORATION

CONSTRUCTION DETAILS

SOUTH RIVER FISH PASSAGE AND VETERANS MEMORIAL PARK IMPROVEMENTS PROJECT - CONTRACT NO. 2025-02
MARSHFIELD MASSACHUSETTS

PROJ. No.: 20180319.A23
DATE: AUGUST 2, 2024

CD-501
13 OF 21

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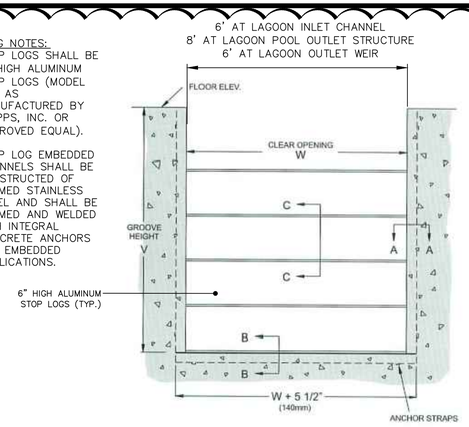
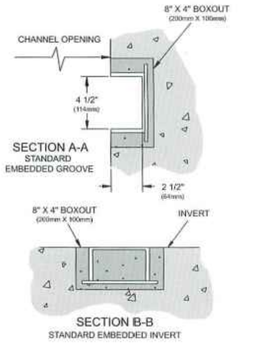
STOP LOG NOTES:

1. STOP LOGS SHALL BE 6" HIGH ALUMINUM STOP LOGS (MODEL 509 AS MANUFACTURED BY WHIPPS, INC. OR APPROVED EQUAL).
2. STOP LOG EMBEDDED CHANNELS SHALL BE CONSTRUCTED OF FORMED STAINLESS STEEL AND SHALL BE FORMED AND WELDED WITH INTEGRAL CONCRETE ANCHORS FOR EMBEDDED APPLICATIONS.



TYPICAL STOP LOG SECTION

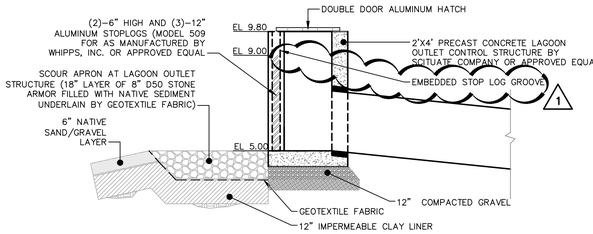


EMBEDDED STOP LOG CHANNEL AND INVERT DETAILS

TYPICAL STOP LOG CONTROL STRUCTURE DETAILS

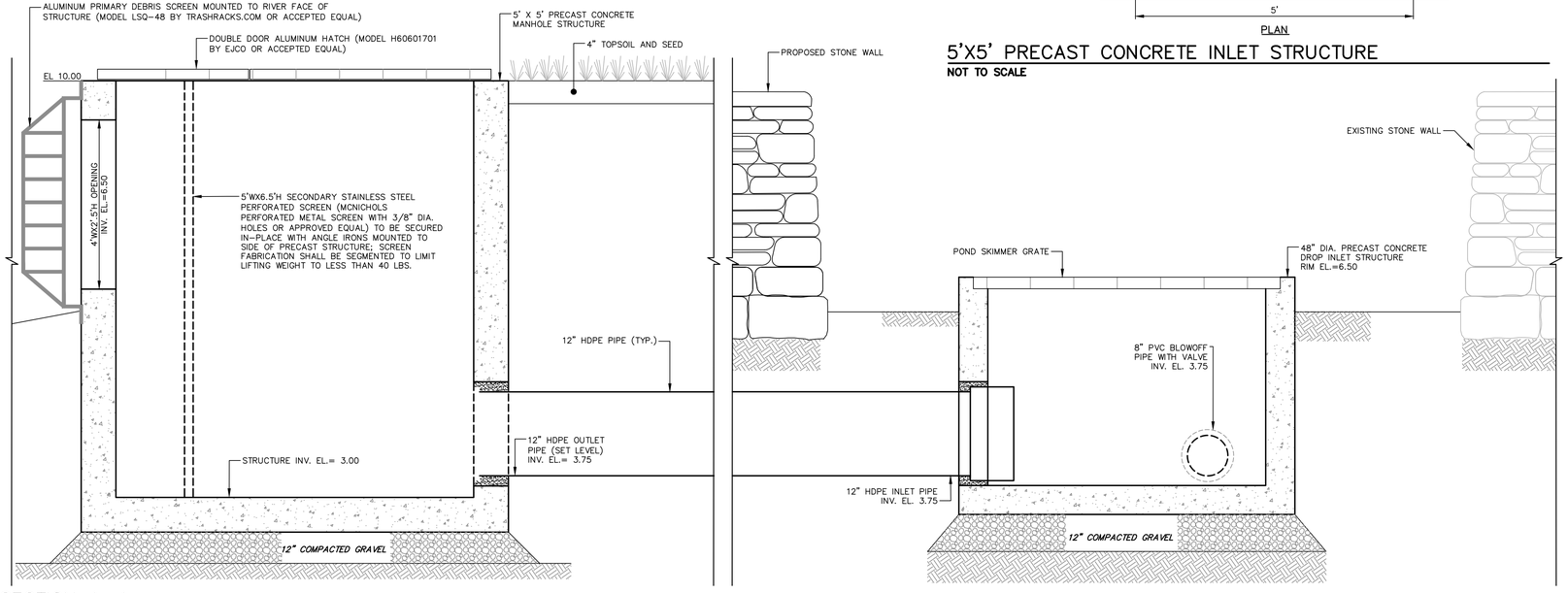
NOT TO SCALE

1



LAGOON OUTLET CONTROL STRUCTURE

NOT TO SCALE



SECTION A-A

NOT TO SCALE

LOW STONE WALL REPAIR NOTES:

1. THE SIZE, COURSE, ORIENTATION, AND PLACEMENT OF STONES SHALL MATCH THE EXISTING STONES AND BLEND WITH ADJACENT WALL SECTIONS. THE CONTRACTOR SHALL TAKE PRECONSTRUCTION PHOTOGRAPHS OF THE COMPLETE SURFACE OF EACH WALL TO BE REPAIRED FOR ARCHIVAL AND COMPARISON PURPOSES.
2. GENERAL CHINK WALL/RESET MISSING STONE CONSTRUCTION SEQUENCE:
   A. INSTALL SECONDARY WATER CONTROL WITHIN WORK AREA AS REQUIRED.
   B. REMOVE WOODY VEGETATION INCLUDING STUMPS AND ROOTS.
   C. EXCAVATE BEHIND WALL AND DISASSEMBLE STONES, CLEAN AND STOCKPILE FOR REUSE. CONDUCT EXCAVATION AND STONE DISASSEMBLY SIMULTANEOUSLY IN ONE-FOOT INCREMENTS. HORIZONTAL LIMIT OF STONE DISASSEMBLY SHALL EXTEND FIVE FEET PAST OUTERMOST LIMIT OF WALL RECONSTRUCTION OR UNTIL STRUCTURALLY SOUND SEGMENT OF WALL IS REACHED, WHICHEVER IS GREATER. VERTICAL LIMIT OF EXCAVATION SHALL EXTEND STRUCTURALLY SOUND FOUNDATION STONES.
   D. LOCATE AND PROTECT EXISTING LINER AND UNDERDRAIN PIPE BEHIND EXISTING WALL FORMING THE PERIMETER OF THE LAGOON.
   E. MONITOR GROUNDWATER AND DEWATER AS NECESSARY.
   F. RESET STOCKPILED STONES, BACKFILL, AND COMPACT BACKFILL IN ONE-FOOT INCREMENTS. CHINK ANY VOIDS GREATER THAN 4" IN ANY TWO DIMENSIONS.
   G. INSTALL TOPSOIL AND SEED.
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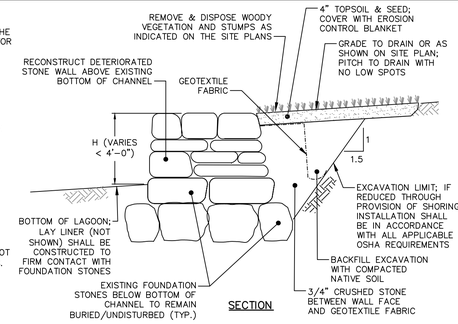
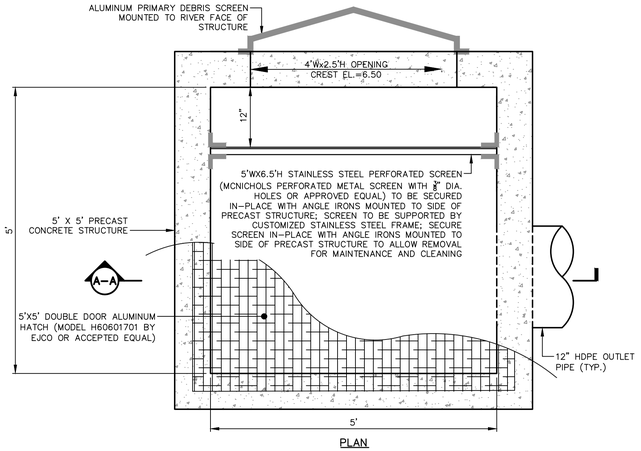
   I. DISASSEMBLE SECONDARY WATER CONTROL.



SECTION

RECONSTRUCT/CONSTRUCT LOW STONE WALL

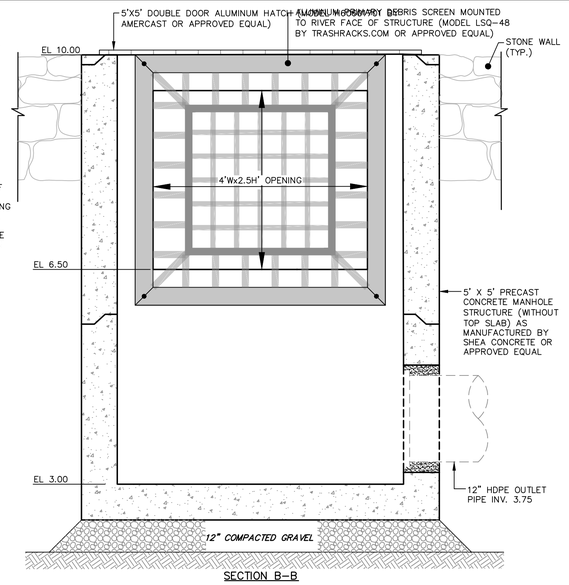
NOT TO SCALE



PLAN

5'X5' PRECAST CONCRETE INLET STRUCTURE

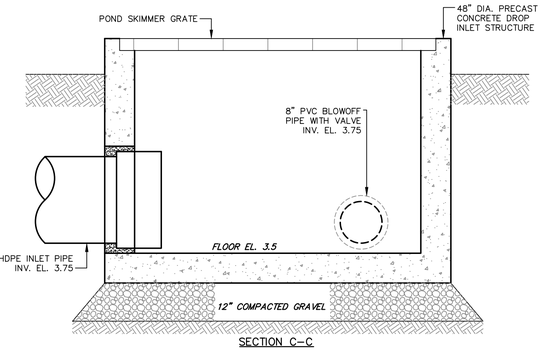
NOT TO SCALE



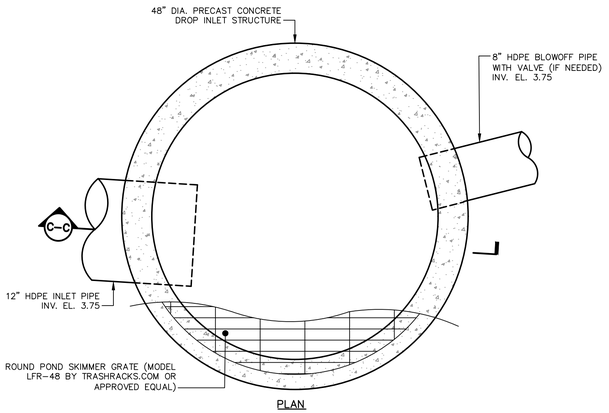
SECTION B-B

PRECAST CONCRETE INLET STRUCTURE

NOT TO SCALE



SECTION C-C



PLAN

48" DIA. PRECAST CONCRETE OUTLET STRUCTURE

NOT TO SCALE

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.	8/23/2024	ADDENDUM NO. 1	DRN/SDA	NSW
0.	8/2/2024	ISSUED FOR BIDDING	DRN/SDA	NSW

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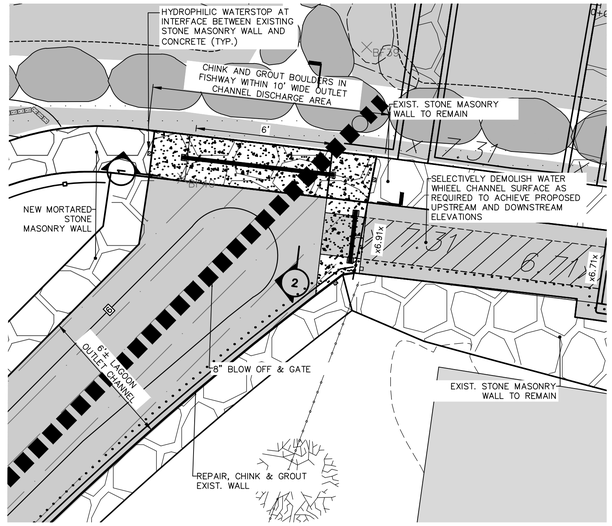
TOWN OF MARSHFIELD
DIVISION OF ECOLOGICAL RESTORATION

CONSTRUCTION DETAILS

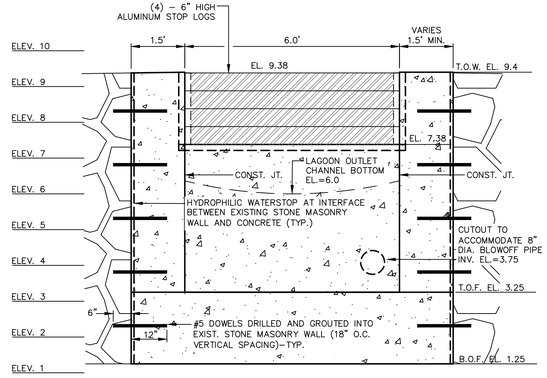
SOUTH RIVER FISH PASSAGE AND VETERANS MEMORIAL PARK IMPROVEMENTS PROJECT - CONTRACT NO. 2025-02
MARSHFIELD MASSACHUSETTS

PROJ. No.: 20180319.A23
DATE: AUGUST 2, 2024

CD-502

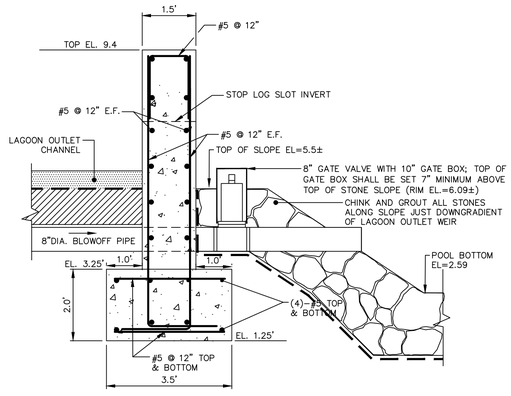


LAGOON OUTLET WEIR LAYOUT AND DETAIL
NOT TO SCALE



NOTE:
1. REINFORCEMENT NOT SHOWN IN THIS VIEW FOR CLARITY PURPOSES.

1 LAGOON OUTLET WEIR SECTION
SCALE: 1/2" = 1'–0"



2 LAGOON OUTLET WEIR SECTION
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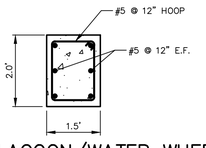
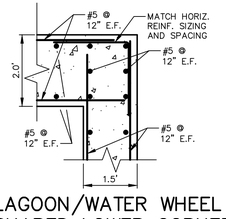
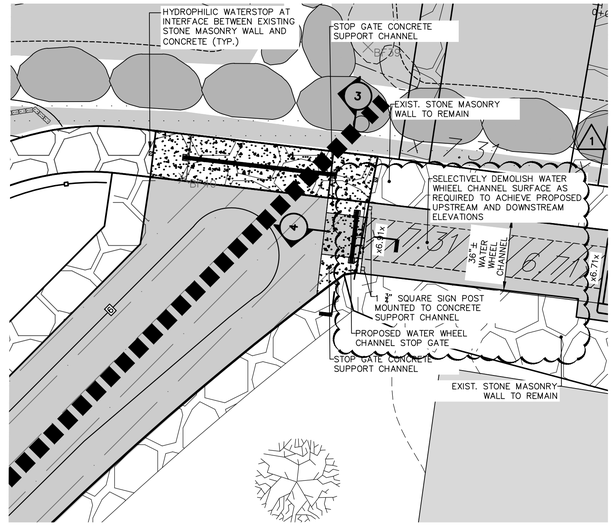


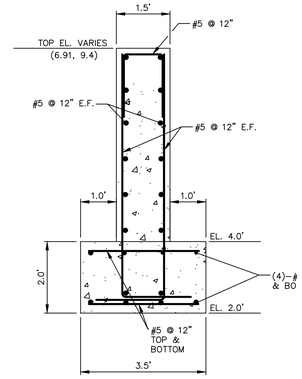
LAGOON/WATER WHEEL OUTLET WEIR UPPER CORNER DETAIL
SCALE: 1/2" = 1'–0"



LAGOON/WATER WHEEL OUTLET WEIR SHARED LOWER CORNER DETAIL
SCALE: 1/2" = 1'–0"



WATER WHEEL OUTLET WEIR LAYOUT AND DETAIL
NOT TO SCALE



4 TYPICAL WATER WHEEL OUTLET WEIR SECTION
SCALE: 1/2" = 1'–0"

STOP GATE NOTES:
1. STOP GATE SHALL BE ALUMINUM (ALLOY 6061–T6) WITH STAINLESS STEEL STEMS AND HARDWARE ALONG WITH FLEXIBLE ULTRA HIGH MOLECULAR WEIGHT (UHMW) SEAT/SEALS WITH A RESILIENT BOTTOM SEAL (MODEL 501 AS MANUFACTURED BY WHIPPS, INC. OR APPROVED EQUAL).
2. GATE FRAMES SHALL BE EMBEDDED IN CHANNEL WALLS.
3. STEEL REINFORCEMENT NOT SHOWN FOR CLARITY.
4. PROVIDE MECHANISM TO LOCK STOP GATE IN THE OPEN POSITION AT VARIOUS ELEVATIONS.

3 WATER WHEEL OUTLET WEIR SECTION AND STOP GATE
SCALE: 1/2" = 1'–0"

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CD-506
18 OF 21

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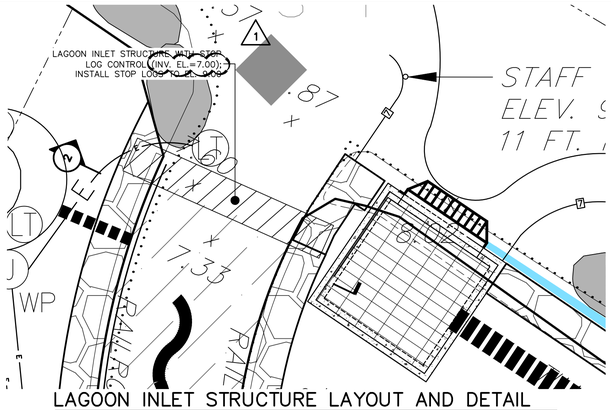
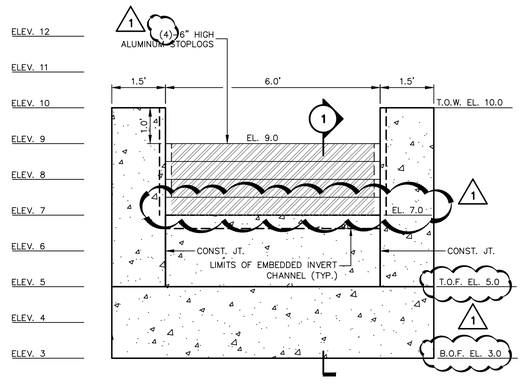
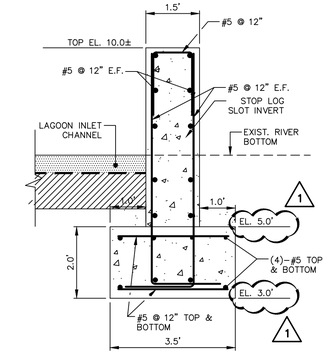


LAGOON INLET STRUCTURE LAYOUT AND DETAIL
NOT TO SCALE

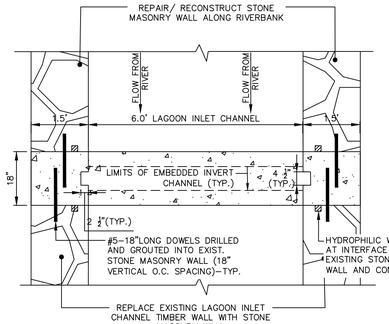


NOTE:
1. REINFORCEMENT, DOWELS AND WATERSTOPS NOT SHOWN IN THIS VIEW FOR CLARITY PURPOSES.

LAGOON INLET STRUCTURE ELEVATION
SCALE: 1/2" = 1'-0"

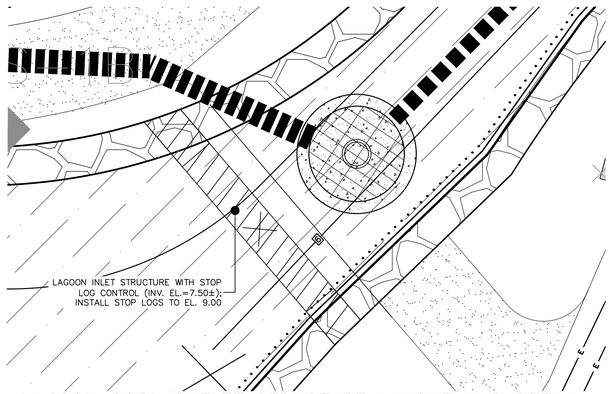


TYPICAL LAGOON INLET STRUCTURE SECTION
1 **SCALE: 1/2" = 1'-0"**

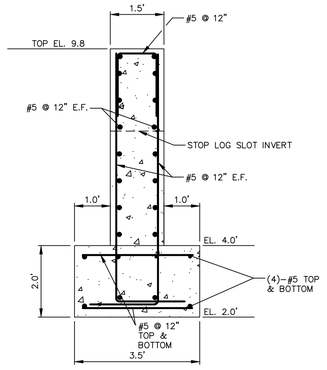


NOTE:
1. REINFORCEMENT, DOWELS AND WATERSTOPS NOT SHOWN IN THIS VIEW FOR CLARITY PURPOSES.

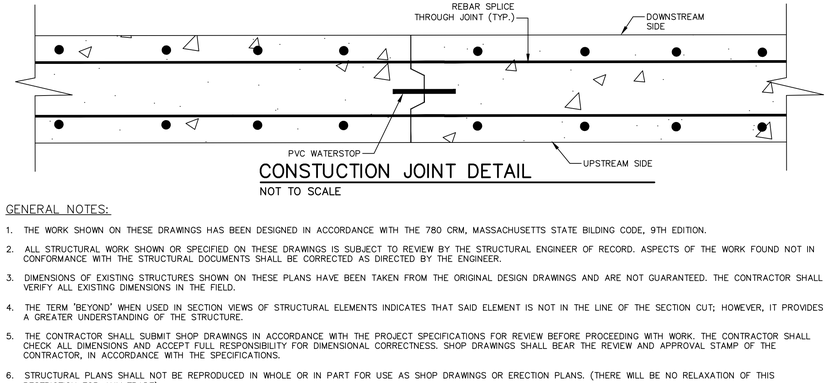
LAGOON INLET STRUCTURE PLAN VIEW
2 **SCALE: 1/2" = 1'-0"**



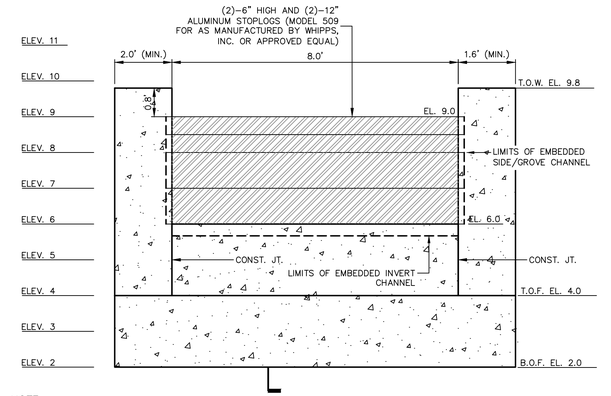
LAGOON POOL OUTLET STRUCTURE LAYOUT AND DETAIL
NOT TO SCALE



TYPICAL LAGOON POOL OUTLET STRUCTURE SECTION
3 **SCALE: 1/2" = 1'-0"**

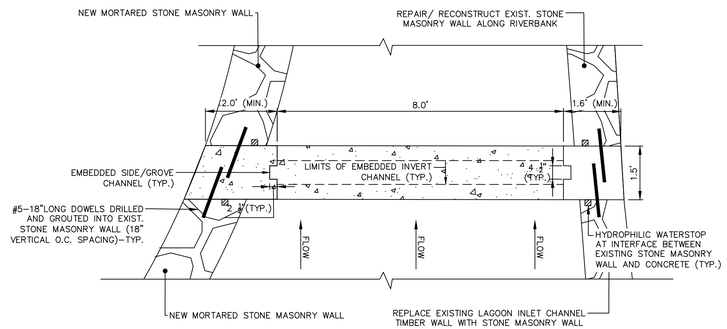


CONSTUCTION JOINT DETAIL
NOT TO SCALE



NOTE:
1. REINFORCEMENT, DOWELS AND WATERSTOPS NOT SHOWN IN THIS VIEW FOR CLARITY PURPOSES.

LAGOON POOL OUTLET STRUCTURE ELEVATION
SCALE: 1/2" = 1'-0"



LAGOON POOL OUTLET STRUCTURE PLAN VIEW
SCALE: 1/2" = 1'-0"

GENERAL NOTES:

1. THE WORK SHOWN ON THESE DRAWINGS HAS BEEN DESIGNED IN ACCORDANCE WITH THE 780 CRM, MASSACHUSETTS STATE BILDING CODE, 9TH EDITION.
2. ALL STRUCTURAL WORK SHOWN OR SPECIFIED ON THESE DRAWINGS IS SUBJECT TO REVIEW BY THE STRUCTURAL ENGINEER OF RECORD. ASPECTS OF THE WORK FOUND NOT IN CONFORMANCE WITH THE STRUCTURAL DOCUMENTS SHALL BE CORRECTED AS DIRECTED BY THE ENGINEER.
3. DIMENSIONS OF EXISTING STRUCTURES SHOWN ON THESE PLANS HAVE BEEN TAKEN FROM THE ORIGINAL DESIGN DRAWINGS AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS IN THE FIELD.
4. THE TERM 'BEYOND' WHEN USED IN SECTION VIEWS OF STRUCTURAL ELEMENTS INDICATES THAT SAID ELEMENT IS NOT IN THE LINE OF THE SECTION CUT; HOWEVER, IT PROVIDES A GREATER UNDERSTANDING OF THE STRUCTURE.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS FOR REVIEW BEFORE PROCEEDING WITH WORK. THE CONTRACTOR SHALL CHECK ALL DIMENSIONS AND ACCEPT FULL RESPONSIBILITY FOR DIMENSIONAL CORRECTNESS. SHOP DRAWINGS SHALL BEAR THE REVIEW AND APPROVAL STAMP OF THE CONTRACTOR, IN ACCORDANCE WITH THE SPECIFICATIONS.
6. STRUCTURAL PLANS SHALL NOT BE REPRODUCED IN WHOLE OR IN PART FOR USE AS SHOP DRAWINGS OR ERECTION PLANS. (THERE WILL BE NO RELAXATION OF THIS RESTRICTION FOR ANY TRADE).
7. A TESTING AGENCY SHALL BE HIRED BY THE CONTRACTOR TO PERFORM TESTS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

COLD WEATHER CONSTRUCTION PROCEDURES:

1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTINUOUSLY PROTECT SOILS, CONCRETE, MASONRY AND OTHER BUILDING MATERIALS FROM DAMAGE DUE TO COLD TEMPERATURES, UNTIL THE STRUCTURES HAVE BEEN TURNED OVER TO THE OWNER. THIS SHALL INCLUDE TEMPORARY ENCLOSURES, INSULATED BLANKETS, AND TEMPORARY HEATING, AS REQUIRED.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR AND/OR REPLACE ANY DAMAGED OR DEFECTIVE WORK, IN A MANNER APPROVED BY THE ENGINEER.
3. CAST-IN-PLACE CONCRETE SHALL NOT BE CONSTRUCTED ON FROZEN GROUND. ALL FROZEN SOIL SHALL BE REMOVED AND REPLACED WITH COMPACTED CRUSHED STONE.
4. FROZEN MATERIALS OR MATERIALS CONTAINING ICE SHALL NOT BE USED.
5. ALL PROTECTIVE AND CORRECTIVE WORK SHALL BE DONE AT THE EXPENSE OF THE CONTRACTOR.

CONCRETE NOTES:

1. ALL CONCRETE WORK SHALL CONFORM TO ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS".
2. ALL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE SPECIFICATIONS, AND SHALL CONFORM TO ASTM A615 GRADE 60, AND SHALL BE DETAILED IN ACCORDANCE WITH ACI 315 "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
3. REINFORCING STEEL SHALL HAVE A MINIMUM CONCRETE COVER AS FOLLOWS:
   - CONCRETE DEPOSITED AGAINST GROUND = 3 IN.
   - CONCRETE EXPOSED TO WEATHER OR IN CONTACT WITH GROUND = 2 IN.
4. ALL REINFORCING STEEL SHALL BE CONTINUOUS AND LAPPED A MINIMUM OF 48 BAR DIAMETERS AT ALL SPLICES, CORNERS, AND INTERSECTIONS UNLESS NOTED OTHERWISE.
5. ALL REINFORCEMENT SHALL BE SECURELY TIED IN ITS PROPOSED LOCATION PRIOR TO AND DURING PLACEMENT OF CONCRETE USING APPROVED CHAIRS, SPACERS AND TIE WIRE AS REQUIRED. NO BARS SHALL BE CUT OR OMITTED IN THE FIELD WITHOUT THE APPROVAL OF THE ENGINEER.
6. CAST-IN-PLACE MARINE CONCRETE SHALL BE NORMAL WEIGHT CONCRETE AND SHALL DEVELOP A COMPRESSIVE STRENGTH OF 5,000 PSI IN 28 DAYS. CONCRETE SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 3/8 INCH, A MINIMUM CEMENTITIOUS CONTENT OF 710 LBS/CU YD., AND A MAXIMUM SLUMP OF 4 INCHES.
7. ALL EXPOSED EDGES OF CONCRETE SHALL HAVE A 1 INCH CHAMFER UNLESS NOTED OTHERWISE.
8. ALL CONCRETE SHALL BE AIR-ENTRAINED.
9. CONSTRUCTION JOINTS SHALL BE DETAILED AND LOCATED ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER. UNLESS SHOWN OTHERWISE, CONSTRUCTION JOINTS ARE TO BE KEYED AND PROVIDE FOR CONTINUITY OF REINFORCING STEEL. CONSTRUCTION JOINTS ARE TO BE LOCATED WHERE CONSTRUCTION OPERATIONS ARE SUSPENDED FOR 30 MINUTES OR MORE.
10. DOWELS: PROVIDE, PLACE, AND SPACE TO MATCH REINFORCING.

DOWEL ANCHORS:

1. ALL ANCHOR DOWELS INDICATED ON THE STRUCTURAL PLANS SHALL BE OF THE SIZE INDICATED AND EPOXY COATED IN ACCORDANCE WITH THE SPECIFICATIONS.
2. EPOXY DOWEL ANCHORS WHERE INDICATED ON THE PLANS SHALL HAVE THE FOLLOWING EMBEDMENTS UNLESS NOTED OTHERWISE OR SUPERSEDED BY THE MANUFACTURERS MINIMUM EMBEDMENT REQUIREMENTS:
   - #4 DIA. = 3"
   - #5 DIA. = 3"
   - #6 DIA. = 4"
   - #7 DIA. = 5"
   - #8 DIA. = 7"

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MARSHFIELD MASSACHUSETTS

PROJ. No.: 20180319.A23
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CD-507
18 OF 21

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LAYER STATE:
MS VIEW:

LEGEND

- CIRCUIT BREAKER
- GROUND
- OHW — OVERHEAD PRIMARY WIRES
- OHW — EXISTING OVERHEAD WIRING
- E — UNDERGROUND ELECTRIC 2#10, 1#10 GND. – 1" (UNLESS NOTED OTHERWISE)
- E — EXISTING ELECTRIC
- EXISTING POLE
- NEW POLE
- POLE GUY
- HH — HEAVY DUTY HANDHOLE WITH OPEN BOTTOM
- MAGNETIC MOTOR STARTER/DISC. WITH HAND OFF AUTO SWITCH EATON OR APPROVED EQUAL (SIZE 1)
- J — JUNCTION BOX
- LT LT#1 — LEVEL TRANSMITTER; NUMERAL INDICATES DEVICE NUMBER

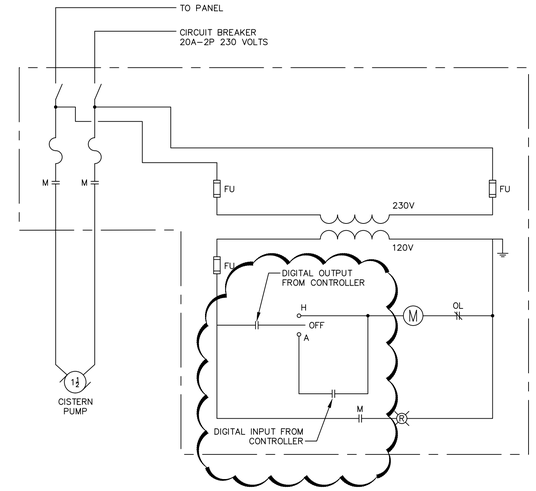
1

ABBREVIATIONS:

Ø	PHASE
A	AMPERE
BLDG	BUILDING
C	CONDUIT
D,R&R	DISCONNECT, REMOVE AND DISPOSE OF
DWG	DRAWING
FCO	FUSED CUTOUT
GND	GROUND
KW	KILOWATT
KV	KILO VOLT
LBE	LOADBREAK
MCB	MAIN CIRCUIT BREAKER
PVC	POLYVINYL CHLORIDE, SCHEDULE 40
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND REPLACE
REL	RELOCATE
RS	RIGID STEEL
V	VOLTS
WP	WEATHERPROOF (NEMA 4X)
XFMR	TRANSFORMER

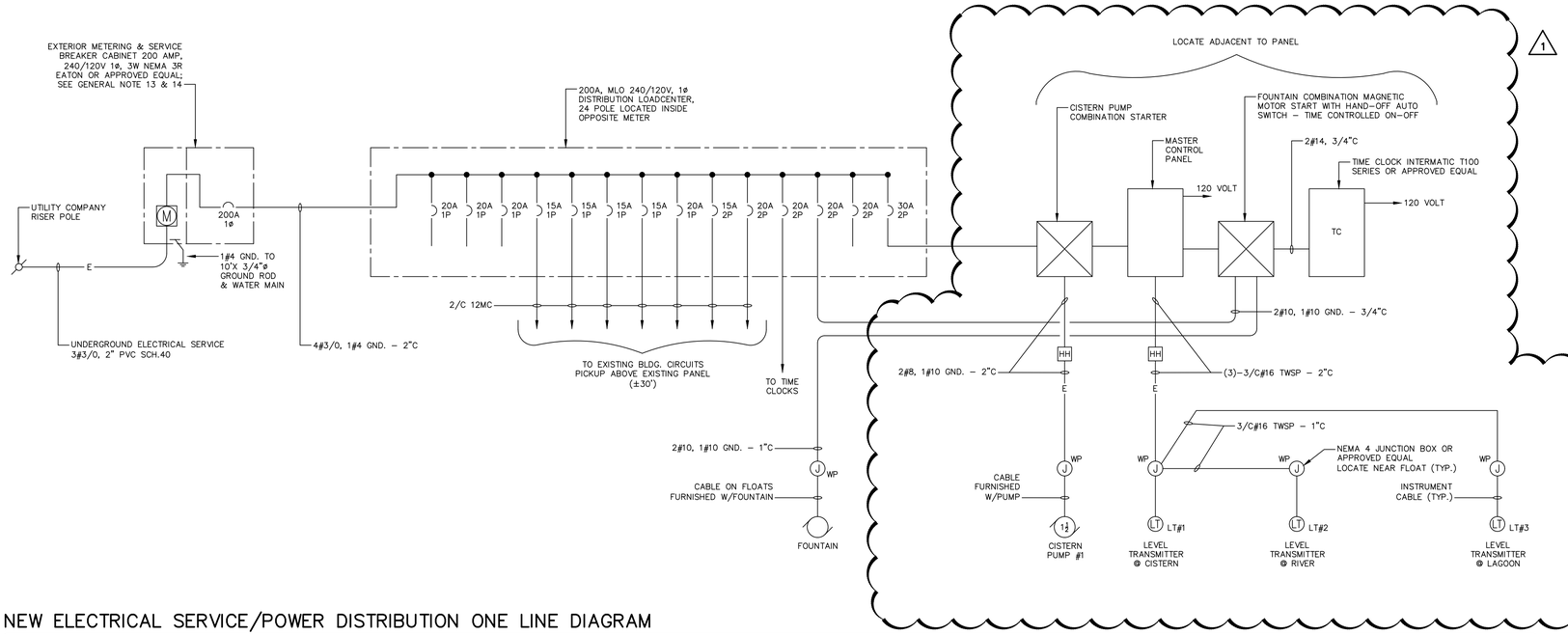
GENERAL NOTES

1. **ALL UNDERGROUND CONDUITS SHOWN ON THIS SHEET ARE INCLUDED IN THE BASE BID.** 1
2. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL AND MASSACHUSETTS ELECTRICAL CODES AND OTHER STATE OF MASSACHUSETTS REQUIREMENTS AND THE NATIONAL ELECTRICAL SAFETY CODE C2. PRIMARY WORK SHALL BE PER EVERSOURCE REQUIREMENTS AND SUBJECT TO THEIR APPROVAL.
3. INSTALL A COMPLETE GROUND SYSTEM IN ACCORDANCE WITH ALL CODES, AND AS INDICATED
4. ITEMS INDICATED TO BE "REMOVED" SHALL BE REMOVED COMPLETELY AND PROPERLY DISPOSED OF.
5. DEMOLITION OF EXISTING ELECTRICAL SYSTEM SHALL BE PERFORMED IN A PHASED SYSTEM OF DECOMMISSIONING. THE ENTIRE NEW DISTRIBUTION SYSTEM SHALL BE CONSTRICTIVELY TESTED AND OPERATIONAL BEFORE CUT OVER OF THE NEW SYSTEM TO EXISTING EQUIPMENT THAT REMAINS.
6. WHERE WIRING IS TO BE REMOVED, RELOCATED OR RECONNECTED, THE CONTRACTOR SHALL TAKE PRECAUTIONS AND ASSUME THAT THE CIRCUIT MAY BE ACTIVE. CONTRACTOR SHALL TEST, VERIFY AND SECURE ALL CIRCUITS BEFORE REMOVAL. UNKNOWN WIRING SHALL BE IDENTIFIED. ANY WIRING TO REMAIN SHALL BE VERIFIED BY THE CONTRACTOR, TAGGED AND IDENTIFIED AS REQUIRED.
7. EXISTING ELECTRICAL EQUIPMENT AND WIRING TO REMAIN SHOWN SHALL BE PROTECTED FROM DAMAGE AS REQUIRED DURING THE CONSTRUCTION PERIOD AND LEFT IN GOOD WORKING ORDER AT COMPLETION. ANY EQUIPMENT DAMAGED SHALL BE REPLACED BY THE CONTRACTOR AT NO EXPENSE TO THE OWNER.
8. OWNER AND CODE REQUIRED SYSTEMS THAT ARE REQUIRED TO REMAIN ACTIVE DURING CONSTRUCTION SHALL BE TEMPORARILY WIRED AS REQUIRED TO REMAIN ACTIVE THROUGHOUT THE CONSTRUCTION PERIOD UNTIL NEW SYSTEMS ARE INSTALLED, TESTED AND ACCEPTED.
9. IN CONDITIONS WHERE IN THE OPINION OF THE CONTRACTOR IT IS NOT CLEAR WHETHER EXISTING ELECTRICAL EQUIPMENT IS TO BE REMOVED OR REMAIN, IT SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR REVIEW AND FINAL DECISION.
10. SITE UTILITY PLANS PLANS HAS BEEN DERIVED FROM THE BEST AVAILABLE EXISTING DRAWINGS AND MUST BE FIELD VERIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL ENGAGE AND CONTRACT WITH A SITE UTILITY LOCATION CONTRACTOR TO FIELD LOCATE AND MARK ALL UTILITIES ALONG DUCTBANK ROUTING AND EQUIPMENT INSTALLATION LOCATIONS. ANY EQUIPMENT THAT IS NOT IDENTIFIED AND CONFLICTS WITH CONSTRUCTION SHALL NOT BE DISCONNECTED AND SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER / ENGINEER FOR DISPOSITION.
11. USE LONG RADIUS SWEEPS FOR ALL BENDS.
12. CONDUITS SHALL BE SWABBED BEFORE CABLES ARE PULLED IN.
13. CUT–OVERS AND ANY INTERRUPTION TO ELECTRICAL SERVICE ARE TO BE SCHEDULED AND PERFORMED AT A TIME THAT IS ACCEPTABLE TO CITY AND OWNER.
14. CONTRACTOR SHALL COORDINATE NEW SERVICE REQUIREMENTS WITH UTILITY COMPANY. 1
15. CONTRACTOR SHALL APPLY FOR SERVICE UPGRADE WITH UTILITY.
16. CONTRACTOR TO SET LEVEL TRANSMITTERS AT ON START UP, BASED ON INPUT FROM ENGINEER.
17. CONTRACTOR SHALL REMOVE EXISTING ELECTRICAL SERVICE METER AND LOAD CENTER AND PROPER DISPOSE OF..



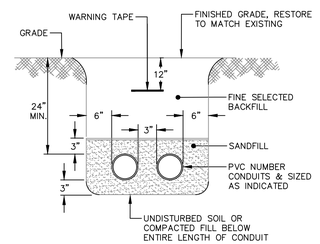
CISTERN PUMP STARTER WIRING DIAGRAM

NOT TO SCALE



NEW ELECTRICAL SERVICE/POWER DISTRIBUTION ONE LINE DIAGRAM

NOT TO SCALE



NOTES:
ALL DIMENSIONS ARE MINIMUM REQUIREMENTS.

TYPICAL ELECTRICAL CONDUIT IN TRENCH

NOT TO SCALE

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8/29/2024

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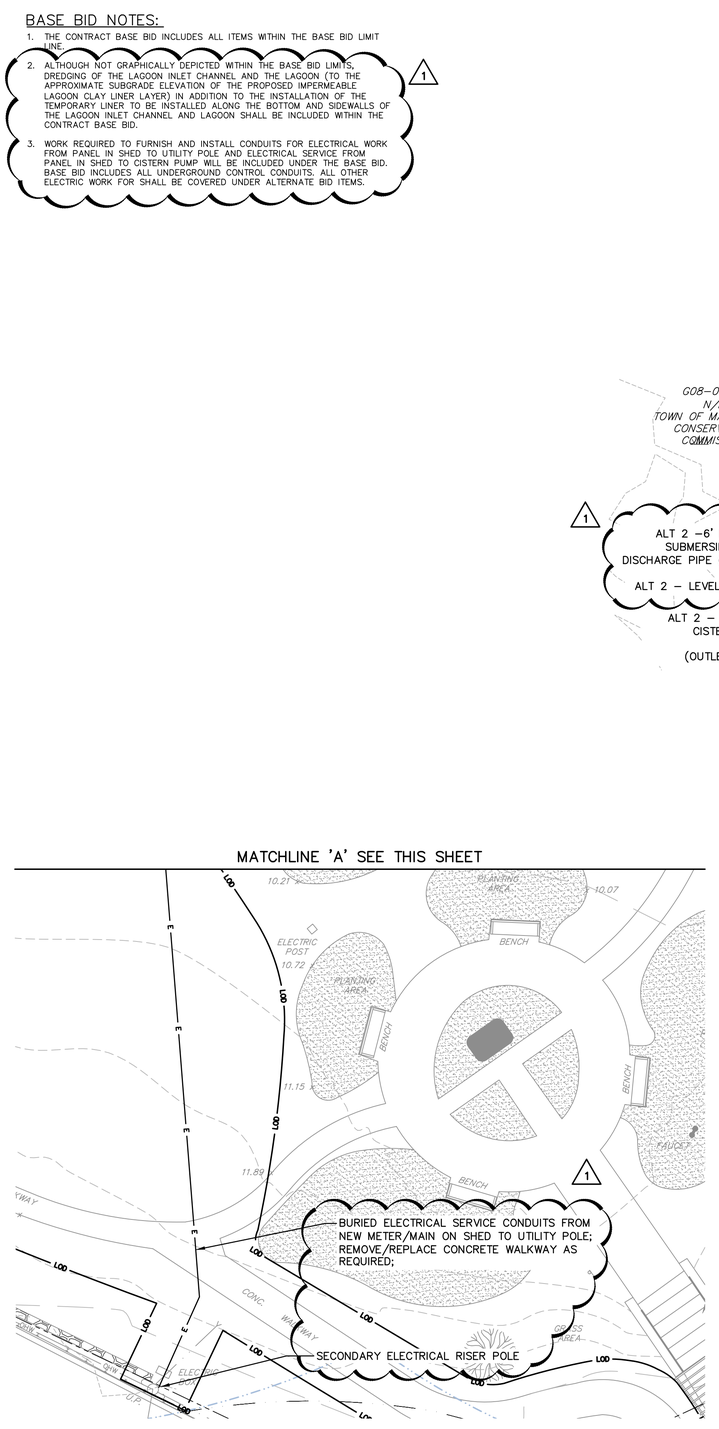
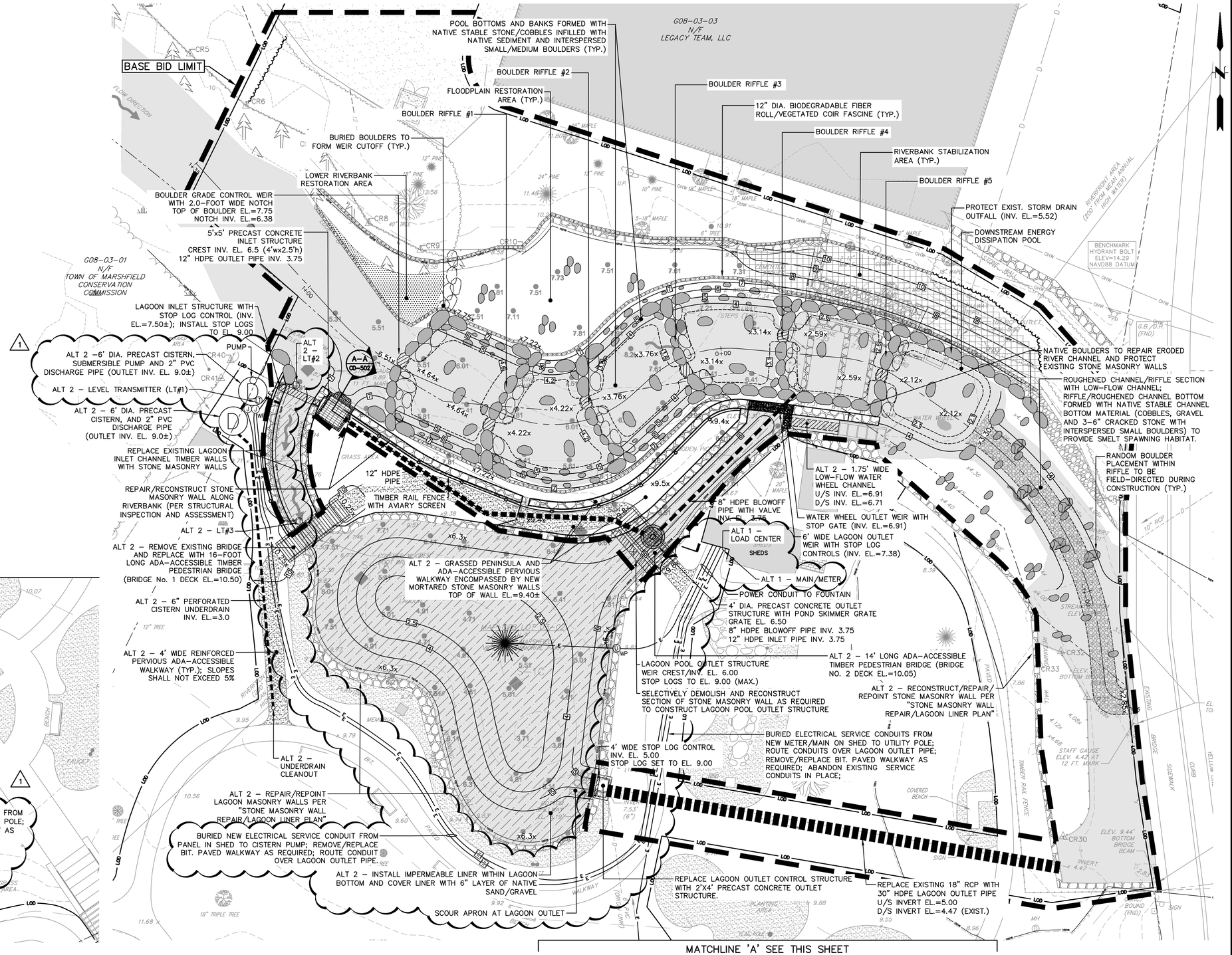
CD-508

BASE BID NOTES:

1. THE CONTRACT BASE BID INCLUDES ALL ITEMS WITHIN THE BASE BID LIMIT LINE.
2. ALTHOUGH NOT GRAPHICALLY DEPICTED WITHIN THE BASE BID LIMITS, DREDGING OF THE LAGOON INLET CHANNEL AND THE LAGOON (TO THE APPROXIMATE SUBGRADE ELEVATION OF THE PROPOSED IMPERMEABLE LAGOON CLAY LINER LAYER) IN ADDITION TO THE INSTALLATION OF THE TEMPORARY LINER TO BE INSTALLED ALONG THE BOTTOM AND SIDEWALLS OF THE LAGOON INLET CHANNEL AND LAGOON SHALL BE INCLUDED WITHIN THE CONTRACT BASE BID.
3. WORK REQUIRED TO FURNISH AND INSTALL CONDUITS FOR ELECTRICAL WORK FROM PANEL IN SHED TO UTILITY POLE AND ELECTRICAL SERVICE FROM PANEL IN SHED TO CISTERN PUMP WILL BE INCLUDED UNDER THE BASE BID. BASE BID INCLUDES ALL UNDERGROUND CONTROL CONDUITS. ALL OTHER ELECTRIC WORK FOR SHALL BE COVERED UNDER ALTERNATE BID ITEMS.

1





No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.	8/23/2024	ADDENDUM NO. 1	DRN/SDA	NSW
0.	8/2/2024	ISSUED FOR BIDDING	DRN/SDA	NSW

SEAL

SEAL

SCALE:
HORZ.: 1"= 10'
VERT.: N/A
DATUM:
HORZ.: MA NAD83
VERT.: NAVD88
10 5 0 10
GRAPHIC SCALE

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TOWN OF MARSHFIELD
DIVISION OF ECOLOGICAL RESTORATION

PROJECT PAYMENT LIMIT

SOUTH RIVER FISH PASSAGE AND VETERANS MEMORIAL PARK IMPROVEMENTS PROJECT - CONTRACT NO. 2025-02
MARSHFIELD MASSACHUSETTS

PROJ. No.: 20180319.A23
DATE: AUGUST 2, 2024

GC-101
21 OF 21

File Path: J:\DWG\P2018\20180319\A23\Civil\Plan\20180319A23_STP01.dwg Layout: GC-101 Plotted: Fri, August 30, 2024 - 2:53 PM User: sean.aruda
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
MS VIEW: LAYER STATE: