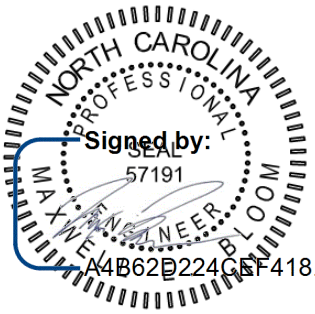
Southern Pines Waterworks Dam Siphon
Town of Southern Pines, NC

ADDENDUM NO. 3

March 16, 2026



Freese and Nichols, Inc
North Carolina Registered Firm C-3916

TO: **Prospective Bidders and Other Plan Holders**

The following additions, deletions, modifications, or clarifications shall be made to the appropriate sections of the plans and specifications and shall become a part of the Contract Documents. Bidders shall acknowledge receipt of this Addendum in the space provided on the Bid form.

GENERAL CLARIFICATIONS:

1. This addendum extends the bid date from March 19, 2026 at 2:00 pm to **March 26, 2026 at 2:00 pm. Questions must be submitted by March 19 at 5:00 pm.**

2. **Question:** The bid documents reference a geotechnical report; however, we were unable to locate this document within the bid package or Addendum #1. Please provide the referenced geotechnical report. This information is important to better understand subsurface conditions, including the anticipated groundwater table elevation, in order to evaluate potential dewatering requirements associated with foundation excavation and other open excavations required for construction.

   Response: No geotechnical report was prepared specifically for this project and none is included in the Bid Documents. Subsurface conditions and groundwater levels have not been characterized beyond the information shown on the Drawings and described in the Specifications. Bidders shall rely on the information provided in the Contract Documents and are responsible for making their own interpretations regarding subsurface conditions and any temporary dewatering methods required to perform the work.

3. **Question:** Please confirm whether a full bathymetric survey of the reservoir was performed as part of the design of this project. If so, please provide the survey data or mapping for informational purposes.

   Response: A full bathymetric survey of the reservoir was not performed as part of the design of this project. No bathymetric survey data or mapping is available for distribution.

4. **Question:** Oldcastle has advised that they do not have the forming or capacity to supply the valve boxes and vaults identified on Drawing C-3. Please provide the required dimensional details for these structures based on the Oldcastle model numbers listed so that alternate precast suppliers can provide pricing for equivalent units.

   Response: Dimensions shall be equivalent to Oldcastle Model 676-LA. Model cutsheet is attached to this Addendum for reference.

5. **Question:** Drawing C-1 indicates a temporary timber mat stream crossing. Please clarify whether this crossing is required to be engineered and confirm the required design load rating for construction equipment.

   Response: The temporary timber mat stream crossing shown on Drawing C-1 is a temporary means and methods item. The Contractor is responsible for the design, installation, maintenance, and removal of the temporary crossing in accordance with applicable regulations and the Contractor's means and methods.

   The crossing shall be designed to safely support the Contractor's anticipated construction equipment loads. No specific design load rating is prescribed in the Contract Documents.

6. **Question:** The full extent of the pipe abandonment work is unclear from the contract documents. While we understand this work will be performed on a unit rate basis, the drawings do not clearly show the total routing or lengths of the pipes to be abandoned. The plans appear to indicate four separate lines to be fully grouted, and a note indicates that GPR investigation was terminated due to grade.

   Please confirm the following for bidding purposes:
   1. Should bidders assume all pipes to be abandoned are 24-inch diameter?
   2. Should the unit rate be assumed to apply to four separate pipe systems as generally indicated on the drawings?
   3. Should bidders assume the abandonment limits terminate at the locations shown on the drawings for bidding purposes, with any additional pipe routing or pipe lengths encountered in the field to be considered additional work, with the opportunity for the Contractor to review and revise the unit price based on the actual field conditions encountered?
   4. Given that the full routing is unknown, please clarify how bidders should account for potential pavement removal/replacement and any special backfill requirements that may be encountered along the unknown portions of the pipe alignment.
   Please advise the appropriate assumptions bidders should carry for pricing this scope.

   Response: The pipe abandonment work previously included in the Base Bid has been removed from the Base Bid scope and is hereby designated as a Bid Alternate. The Base Bid shall not

include pipe abandonment unless the corresponding Bid Alternate is accepted by the Owner. Additional information is provided for information purposes only as an attachment to this addendum. Additional information includes the January 2022 Inspection Report prepared by Bander Smith, July 1924 Waterworks Improvement Plans, and a field sketch circa 1964.

1. **Sheet C-2 has been revised to show pipe sizes. Contractor to field verify.**
2. **Sheet C-2 has been revised to clarify the two pipes to be grouted. The pipes are intended to be grouted from the downstream toe of the dam to the existing intake structure. The unit-price bid item shall be applied to the separate pipe systems as generally indicated on the drawings.**
3. **For bidding purposes, bidders may assume that the pipe abandonment limits terminate at the locations shown on the Drawings. The unit-price bid item for pipe abandonment applies to the pipe segments generally indicated on the Drawings and described in the Contract Documents. The unit price shall include all labor, materials, and incidental work necessary to abandon the pipes within the indicated limits. If additional pipe routing or pipe lengths beyond those shown on the Drawings are encountered during construction, such work shall be addressed in accordance with the Change Management provisions of the Contract. The Contract does not provide for revision of bid unit prices based on field-encountered conditions.**
4. **Sheet C-3 has been revised to show the full routing intended to be grouted. Pavement removal and special backfill requirements are not anticipated.**

7. **Question:** Detail 4 on Drawing C-3 shows a dark rectangular shape near the end of the intake section, just before the perforated portion of the PVC pipe begins. This appears to indicate a pipe strap with a foundation beneath it; however, the elevation view in this detail does not clearly show a foundation, and a corresponding foundation is not shown in the profile view on Drawing C-2.

   Please clarify what this element represents and confirm whether a foundation or support is required at this location, or if this is a drafting error.

   Response: The siphon intake has been replaced with a DIP cross with flanged connections. Refer to Sheet C-3 attached to this addendum.

8. **Question:** Given some of the outstanding information needed for us to properly evaluate the project and submit a responsible proposal, we respectfully request a one-week extension to the bid submission deadline.

   Response: The bid deadline has been extended to March 26 as stated in item 1 of this addendum.

9. **Question:** Specification Section 33 05 01.02, Paragraph 2.01 A.1 states that “All ductile iron pipe shall have a minimum working pressure as indicated on the Drawings.” We are unable to locate the required working pressure or pressure class for the 16-inch ductile iron pipe on the drawings. Please provide the required minimum working pressure or pressure class for the ductile iron pipe. This information is also necessary to properly select the appropriate flange pressure rating per Section 33 05 01.02, Paragraph 2.01 C.2.

Response: Ductile iron pipe shall be pressure class 250.

10. **Question:** Please provide the specification for the 16-inch PVC intake pipe so bidders can properly determine and price the required pipe material, pressure class/DR, perforation requirements, joint type, couplings, and any required restraints or fittings. The current bid documents identify a 16-inch perforated PVC intake with coupling, but do not appear to provide sufficient detail to determine the exact pipe type and rating required for bidding.

    Response: The siphon intake has been replaced with a DIP cross with flanged connections. Refer to sheet C-3 attached to this addendum.

11. **Question:** Please provide the specification for the valve vault ring and cover, including the required size, material, frame and cover type, and load rating (e.g., H-20 or equivalent). We are unable to locate this information in the bid documents and need it to properly select and price the appropriate ring and cover assembly.

    Response: Valve vault cover shall be Oldcastle Model No 676-1-T-332P or equivalent.

12. **Question:** Please provide the specification for the valve boxes, including the required type, size, material, and load rating (traffic or non-traffic). We are unable to locate sufficient information in the bid documents to properly select and price the required valve box assemblies.

    Response: Valve boxes shall be Oldcastle Model 1730-18 as shown on sheet C-3 and shall be traffic rated.

13. **Question:** Note 15 on Sheet G-1 states no vibratory equipment is permitted within or proximal to dam footprint. Can you please clarify exactly what this area is? If it includes the footprint of the siphon alignment at all, how do you propose that we compact our backfill to 95% for the open cut portions of work?

    Response: The restriction on vibratory equipment applies within or directly adjacent to the dam embankment footprint, including areas where vibration could adversely affect the integrity of the dam. The intent of this note is to prohibit vibratory compaction or similar equipment that could transmit vibrations into the embankment.

    Where compaction is required within or near the dam footprint, the Contractor shall achieve the specified compaction requirements using non-vibratory methods, such as static compaction equipment, hand-operated compaction equipment, or other means that do not induce vibration. Compaction methods are subject to Engineer review and approval.

14. **Question:** Dewatering equipment (pumps / piping) will need to be located outside of the current LOD in order to facilitate work. This will not require any land disturbance, but wanted to make sure that was not going to be an issue. Please confirm.

    Response: Temporary placement of dewatering equipment (pumps, piping, and associated appurtenances) outside of the Limits of Disturbance, where no ground disturbance occurs, is

acceptable. Any ground disturbance beyond the defined LOD will require prior approval and appropriate erosion and sediment control measures.

15. **Question:** Information on the "existing pipe works" to be abandoned is lacking. How are we to price grout and abandonment work without knowing the full extent / details of the system? At the very least, we'll need to know pipe diameter(s) & depths.

    Response: See response to question 6 above.

16. **Question:** Please provide additional details on the "internal drainage system" that we are to tie to and extend.

    Response: The internal drainage system is an existing feature of the dam and is shown schematically on the Drawings based on available information. Detailed configuration and condition of the internal drainage system are not fully known.
    The Contractor shall field verify the location and condition of the internal drainage system prior to connection. Any discrepancies or conditions encountered that differ materially from what is shown shall be addressed via the Contractor Contingency for Field Verification Allowance.

17. **Question:** Is there a minimum level that the reservoir can't be lowered past to prevent a fish kill?

    Response: No specific minimum reservoir elevation related to fish habitat preservation is identified in the Contract Documents. The Contractor is responsible for coordinating reservoir drawdown operations with the Owner.

18. **Question:** Do you have any information on the overall drainage area that this reservoir is in?

    Response: The overall drainage area contributing to the reservoir is not explicitly defined in the Contract Documents. Based on available mapping, the contributing drainage area is estimated to be on the order of 1.7 square miles.
    This estimate is provided for informational purposes only. The Contractor remains responsible, per the Specifications, for evaluating watershed inflows and determining appropriate dewatering and water control measures necessary to perform the work.

19. **Question:** Please confirm that 24-hour monitoring of the dewatering / reservoir lowering operation is required per spec. Since dewatering / control of reservoir level will be a continuous operation, does this mean that manpower will need to be onsite 24/7 for the full duration of the project?

    Response: The Specifications require that dewatering and reservoir lowering operations be continuously monitored to maintain control of water levels and protect the work. This requirement does not necessarily mandate continuous on-site staffing if remote monitoring or automated systems are employed, provided such systems maintain compliance with the Contract Documents and are acceptable to the Engineer.
    The Contractor is responsible for providing adequate personnel, monitoring, and response capability to safely manage continuous dewatering and reservoir control operations.

20. **Question:** How will we be compensated for any undercut or unsuitable soils encountered?

    Response: Undercut or removal of unsuitable soils shall be addressed in accordance with the Earthwork and Change Management provisions of the Contract Documents. Where unsuitable materials are encountered that were not reasonably anticipated based on the information provided, the Contractor shall notify the Engineer and Owner.
    Compensation, if any, for undercut or replacement of unsuitable soils will be handled in accordance with the applicable unit-price bid items or Change Management procedures, as appropriate.

BIDDING AND CONTRACT REQUIREMENTS:

A3-22. Section 00 11 16 Invitation to Bid

Replace **00 11 16 Invitation to Bid** in its entirety with the Revised Invitation to Bid included in this Addendum.

A3-23. Section 00 43 13 Bid Bond

Replace **00 43 13 Bid Bond** in its entirety with the Revised Bid Bond included in this Addendum.

A3-24. Section 00 41 16 Bid Form Exhibit A

Replace **00 41 16 Bid Form Exhibit A** in its entirety with the Bid Form Exhibit A included in this Addendum.

TECHNICAL SPECIFICATION REQUIREMENTS:

Section 01 29 01 Measurement and Basis for Payment

Replace **01 29 01 Measurement and Basis for Payment** in its entirety with the Revised Measurement and Basis for Payment in this Addendum.

DRAWING REQUIREMENTS:

SHEET C-2 – Proposed Plan and Profile

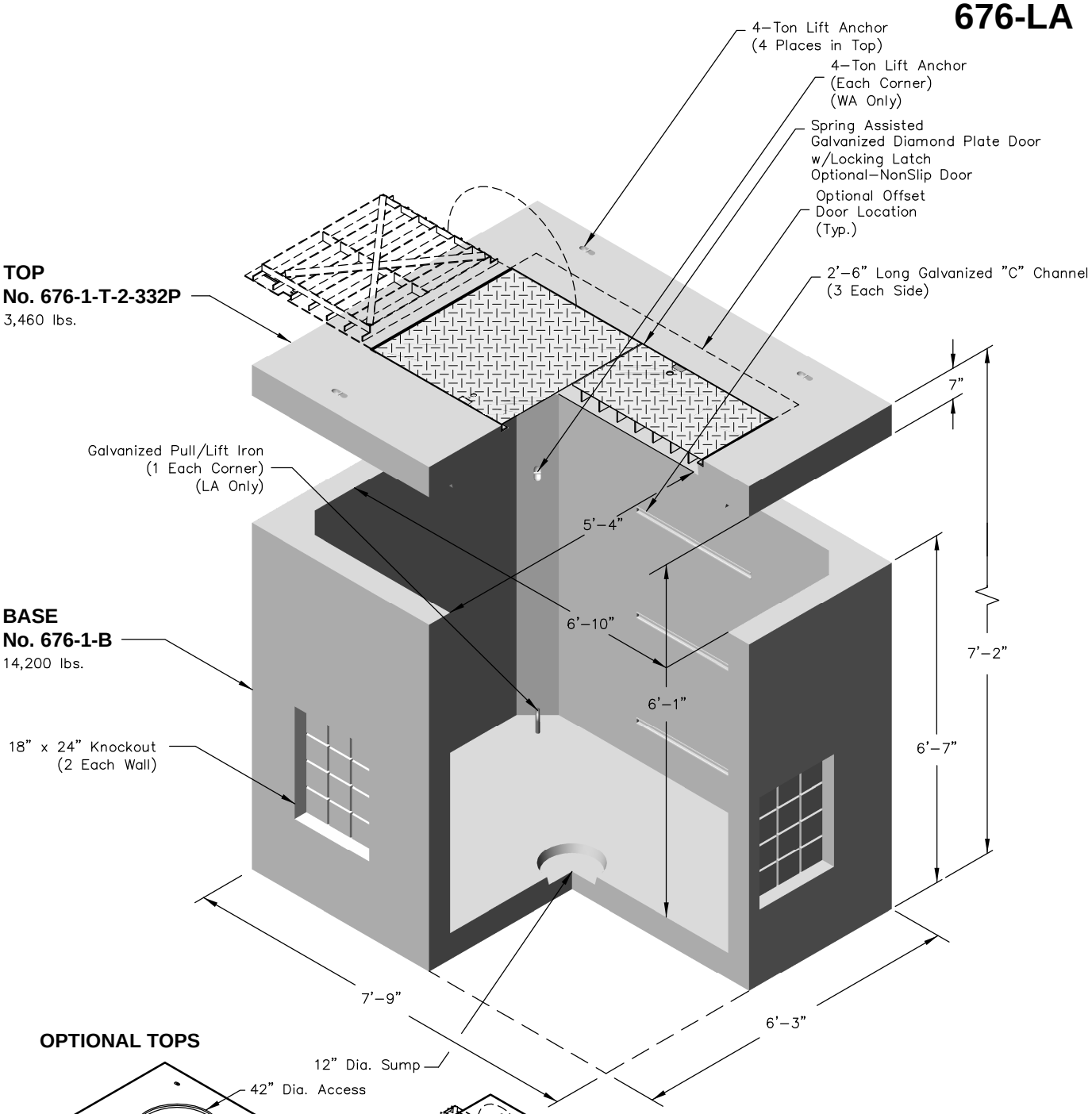
Replace Sheet C-2 in its entirety with the updated Sheet C-2 included in this Addendum.

SHEET C-3 – Construction Details 1 of 2

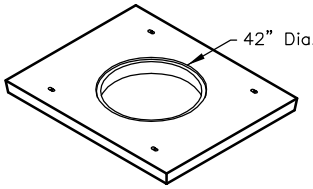
Replace Sheet C-3 in its entirety with the updated Sheet C-3 included in this Addendum.

END OF ADDENDUM NO. 3

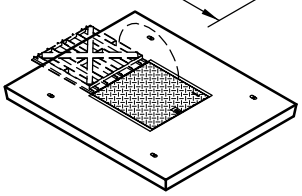
676-LA



OPTIONAL TOPS



ROUND ACCESS
No. 676–1–T–42C
3,200 lbs.



LOCKING GALV. STEEL DOOR
No. 676–1–T–332P
3,690 lbs.

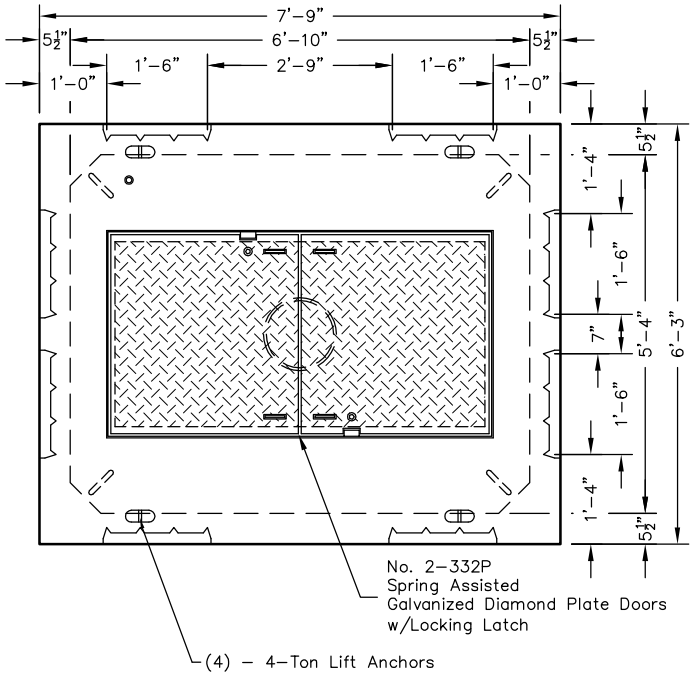
Note:
– C–Channels are eliminated in vaults having 676–WA designation.
– Base available in heights as required.

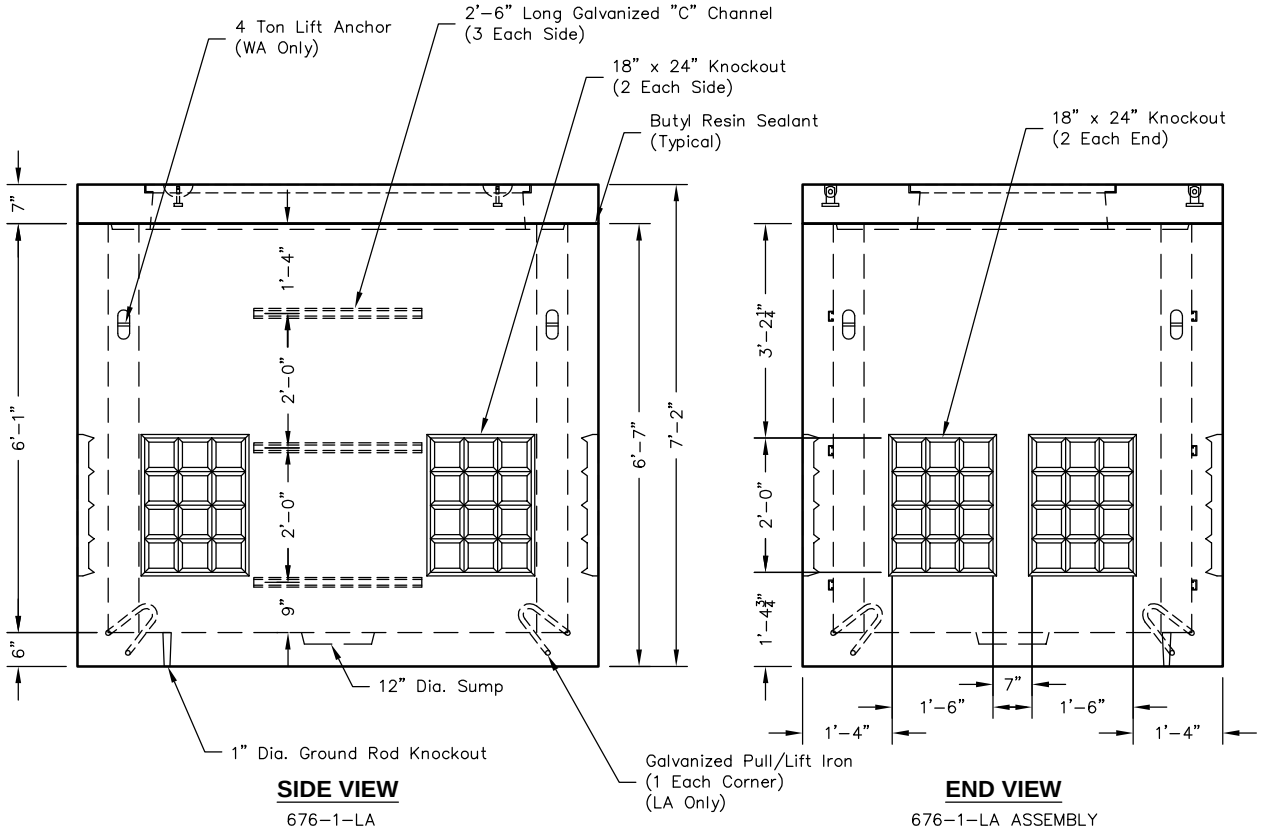
Note: Designed for 0 to 5'–0" of Cover

Oldcastle Precast®
PO Box 323, Wilsonville, Oregon 97070-0323
Tel: (503) 682-2844 Fax: (503) 682-2657

676-LA	676-LA 5 x 7 x 6 POWER WATER GAS
File Name: 020-676-1LA	
Issue Date: 2016	
oldcastleprecast.com/wilsonville	

676-LA





SIDE VIEW
676–1–LA

END VIEW
676–1–LA ASSEMBLY

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PO Box 323, Wilsonville, Oregon 97070-0323
Tel: (503) 682-2844 Fax: (503) 682-2657

676-LA	676-LA 5 x 7 x 6 POWER / WATER / GAS
File Name: 020-676-1LA	
Issue Date: 2016	
oldcastleprecast.com/wilsonville	

00 11 16 INVITATION TO BID

The Town of Southern Pines is soliciting Bids for the construction of the following Project: **Southern Pines Waterworks Dam Siphon.** Sealed Bids must be delivered to James Michel, 801 SE Service Road, Southern Pines, NC 28387 no later than ~~**2:00 PM, March 19, 2026**~~ **2:00 PM, March 26, 2026** The Bids will be opened and read aloud. Bids received after this time will be unopened.

Direct all questions regarding the project to the Engineer. Contact information is shown below. Bidding Documents may be examined free of charge at the following addresses:

Engineer: Maxwell Bloom, P.E., Freese and Nichols, Inc., 1017 Main Campus Dr., Suite 1200, Raleigh NC 27606. 470.681.5172, Max.bloom@freese.com

This Project generally consists of furnishing and installing an approximately 250 LF of 16-inch DIP dual siphon system (500 LF in total piping) through the embankment of the Southern Pines Water Works Dam.

The drawings and specifications may be reviewed online and copies may be obtained from Accent Imaging at 8121 Brownleigh Drive, Raleigh, NC 27617, 919-782-3333, www.accentimaging.com.

Bidders must obtain documents through Accent Imaging to be included on the Bidders List. Bids will only be accepted from companies listed on the bidders list. The Accent Imaging website, planscope.com, will be updated periodically with Addenda, plan holder's lists and other information relevant to bidding the Project.

With request for the Bidding Documents supply the following information: Company name, contact person, street address, and phone and fax numbers for Bidding office; NC contractor's license with limitation and classification; indicate if the firm will be a Bidder, Supplier or Sub-Contractor.

A non-mandatory pre-bid conference for the Project will be held at **2:00 PM, February 25, 2026**. All questions related to this project must be received by the Engineer in writing no later than **5:00 PM, ~~March 14, 2026~~ March 19, 2026**. Questions received after this time may not be answered.

Bidders must submit a cashier's check, certified check, or acceptable bidder's bond with their Bid as a guarantee that the Bidder will enter into a contract for the Project with the Owner. The security must be payable to Owner in the amount of 5 percent of the Bid submitted. Contractor must execute the Contract, bonds and certificates of insurance on the forms provided in the Contract Documents. Performance, Payment, and Maintenance Bonds are required.

The Owner reserves the right to adopt the most advantageous interpretation of the Bids submitted in the case of ambiguity or lack of clearness in stating bid prices, to reject any or all Bids, and/or waive formalities. Incomplete or qualified bids will not be accepted. No bid may be withdrawn for a period of ninety (90) days after scheduled bid opening.

Town of Southern Pines
James Michel, P.E.

Town Engineer

END OF SECTION

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00 41 16 Bid Form Exhibit A

Project:	Southern Pines Waterworks Dam Siphon		**Project No.:**
Owner:	Town of Southern Pines, North Carolina		
Engineer:	Max Bloom, Freese and Nichols Inc.		SPN24023
Offeror:			

Base Bid

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Extended Amount
Items in Base Bid (excluding Allowances) per Section 01 29 01 "Measurement and Basis for Payment"					
1	Mobilization & QC (not to exceed 5% of total bid)	LS	1		
2	Erosion and Sedimentation Control	LS	1		
3	Demolition	LS	1		
4	Care of Water During Construction	LS	1		
5	16" Ductile Iron Pipe	LF	500		
6	Ductile Iron Fittings	LBS	5500		
7	16" Gate Valve	EA	2		
8	16" x 16" Tee	EA	2		
9	16"Siphon Intake	EA	2		
10	16" Swing Check Valve	EA	2		
11	2" Combination Air Release Valve	EA	2		
12	4" Fire Department Connection	EA	2		
13	Valve Box	EA	2		
14	Valve Vault	EA	1		
15	Concrete (3000 psi)	CY	18		
16	Reinforced Concrete (4000 psi)	CY	25		
17	Sand Filter (115 CY ASTM C-33 Sand and 35 LF 6" DIP Drain)	LS	1		
18	Rip Rap/#57 Stone	TONS	210		
19	Excavation/Backfill	CY	500		
20	Seeding/Revegetation	AC	0.50		
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
A	**Total Base Bid Items Amount (Sum of Extended Amounts for each Base Bid Line Item)**				
Allowances in Base Bid per Section 01 23 10 "Alternates and Allowances"					
1	Contractor Contingency for Field Verification	LS	1		
C	**Total Allowance Amount (Sum of Extended Amounts for Each Allowance Line Item)**				
D	**Total Base Bid with Allowances (Sum of A and C)**				
Alternates to be considered for inclusion in the Contract per Section 01 23 10 "Alternates and Allowances"					
1	Alternate I - Alternate Site Access and Construction Entrance	LS	1		
2	Pipe Abandonment	LF	600		
E	**Total Amount for Alternates for Consideration (Sum of Extended Amounts for Each Alternate Line Item)**				
F	**Total Base Bid with Allowance and Alternates for Consideration (Sum of D and E)**				

BID SUBMITTED BY:

Offeror: _____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

00 43 13 BID BOND

Offeror as Principal Name: Mailing address (principal place of business):	**Surety** Name: Mailing address (principal place of business):
Owner Name: The Town of Southern Pines Mailing address: **801 SE Service Road** **Southern Pines, NC 28387**	Physical address (principal place of business): Telephone (Main): Telephone (Claims): Surety's state of incorporation:
Contract Project name and number: Southern Pines Waterworks Dam Siphon SPN24023 Bid/Proposal Due Date: ~~March 19, 2026~~ March 26, 2026	***By submitting this bond, Surety affirms it is authorized to do business and licensed to execute bonds in North Carolina.***
Bond Contract Price Offered: $_____ Penal Sum of Bond: 5% of Contract Price offered Date of Bond:	**Local Agent for Surety** Name: Company: Mailing address (principal place of business): Telephone (Main):

Surety and Offeror, intending to be legally bound by this bond, do each cause this bond to be duly executed on its behalf by its authorized officer, agent, or representative. The Offeror and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally to this bond. The condition of this obligation is such that if Owner accepts Offeror's Bid or Proposal and Offeror delivers the executed Agreement and the required bonds and evidence of insurance within the time stipulated in the Bidding or Proposal Documents this obligation is null and void. Payment under this bond will be due and payable upon default by Offeror and within 30 calendar days after receipt by Offeror and Surety of written notice of default from Owner. Venue lies exclusively in Moore County, North Carolina for any legal action.

Offeror as Principal	**Surety**
Signature: _____	Signature: _____
Name: _____	Name: _____
Title: _____	Title: _____
Email: _____	Email: _____ *(Attach Power of Attorney)*

END OF SECTION

01 29 01 MEASUREMENT AND BASIS FOR PAYMENT

PART 1 - GENERAL

1.01 PAYMENT FOR MATERIALS AND EQUIPMENT

A. Payment will be made for materials and equipment materials properly stored and successfully incorporated into the Project less the specified retainage.

B. Provide a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of Liens. Provide documentation of payment for materials and equipment with the next Application for Payment. Remove items from the tabulation of materials and equipment if this documentation is not provided with the next Application for Payment.

C. Provide evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest.

D. The Work covered by progress payments becomes the property of the Owner at the time of payment. The Contractor's obligations with regard to proper care and maintenance, insurance, and other requirements are not changed by this transfer of ownership until final acceptance in accordance with the General Conditions.

E. Payment for materials and equipment does not constitute acceptance of the product.

1.02 MEASUREMENT AND BASIS FOR PAYMENTS ON LUMP SUM ITEMS

A. Measurement for progress payments is the invoice value for stored materials and the earned value for all other cost for constructing each item. Earned value is expressed as the value of the Work completed divided by the total value of installation cost. The total amount paid will be equal to the total lump sum amount for that item.

1.03 MEASUREMENT AND BASIS FOR PAYMENTS ON UNIT PRICE ITEMS

A. Measure the Work using the unit of measure indicated in this Section for each unit price line item. Payment will be made only for the actual measured unit and/or computed length, area, solid contents, number, and weight unless other provisions are made in the Contract Documents. Payment on a unit price basis will not be made for Work outside dimensions shown in the Contract Documents.

B. Payment will be made for the actual quantity of Work completed and for materials and equipment stored during the payment period. Payment amount is the Work quantity measured per Paragraph A above multiplied by the unit price for that line item in the Agreement.

1.04 MEASUREMENT AND BASIS FOR PAYMENT FOR BASE ITEMS

A. Bid Item 1 – Mobilization & QC:

1. Include the following costs in this bid item:

1. Bonds and insurance;

2. Transportation and setup for equipment;

3. Transportation and/or erection of all field offices, sheds and storage facilities;
4. Costs for required materials testing.
5. Salaries for preparation of documentation required before the first Application for Payment;
6. Salaries for field personnel assigned to the Project related to the mobilization of the Project; and
7. Mobilization may not exceed 5 percent of the total Contract Price.

2. Measuring for payment is on a lump sum basis. Payment for mobilization will be based on the earned value of Work completed.

B. Bid Item 2 – Erosion and Sedimentation Control

1. Measuring for payment is on a lump sum basis for erosion and sedimentation control.
2. Payment for erosion and sedimentation control shall be made at the lump sum price bid, and shall be full compensation for design, implementation, maintenance, and removal of erosion control devices for the duration of the project. Contractor shall furnish and place sediment control devices where shown on the drawings and as required by the Town and NCDEQ. Payment shall be allowed for 25% of the lump sum bid price upon approval by the Owner. The remaining 75% of the lump sum bid price shall be paid in equal, monthly installments based on the time remaining to achieve substantial completion.

C. Bid Item 3 – Demolition

1. Measurement: No measurements are required.
2. Payment: Payment for this item shall be at the lump sum price bid for “Demolition”, which shall constitute full compensation for all costs of furnishing the labor, equipment, materials, transportation, submittals, permits, fees, and incidentals necessary to perform the work. The item shall include demolition, excavation, backfill, and disposal of all the demolished project components to the limits indicated in the drawings, including; concrete wave wash wall, parapet wall, and all other costs incidental and necessary to the completion of the work as shown on the drawings and as specified. Excavation and backfill necessary to demolish any of the project components and regrade the area are to be considered incidental to this Bid Item unless the project components are located within neat lines and grades designated for excavation or compacted fill within the drawings, in which case excavation and backfill shall be paid separately. The Contractor shall be responsible for leaving the area in a condition suitable for the progression of the Project.

D. Bid Item 4 – Care of Water During Construction

1. Measurement: No measurements are required.
2. Payment: Payment for this item shall be made at the lump sum price bid for “Care of Water During Construction”, which payment shall constitute full compensation for all costs of furnishing the labor, equipment, and materials for any cofferdams, temporary diversions and drainage channels, installing pumps and other equipment as required, maintaining the work free from water, and removing the temporary protective works.

3. Partial payments will be made based upon the number of contract days completed as a proportion of the total time of completion.

E. Bid Item 5 – 16” Ductile Iron Pipe

1. Measurement for payment shall be per linear foot of 16” ductile iron pipe furnished, installed, complete and accepted in place. Measurement will be along the siphon centerline without deduction for valves and fittings.

2. Payment made at the unit price bid shall include furnishing, hauling and laying of pipe shown on the plans, trench safety measures, thrust blocking, joint restraints, specials, all adapters, dewatering where necessary; trench excavation, and backfilling, including embedment material, restoring trench surface to grade, flowable fill, replacement of top soil, protecting or replacing existing structures or utilities, tracing wire, detectable tape, disposal of surplus materials, cleaning up and maintenance, pressure testing, flushing, and any incidental work and materials not otherwise provided for these specifications, all in strict accordance with the plans and specifications.

3. Payment for Ductile Iron Pipe shall also include any and all extra precautions or construction requirements necessary to adequately protect and support existing infrastructure. Payment for the Ductile Iron Pipe shall include all costs required to have utility companies repair any damage inflicted to their lines by the Contractor and any cleanup, property damages, fines, etc. resulting from damage inflicted to any utility line by the Contractor that is not covered under the Utility Coordination Allowance.

F. Bid Item 6 – Ductile Iron Fittings

1. Measurement shall be per pound of ductile iron fittings based on the weights published in AWWA C110, exclusive of any accessories.

2. Payment shall be full compensation for furnishing and installing the fittings, glands, restraining type glands, bolts, accessories, joint restraint, restrained couplings or sleeves, and any incidentals necessary to complete the work.

G. Bid Item 7 - 16” Gate Valve

1. Measurement for payment shall be per each gate valve installed.

2. Payment made at the unit bid price shall be considered full compensation for furnishing and installing all gate valves including the service box, cover, concrete footing, joint restraint, and any incidental work and materials not otherwise indicated in other pay items as outlined in the Contract Documents.

H. Bid Item 8 – 16” x 16” Tee

1. Measurement for the number of 16” x 16” Tees will be per each Tee actually furnished, installed, and completed as indicated and accepted by the Engineer.

2. Payment for the 16” x 16” Tees will be made for the quantity as above determined at the contract price per each. Price and payment shall be considered full compensation for excavation, installing the Tees, pressure testing, all fittings and associated joint restraints, thrust restraints, removal of excess excavated material, clean up, and any incidental work and materials not otherwise indicated in other pay items as outlined in the Contract Documents.

I. Bid Item 9 – 16" PVC Intake w/ Couplings

1. Measurement for the number of 16" PVC Intake w/ Couplings will be per each intake actually furnished, installed, and completed as indicated and accepted by the Engineer.

2. Payment for the 16" PVC Intake w/ Couplings will be made for the quantity as above determined at the contract price per each. Price and payment shall be considered full compensation for excavation, installing the intakes, pressure testing, all fittings and associated joint restraints, thrust restraints, removal of excess excavated material, clean up, and any incidental work and materials not otherwise indicated in other pay items as outlined in the Contract Documents.

J. Bid Item 10 - 16” Swing Check Valve

1. Measurement for the number of 16” Swing Check Valves will be per each check valve actually furnished, installed, and completed as indicated and accepted by the Engineer.

2. Payment for each 16” Swing Check Valve will be made for the quantity as above determined at the contract price per each. Price and payment shall be considered full compensation for excavation, installing the Swing Check Valves, pressure testing, all fittings and associated joint restraints, thrust restraints, removal of excess excavated material, clean up, and any incidental work and materials not otherwise indicated in other pay items as outlined in the Contract Documents.

K. Bid Item 11 - 2" Combination Air Release Valve

1. Measurement for the number of 2” Combination Air Release Valves will be per each Combination Air Release Valve actually furnished, installed, and completed as indicated and accepted by the Engineer.

2. Payment for each Combination Air Release Valve will be made for the quantity as above determined at the contract price per each. Price and payment shall be considered full compensation for excavation, installing the Combination Air Release Valves, pressure testing, all fittings and associated joint restraints, thrust restraints, clean up, and any incidental work and materials not otherwise indicated in other pay items as outlined in the Contract Documents.

L. Bid Item 12 – 4” Fire Department Connection

1. Measurement for the number of 4” Fire Department Connections will be per each Fire Department Connection actually furnished, installed, and completed as indicated and accepted by the Engineer.

2. Payment for each Fire Department Connection will be made for the quantity as above determined at the contract price per each. Price and payment shall be considered full compensation for installing the Fire Department Connections, pressure testing, all fittings and associated joint restraints, thrust restraints, clean-up, and any incidental work and materials not otherwise indicated in other pay items as outlined in the Contract Documents.

M. Bid Item 13 – Valve Box

1. Measurement for the number of Valve Boxes will be per each Valve Box actually furnished, installed, and completed as indicated and accepted by the Engineer.

2. Payment for each Valve Box will be made for the quantity as above determined at the contract price per each. Price and payment shall be considered full compensation for installing the Valve Box, pressure testing, all fittings and associated joint restraints, thrust restraints, clean up, and any incidental work and materials not otherwise indicated in other pay items as outlined in the Contract Documents.

N. Bid Item 14 – Valve Vault

1. Measurement for the number of Valve Vault will be per each Valve Vault actually furnished, installed, and completed as indicated and accepted by the Engineer.

2. Payment for each Valve Vault will be made for the quantity as above determined at the contract price per each. Price and payment shall be considered full compensation for installing the Valve Vault, pressure testing, all fittings and associated joint restraints, thrust restraints, clean up, and any incidental work and materials not otherwise indicated in other pay items as outlined in the Contract Documents.

O. Bid Item 15 - 3,000 PSI Concrete

1. Measurement will be made on the basis of the unit price per cubic yard for the volume of cast in place concrete installed according to the Contract Documents.

2. Payment for this item shall be provided at 100% of the lump sum price on the first pay estimate after completion of the work, upon approval by the Engineer and acceptance by the Owner.

P. Bid Item 16 – 4,000 PSI Reinforced Concrete

1. Measurement will be made on the basis of the unit price per cubic yard for the volume of steel reinforced concrete installed according to the Contract Documents.

2. Payment for this item shall be provided at 100% of the lump sum price on the first pay estimate after completion of the work, upon approval by the Engineer and acceptance by the Owner.

Q. Bid Item 17 – Sand Filter

1. Measurement for sand filter shall be on a lump sum basis.

2. Payment for this item shall be provided at 100% of the lump sum price on the first pay estimate after completion of the work, upon approval by the Engineer and acceptance by the Owner.

R. Bid Item 18 – Rip Rap/#57 Stone

1. Measurement will be made on the basis of the unit price per ton for the amount of riprap installed according to the Contract Documents.

2. Payment for this item shall be provided at 100% of the lump sum price on the first pay estimate after completion of the work, upon approval by the Engineer and acceptance by the Owner.

S. Bid Item 19 – Excavation/Backfill

1. Measurement will be made on the basis of the unit price per cubic yard for the volume of excavation and backfill according to the Contract Documents.

2. Payment for this item shall be provided at 100% of the lump sum price on the first pay estimate after completion of the work, upon approval by the Engineer and acceptance by the Owner.

T. Bid Item 20 - Seeding/Revegetation

1. Measurement for Seeding/Revegetation will be made on the basis of the unit price per acre seeded.

2. Payment for Seeding/Revegetation shall include all required seeding, watering, maintenance, labor, and equipment necessary to re-establish vegetation in disturbed areas and shall be considered full compensation as outlined in the Contract Documents.

1.05 MEASUREMENT AND BASIS FOR PAYMENT FOR ALLOWANCES

A. Allowance 1 – Contractor Contingency for Field Verification

1. Measurement: No measurements are required.

2. Payment for Field Verification shall be made as a contingency allowance. The Contractor may utilize this allowance only upon written authorization from the Owner or Engineer, and only for unforeseen field conditions which require verification beyond the scope of work originally specified. No payment will be made under this item unless specifically directed and approved by the Owner or Engineer. Any unused portion of the contingency allowance will revert to the Owner.

1.06 MEASUREMENT AND BASIS FOR PAYMENT FOR ALTERNATES

A. Alternate I – Alternate Construction Entrance and Access Road.

1. Measuring for payment is on a lump sum basis for Alternate I.

2. Payment for Alternate I shall be made at the lump sum price bid, and shall be full compensation for design, implementation, maintenance, and removal of erosion control devices for the duration of the project. Contractor shall furnish and place sediment control devices where shown on the drawings and as required by the Town and NCDEQ. Payment shall be allowed for 25% of the lump sum bid price upon approval by the Owner. The remaining 75% of the lump sum bid price shall be paid in equal, monthly installments based on the time remaining to achieve substantial completion.

B. Alternate II – Pipe Abandonment

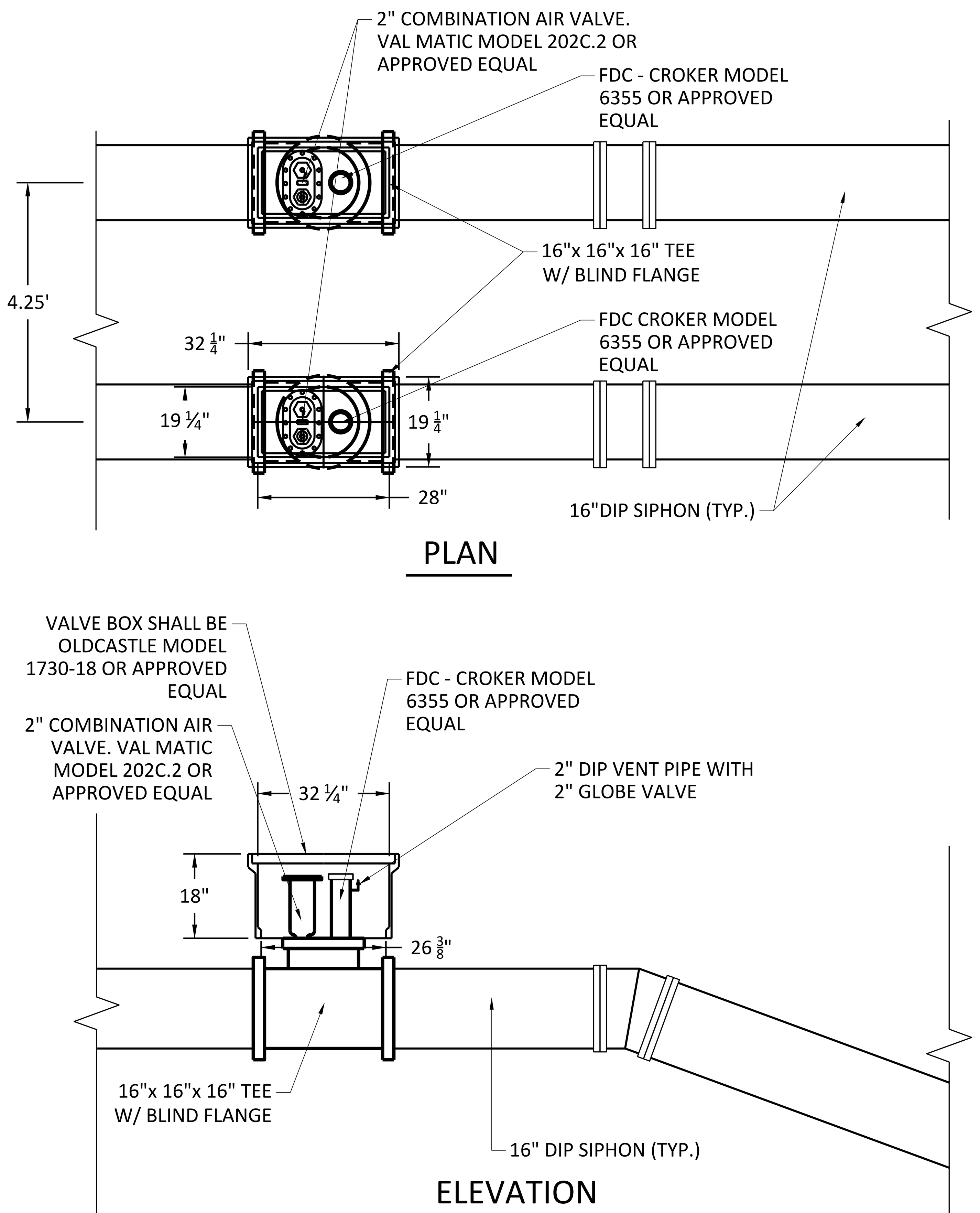
1. Measurement for Pipe Abandonment shall be per linear foot of pipe abandoned as measured along the centerline of the pipe.

2. Payment for Pipe Abandonment shall be made at the unit price bid per linear foot and shall include jet cleaning, camera inspection, filling the pipe with grout, excavation, backfill, temporary pavement repair, removal of valve boxes as required, and permanent pavement repair as required. Payment shall be full compensation as outlined in the Contact Documents.

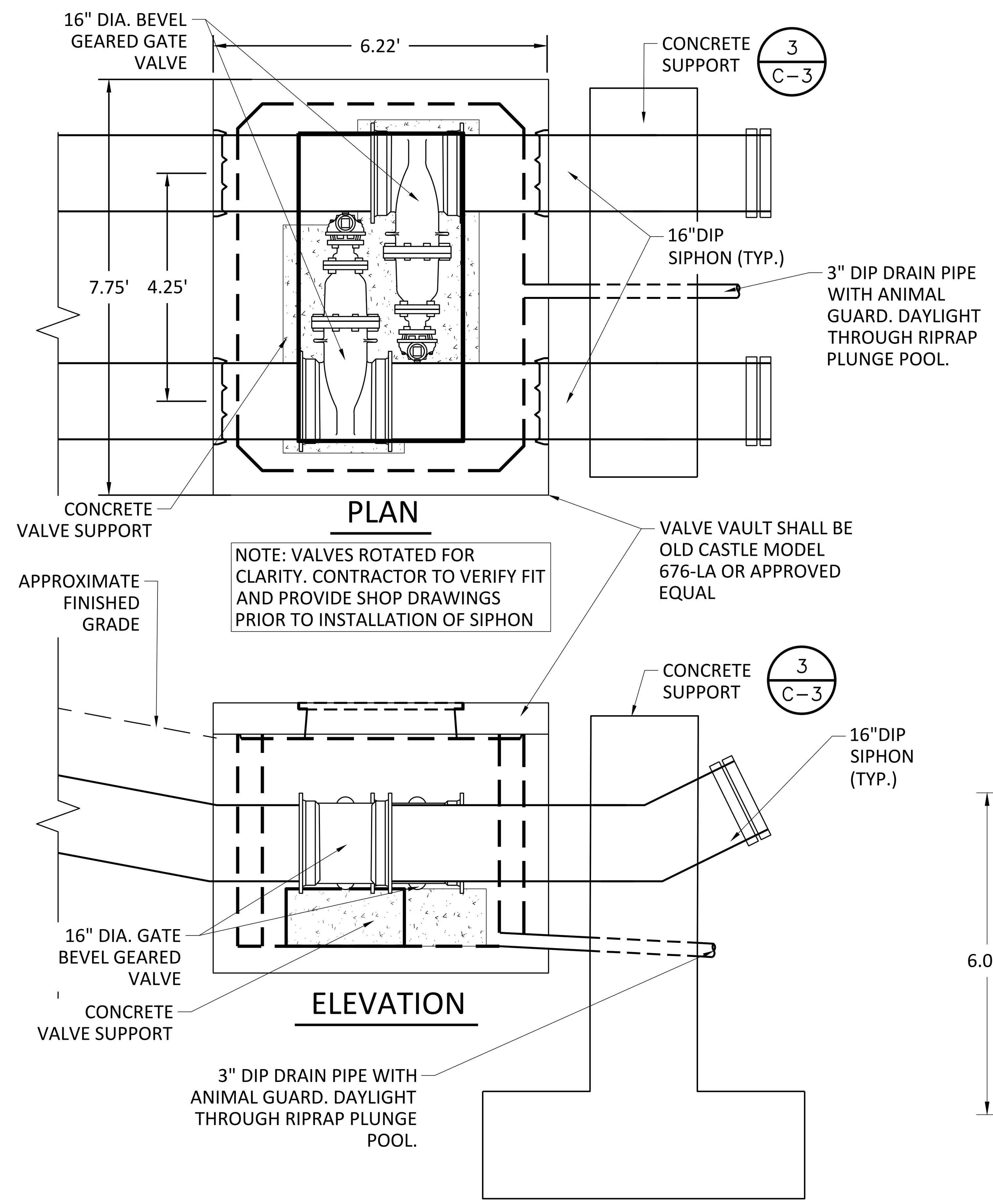
PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

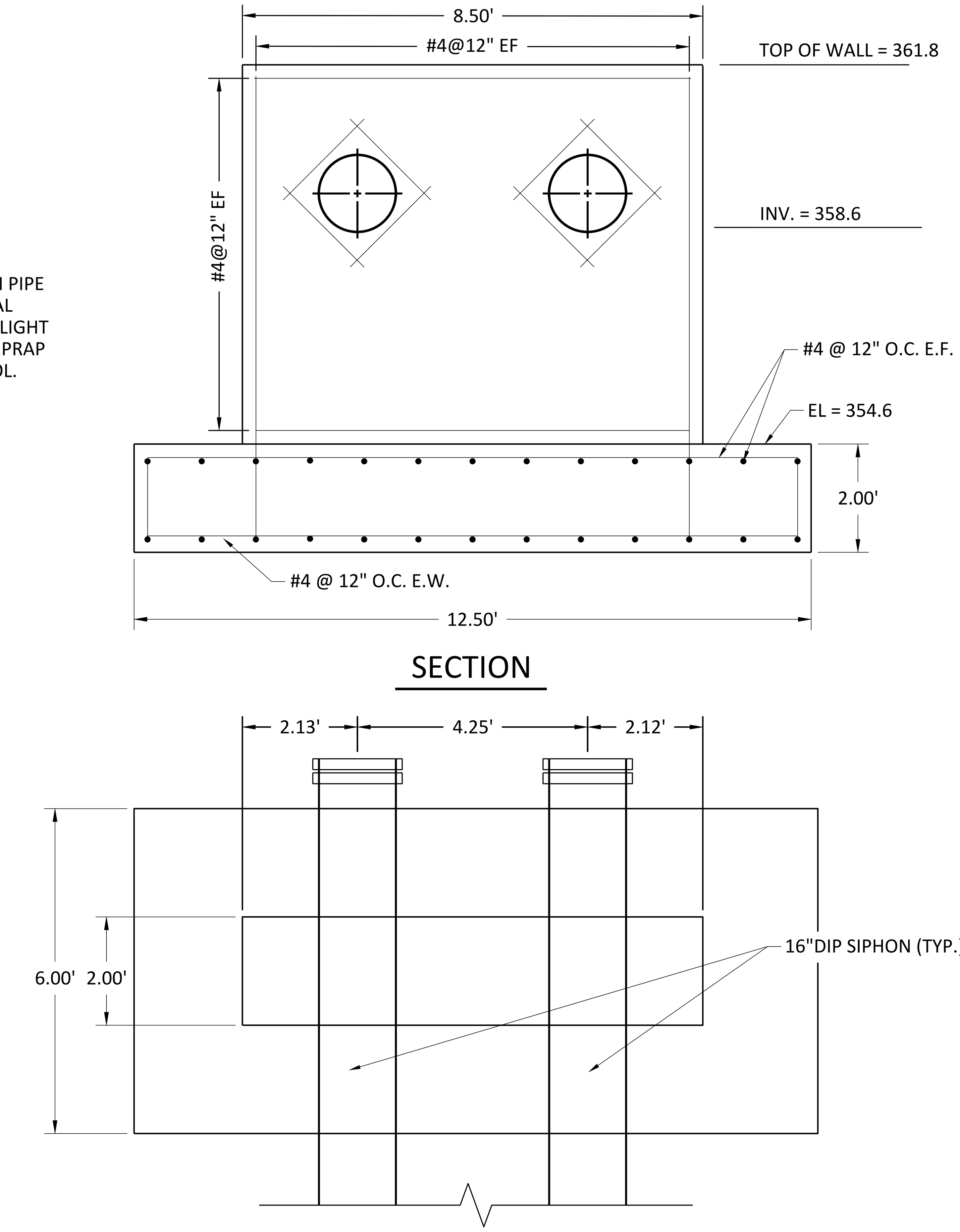
END OF SECTION



1 C-3 VALVE BOX
1"= 2'



2 C-3 VALVE VAULT
1"= 2'



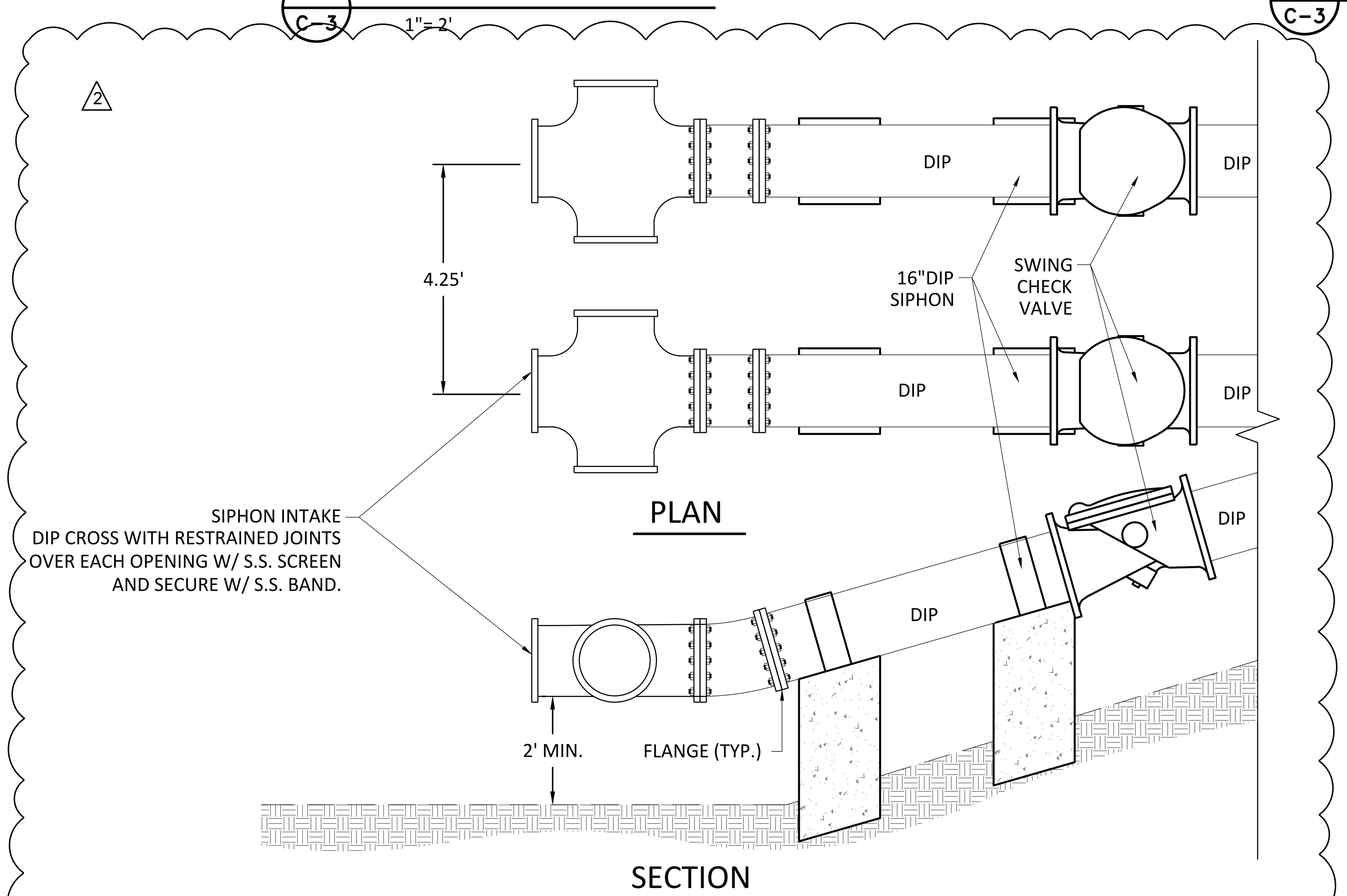
3 C-3 CONCRETE OUTLET SUPPORT
1"= 2'

NOTES:

1. STEEL SHOP DRAWINGS SHALL BE PROVIDED TO ENGINEER IN ACCORDANCE WITH APPLICABLE SUBMITTAL PROCEDURES FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION OF RISER.
2. VERTICAL AND HORIZONTAL STEEL MAY BE FIELD-CUT TO ACCOMMODATE PIPE OPENINGS. ADDITIONAL REINFORCEMENT SHALL BE PROVIDED AT OPENINGS IN ACCORDANCE WITH THE TABLE BELOW.
3. REINFORCEMENT IN CONCRETE FACE CAST AGAINST EARTH SHALL HAVE A MINIMUM 3" OF CLEAR COVER. A MINIMUM OF 2" OF CLEAR COVER SHALL BE MAINTAINED BETWEEN REINFORCEMENT AND ALL OTHER CONCRETE SURFACES.
4. OUTLET SUPPORT SUBGRADE SHALL BE APPROVED BY THE ENGINEER OR THEIR DESIGNATED REPRESENTATIVE PRIOR TO ERECTING FORMWORK FOR THE BASE SLAB.
5. OUTLET SUPPORT SUBGRADE SHALL BE CLEAR OF TRASH, DEBRIS, AND STANDING WATER PRIOR TO CONCRETE PLACEMENT.
6. REINFORCEMENT SHALL BE INSPECTED BY ENGINEER OR THEIR DESIGNATED REPRESENTATIVE PRIOR TO CLOSURE OF FORMWORK AND PRIOR TO CONCRETE PLACEMENT.
7. CONCRETE SHALL HAVE A STRENGTH OF 4,000 PSI AT 28-DAYS.

ADDITIONAL REINFORCEMENT AROUND OPENINGS

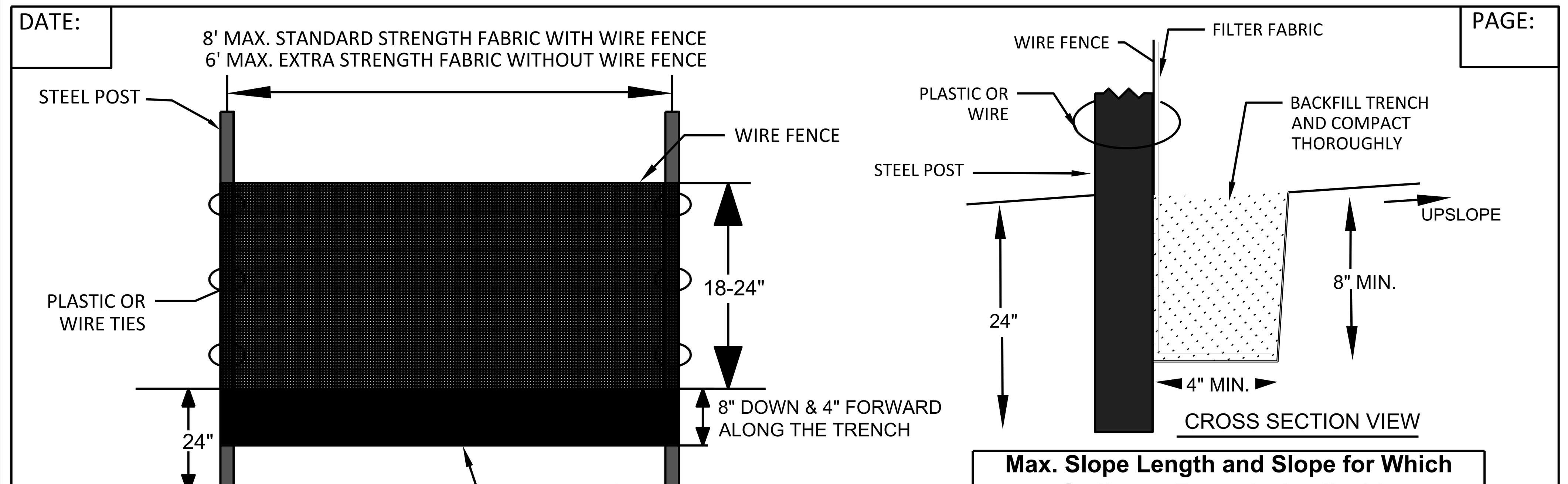
OPENING	DIAMETER OF OPENING	REINFORCEMENT QTY	BAR SIZE	BAR LENGTH
SIPHON	16"	8	#4	2'–2"



4 C-3 SIPHON INTAKE
1"= 2'

DATE:

PAGE:



Notes:

1. Construct the sediment barrier of standard strength or extra strength synthetic filter fabrics.
2. Ensure that the height of the sediment fence does not exceed 24 inches above the ground. (Higher fences may impound volumes of water sufficient to cause failure of the structure)
3. Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.
4. Support standard strength filter fabric by wire mesh fastened securely to the upslope side of the posts. Extend the wire mesh support to the bottom of the trench. Fasten the wire reinforcement, then fabric on the upslope side of the fence post. Wire or plastic zip ties should have a minimum 50 pound tensile strength.
5. When a wire mesh support fence is used, space posts a maximum of 8 feet apart. Supports should be driven securely into the ground a minimum of 24 inches. Wire mesh should be a minimum 14-gauge with 6 inch mesh spacing.
6. Extra strength filter fabric with 6 foot post spacing does not require a wire mesh support fence. Securely fasten the filter fabric directly to posts. Wire or plastic zip ties should have a minimum of 50 pound tensile strength.
7. Excavate the trench approximately 4 inches wide and 8 inches deep along the proposed line of the posts and upslope from the barrier.
8. Place 12 inches of fabric along the bottom and side of the trench.
9. Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance.
10. Do not attach filter fabric to existing trees.
11. Do not place across ditches, streams, or any other areas of concentrated flow.

Max. Slope Length and Slope for Which Sediment Fence is Applicable

Slope	Slope Length (ft)	Max. Area (ft^2)
<2%	100	10,000
2 to 5%	75	7,500
5 to 10%	50	5,000
10 to 20%	25	2,500
>20%	15	1,500

Maintenance:

1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater. Make any required repairs immediately.
2. Should the fabric of a sediment fence collapse, tear, decompose, or become ineffective, replace it promptly.
3. Remove sediment deposits as necessary to provide adequate storage volume for the next rain and reduce pressure on the fence. Take care to avoid undermining the fence during cleanouts.
4. Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

DEQ NORTH CAROLINA Department of Environmental Quality

SEDIMENT FENCE

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

ISSUED FOR BID

Freese and Nichols, Inc.
North Carolina Registered Engineering Firm C-3916

FREESE AND NICHOLS
1017 Main Campus Drive, Suite 1200
Raleigh, North Carolina 27606
Phone - (919) 582-5850
Web - www.freese.com

TOWN OF SOUTHERN PINES
SOUTHERN PINES WATERWORKS DAM SIPHON

CIVIL
CONSTRUCTION DETAILS 1 OF 2

F&N JOB NO. SPN24023
DATE 2/09/2026
DESIGNED MB
DRAWN AVR
REVISED
CHECKED
FILE NAME CV-ALL-PL-DETAILS.dwg

NO.	ISSUE	BY	DATE
2	ADDENDUM #3	FNI	3/16/26
1	ISSUED FOR BID	FNI	2/09/26
0	ISSUED FOR DAM SAFETY APPROVAL	FNI	5/30/25

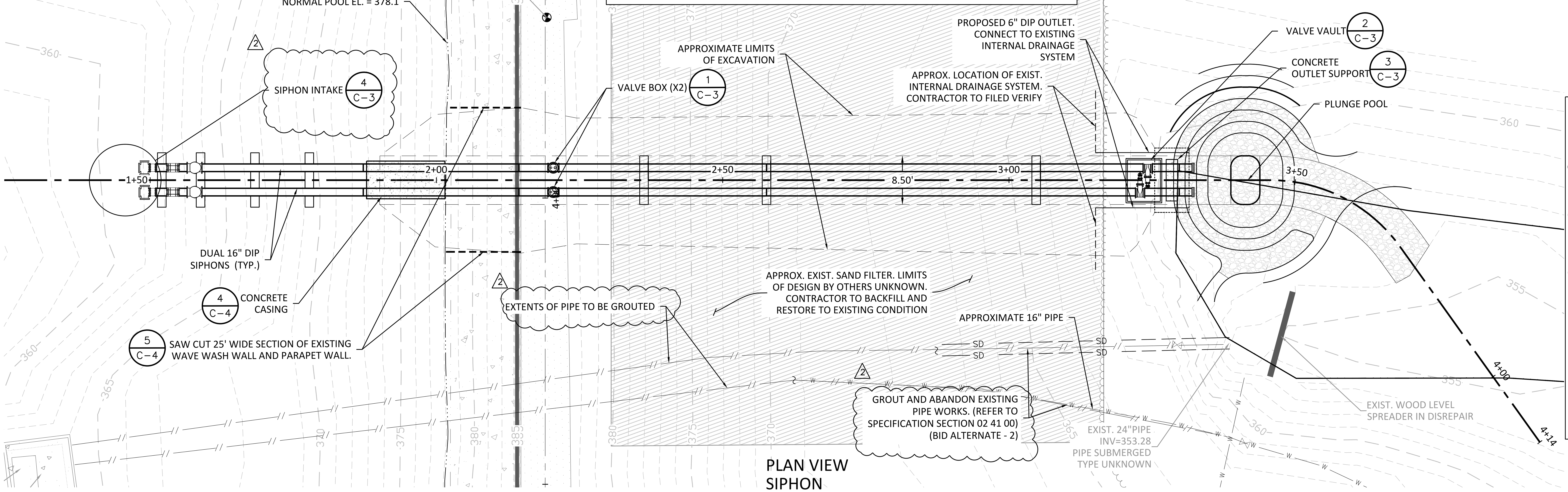
VERIFY SCALE 0 1 Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET C-3

SEQ. 5 OF 6

SIPHON NOTES:

1. THE SIPHONS SHALL BE DIP MEETING THE REQUIREMENTS AS SHOWN IN THE TECHNICAL SPECIFICATIONS.
2. END CAPS, COUPLINGS, AND FITTINGS SHALL BE SUITABLE FOR USE WITH THE SPECIFIED PIPE AND SHALL BE MADE WATER TIGHT.
3. SIPHON THRUST BLOCKS SHALL BE LOCATED AT EACH PIPE JOINT. UNLESS OTHERWISE NOTED.
4. THE SIPHON SYSTEM SHALL BE INSTALLED BY TRENCHING METHODS ONCE THE SUBGRADE IS 12 INCHES ABOVE THE PROPOSED TOP OF PIPE.
5. THE SIPHON SYSTEM SHALL BE TESTED IN THE PRESENCE OF THE ENGINEER FOR LEAKAGE.
6. ALL JOINTS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND SHALL BE WATER TIGHT FOR A HEAD OF AT LEAST 50 FEET OF WATER FOR A MINIMUM OF TWO HOURS. THE CONTRACTOR IS REQUIRED TO TAKE CORRECTIVE MEASURES TO MEET THE TESTING REQUIREMENTS.
7. TRAVELING OVER THE PIPE WILL NOT BE PERMITTED UNTIL THE PIPE HAS BEEN COVERED TO A DEPTH SUFFICIENT TO PREVENT DAMAGE TO OR BREAKAGE OF THE PIPE.
8. THE METHOD OF LOWERING THE PIPE INTO THE TRENCH AND PLACING THE PIPE IN POSITION SHALL BE SUCH AS TO PREVENT DIRT FROM GETTING INSIDE THE PIPE AND COUPLING, AND TO PREVENT DAMAGE TO THE PIPE.
9. BEFORE AND DURING ASSEMBLY OF A JOINT, ALL PARTS SHALL BE CLEANED AND SHALL BE FREE OF MUD, ICE, OIL, AND GREASE.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE SIPHON SYSTEM OCCURRING DURING BACKFILL OF THE EMBANKMENT.
11. CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL, PRODUCT INFORMATION FOR THE SIPHON PIPE, FITTINGS, VALVE BOX/VAULT, AND VALVES.
12. A VALVE KEY SHALL BE TURNED OVER TO THE OWNER PRIOR TO PROJECT CLOSE OUT.
13. INFORMATION SHOWN ON THE SIPHON PROFILE VIEW IS TYPICAL OF A DUAL SIPHON SYSTEM.



PLAN VIEW SIPHON

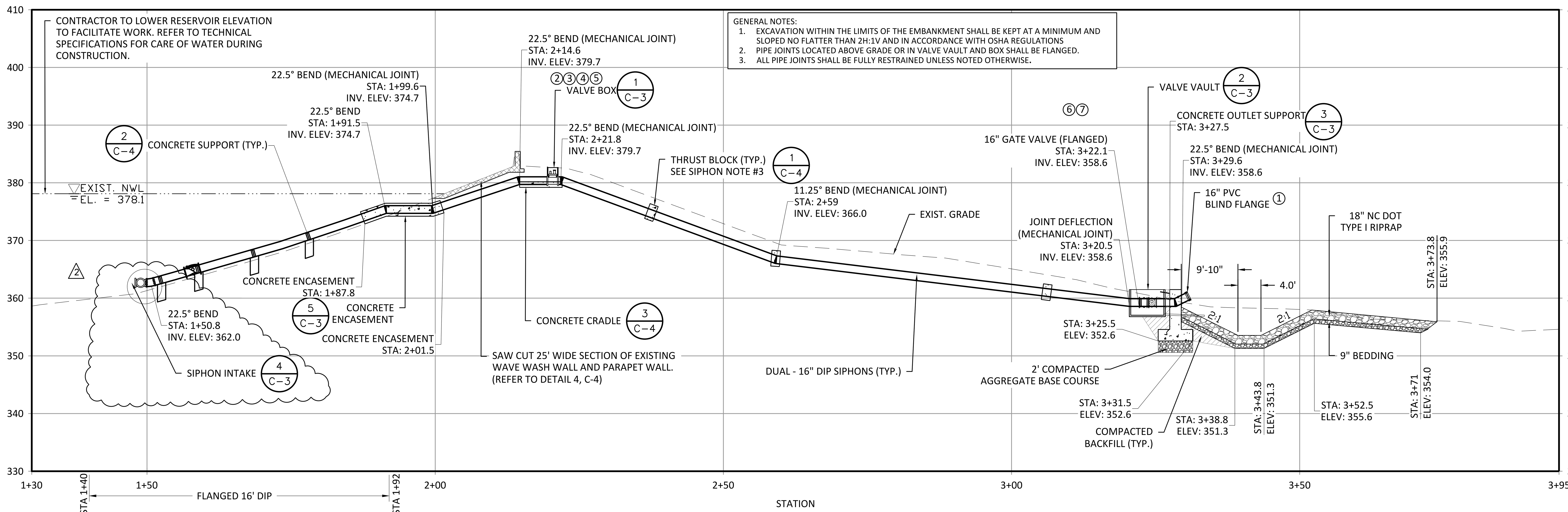
SIPHON OPERATION PROCEDURE:

1. REMOVE BLIND FLANGE ON DOWNSTREAM END.
2. REMOVE CAP ON 4" FDC LOCATED IN THE VALVE BOX AT THE CREST OF THE DAM.
3. ENSURE THE 2" GLOBE VALVE IS CLOSED ON THE 4" FDC LOCATED IN THE VALVE BOX AT THE CREST OF THE DAM.
4. *PUMP THE SIPHON FULL OF WATER AT THE 4" FDC*.
5. RE-INSTALL THE CAP ON THE 4" FDC.
6. OPEN THE GATE VALVE LOCATED AT THE SIPHON OUTLET.
7. SHUT OFF FLOW BY GRADUALLY CLOSING THE GATE VALVE AND/OR OPENING THE 2" GLOBE VALVE AT THE CREST.

THE SIPHON MAY REMAIN IN A FULLY CHARGED STATE (FILLED WITH WATER). IT IS RECOMMENDED THAT THE SIPHON IS OPERATED ON A ROUTINE BASIS TO FLUSH THE SYSTEM.

GENERAL NOTES:

1. EXCAVATION WITHIN THE LIMITS OF THE EMBANKMENT SHALL BE KEPT AT A MINIMUM AND SLOPED NO FLATTER THAN 2H:1V AND IN ACCORDANCE WITH OSHA REGULATIONS
2. PIPE JOINTS LOCATED ABOVE GRADE OR IN VALVE VAULT AND BOX SHALL BE FLANGED.
3. ALL PIPE JOINTS SHALL BE FULLY RESTRAINED UNLESS NOTED OTHERWISE.



PROFILE VIEW SIPHON

NORTH

SCALE IN FEET HORIZONTAL (0, 10', 20')

SCALE IN FEET VERTICAL (0, 10', 20')

Freese and Nichols, Inc.
North Carolina Registered Engineering Firm C-3916

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 057191 — Signed by: [signature] 2/16/2026

FREESE NICHOLS
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Raleigh, North Carolina 27606
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Web - www.freese.com

TOWN OF SOUTHERN PINES
SOUTHERN PINES WATERWORKS DAM SIPHON
CIVIL
PROPOSED PLAN AND PROFILE

F&N JOB NO.	SPN24023
DATE	2/09/2026
DESIGNED	MB
DRAWN	AVR
REVISED	
CHECKED	
FILE NAME	CV-SDN-PP-SITE.dwg

NO.	ISSUE	BY	DATE
3	ADDENDUM #3	FNI	3/16/26
2	ISSUED FOR BID	FNI	2/09/26
1	ISSUED FOR DAM SAFETY APPROVAL	FNI	5/30/25

VERIFY SCALE: Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET C-2

SEQ. 4 OF 6

ISSUED FOR BID

ACAD Rel: C3D 2023

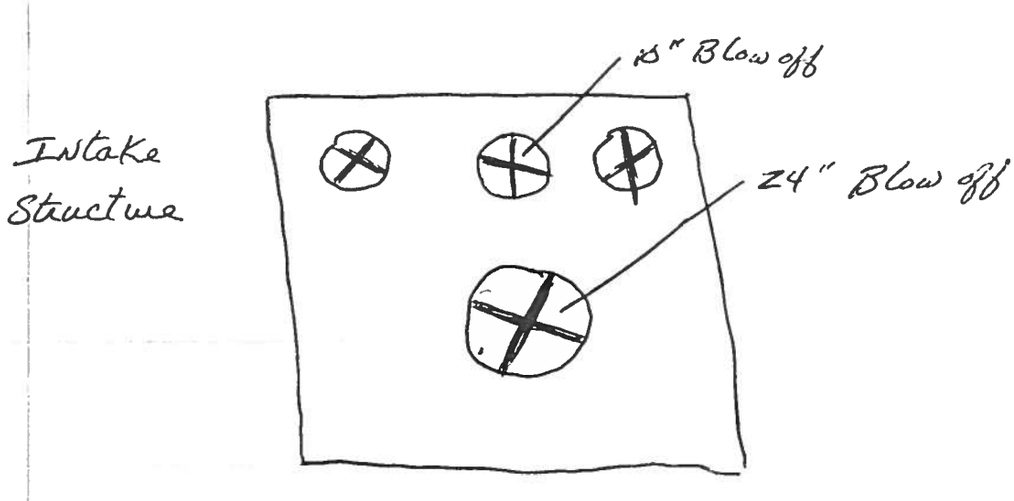
PLOT DATE: 3/16/2026 2:45 PM PLOT BY: 08521 FILENAME: N:\WRD\Drawings\CV-SDN-PP-SITE.dwg

Water lines at Town Reservoir -

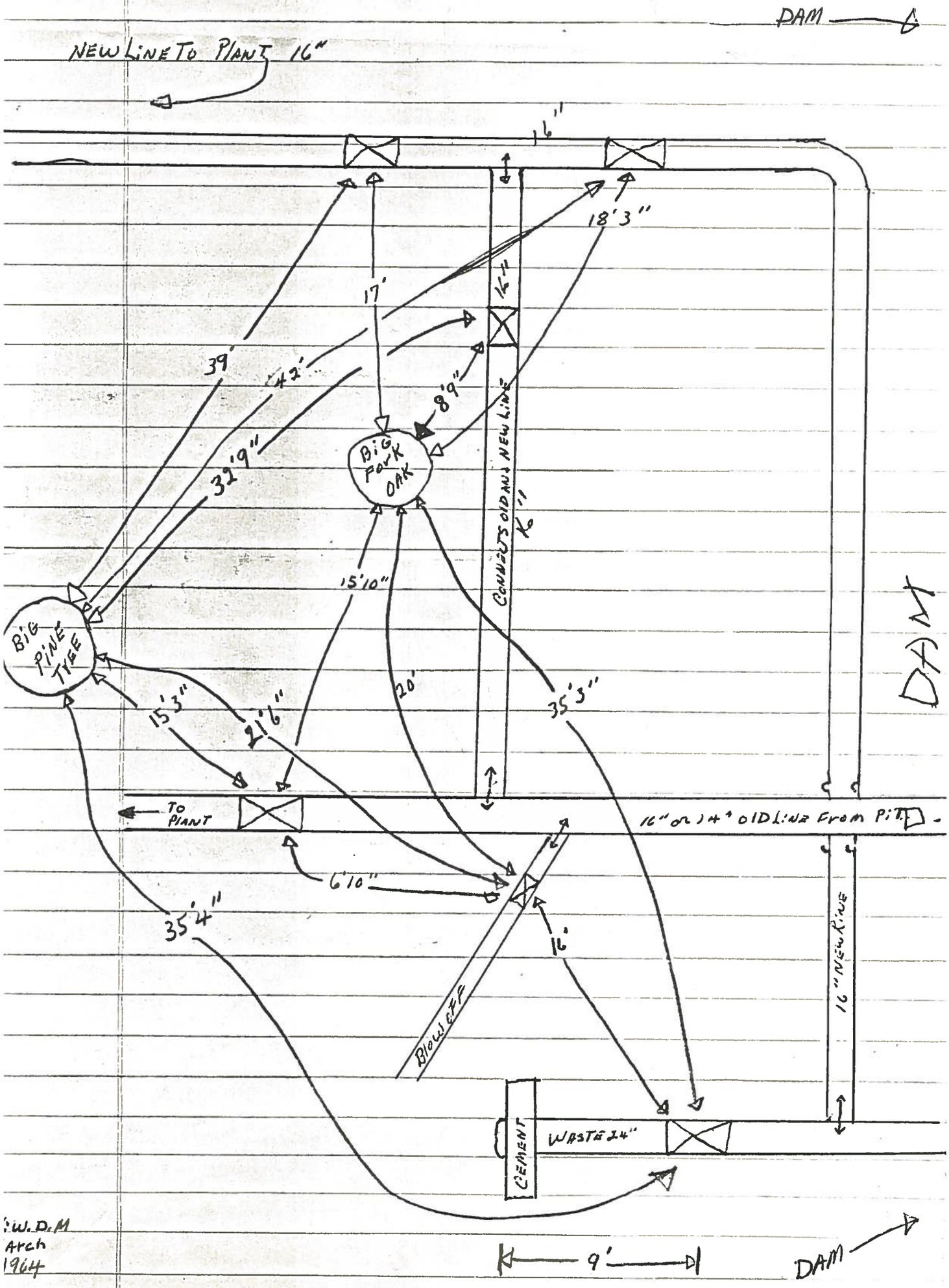
The intake structure in reservoir has 4 valves on it - Two of these are suppose to be blow off valves - a 10" and a 24" valve.

The 24" valve on the original blue prints empties into Mills Creek about 125 feet down from the center of the dam -

Hand drawn map by Dallas shows placement of the valves and location of piping located in woods below dam -



Should be a valve located on each line along with valves on intake structure —



W.D.M
Arch
1964

Inspection Report

Southern Pines Waterworks Dam - Intake Tower
Southern Pines, North Carolina

For: **Stephanie Pluta, PE**
Water Resources Design Engineer | Freese and Nichols, Inc. | Raleigh, NC
984-204 1189 (office) | 919-641-7311 (cell) |
stephanie.pluta@freese.com | www.freese.com

Date of Report: 1/28/2022

Date of Inspection: 12/10/2021

Sent via email to Stephanie Pluta <Stephanie.Pluta@freese.com>

BANDER SMITH
DAM INSPECTION, REPAIR + CONSTRUCTION

BanderSmith.com
P.O. Box 7188
Richmond, VA 23221

Summary

Bander Smith was contacted by Freese and Nichols to perform an inspection of the intake tower system at Southern Pines Waterworks Dam in Southern Pines, North Carolina. The goal of the project was to assess the condition of the tower as well as evaluate the valves.

Crews completed the inspection on December 10th, 2021. Weather conditions were partly cloudy with temperatures in the upper 40s for most of the day. A 4-person commercial dive team was onsite.

The intake system consists of a square cast in place tower that supports three 16" water supply inlets located at different elevations, a 24" water supply control valve, and a 24" low level bottom drain. A 24" supply line runs through the control tower (from the upstream face to the downstream face) and extends downstream through the earthen embankment to a plunge pool. The inlet to the 24" water line was buried in 3' of sediment and was unable to be located outside the tower. The low-level drain is located on the upstream side of the 24" supply line inside the tower. A 24" water supply valve is located just downstream of the bottom drain and allows water to enter the line from the tower. The valve was unique and resembles a sink or tub drain.

Condition Report:

Structure:	Condition:	Notes:
Concrete Control Tower	**Fair**	No significant issues, a few areas where the stems penetrate the tower ceiling are spalled. Slight pitting around the tower at the normal pool level.
Ladder & Railings	**Poor**	Heavy Deterioration observed, but ladder and railing are stable for now. Metal access grating over the tower opening has fallen to the bottom of the tower.
Water Intake Trash Screen	**Serious**	Heavy Deterioration and several sections were missing. The rack will no longer perform as designed.
16" Intake No. 1	**Critical**	Outer valve fully open. Inner valve ¾ open. All components appear intact, however heavy corrosion is prevalent. The valve has not been operated in a long time and appears seized shut.
16" Intake No. 2	**Critical**	The outer valve is shut, and the inner valve is ½ open. Heavy corrosion throughout, especially at the water line. The operator appears seized up.
16" Intake No. 3	**Critical**	Both the inner and outer valves are shut. The inlet is 12" above the sediment bottom. Heavy corrosion throughout, especially at the water line. The stem is bent. The operator appears seized up.
Valve No. 4 – 24" Bottom Drain	**Critical**	The low-level drain inlet is buried in approximately 3' of sediment. The stem is broken at the waterline. The operator appears to be seized up. The pedestal position indicates the valve is open ¼. This could not be confirmed by the diver due to the bonneted design.
Valve No. 5 – 24" Water Supply Control	**Poor**	Unique stopper style valve with a 90-degree stem transition. Heavy deterioration but no breakages observed. The operator is seized up. Pedestal position indicator shows the valve to be ¼ open however the diver confirmed the valve was closed.
Outfall & Plunge Pool	**Fair**	The discharge end of the 24" supply line is underwater due to sediment build-up downstream. The line was open at least 20' upstream. No water flow observed.

Conclusions

The concrete control tower appears stable and a few minor upgrades, such as spall repairs and a concrete surface treatment, will extend its service life.

The access ladder and railings should be replaced if the tower will be returned to service. A new metal access grate with locking mechanism should be installed as soon as possible. This situation presents a fall hazard and is a liability.

The valves are old, showing significant signs of corrosion, and several components have failed. The valves and components are not salvageable. The future purpose of the tower should be determined. At which point, a repair plan can be implemented. If the goal is to have an operational low level drain system, then several of the valves can be removed or blanked off, and a new low level drain valve installed in the tower. The inlet to the water supply line on the outside of the tower will need to have the sediment diver-displaced.

The position indicator on the 24" low level drain valve showed the valve to be ¼ open. This could not be confirmed by the diver due to the bonneted valve system and the fact the inlet is buried in 3' of sediment. It is unclear if the 24" water supply line running through the dam is pressurized. The downstream plunge pool should be pumped out and a crawler camera system inserted to evaluate the pipe through the dam. This will help determine the pipe's exact layout and condition.

Overview & Inspection Procedures

Crews arrived onsite at 8:00 AM on December 10th, 2021. Personnel walked the site, discussed the intake configuration, and further developed the inspection plan. Crewmembers followed Level I inspection procedures developed in the U.S. Navy and offshore diving industry. An inspection condition chart (below) was used to rate the primary structure elements.

- Bander Smith crewmembers evaluated the intake tower using a small jon boat.
- A 4-person commercial dive team evaluated the tower interior and valves, then moved to the tower exterior

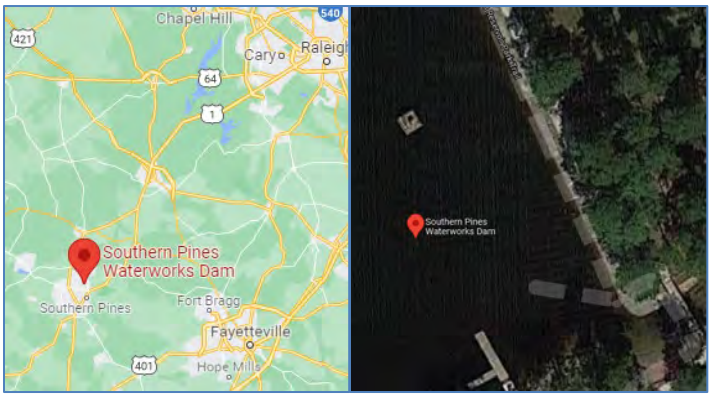


Figure 1 – Google Site Map

*******Directions are from the perspective of an observer looking downstream unless otherwise noted.*******

Site Conditions

Conditions were partly cloudy. A lite rain/mist fell in the morning. No significant rain fell prior to arrival. The lake was at normal pool

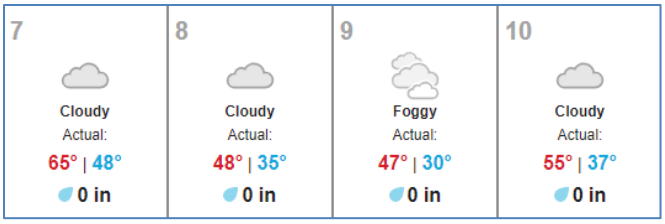


Figure 3 - Weather History (weather underground)

Limitations:

On site measurements, observations, pictures, and video were obtained during the inspection and included with this report. No original design information was available. The information contained in this report is meant to provide an understanding of the structure and can be used for design/evaluation by a qualified Professional Engineer or the dam owners for improvements. This report is not reflective of a formal engineering analysis. Bander Smith's conclusions and recommendations are based off information obtained at the time of the inspection and could change if site conditions change.

TABLE 4
ROUTINE UNDERWATER CONDITION ASSESSMENT RATINGS

RATING		DESCRIPTION
6	Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
5	Satisfactory	Limited minor to moderate defects or deterioration observed, but no overstressing observed. No repairs are required.
4	Fair	All primary structural elements are sound; but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present, but do not significantly reduce the load bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
3	Poor	Advanced deterioration or overstressing observed on widespread portions of the structure, but does not significantly reduce the load bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
2	Serious	Advanced deterioration, overstressing or breakage may have significantly affected the load bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high priority basis with urgency.
1	Critical	Very advanced deterioration, overstressing or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high priority basis with strong urgency.

Figure 4 – Condition Rating Chart for this report

Overview

Southern Pines Waterworks Dam is an earthen embankment structure located in Southern Pines, North Carolina. The lake/dam originally served as a water supply reservoir for the town, however it has since been decommissioned and now serves as a recreational area for the community. A 29' tall concrete intake tower located roughly 85' out into the lake from the dam crest is the original water supply intake tower. The structure consists of water supply inlets at different elevations, a water supply control valve, and a low-level bottom drain. A 24" water supply pipe extends from the tower downstream to the plunge pool.

Figure 5 – Intake Tower in Lake

Figure 6 – Downstream Discharge area

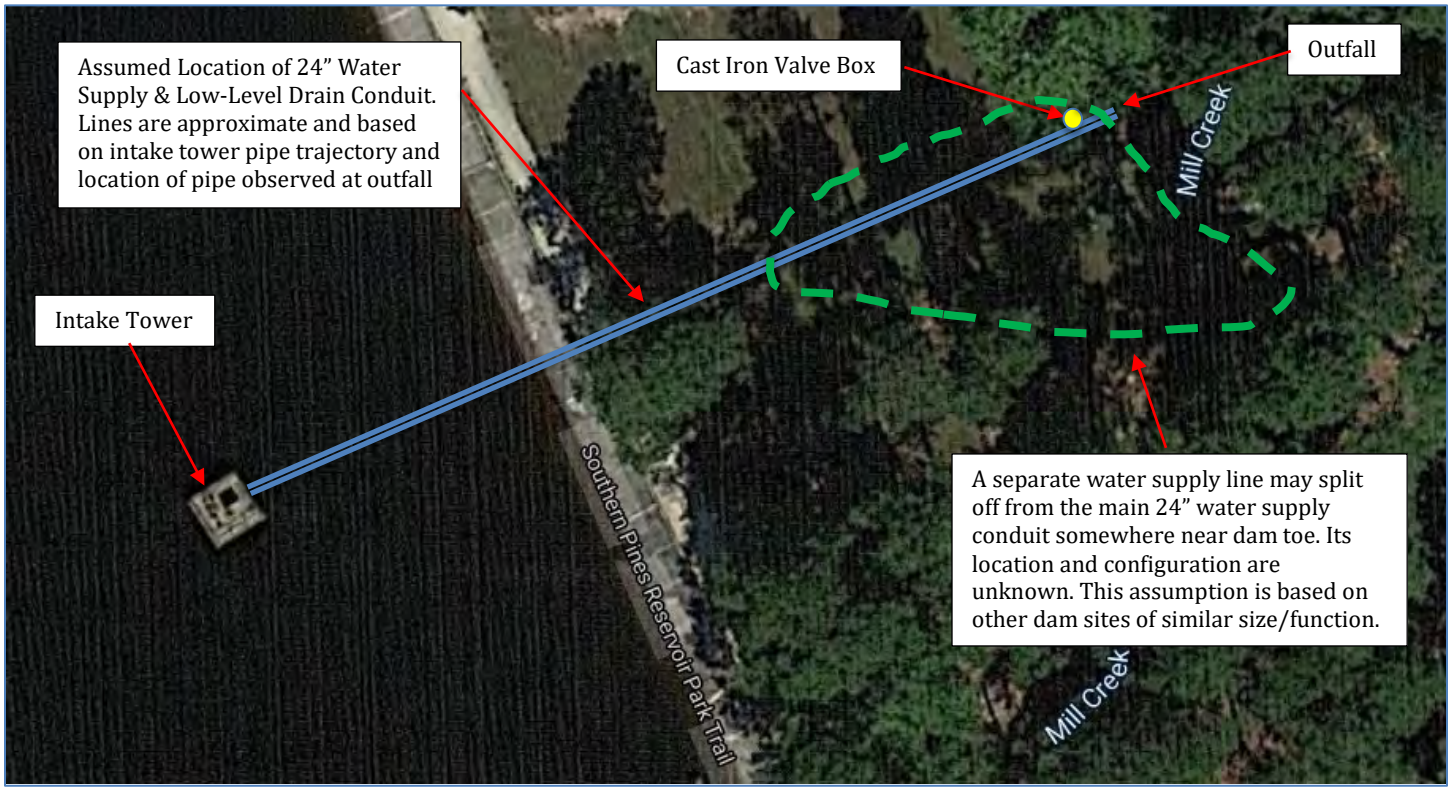


Figure 7 - Google Site View

Figure 8 – Upstream Tower Face

Figure 9 – Left Side Tower Face

Figure 10 – Downstream Tower Face

Figure 11 – Right Side Tower Face

Figure 12 – Top of Tower

Figure 13 – Tower Interior (debris in lower left corner)

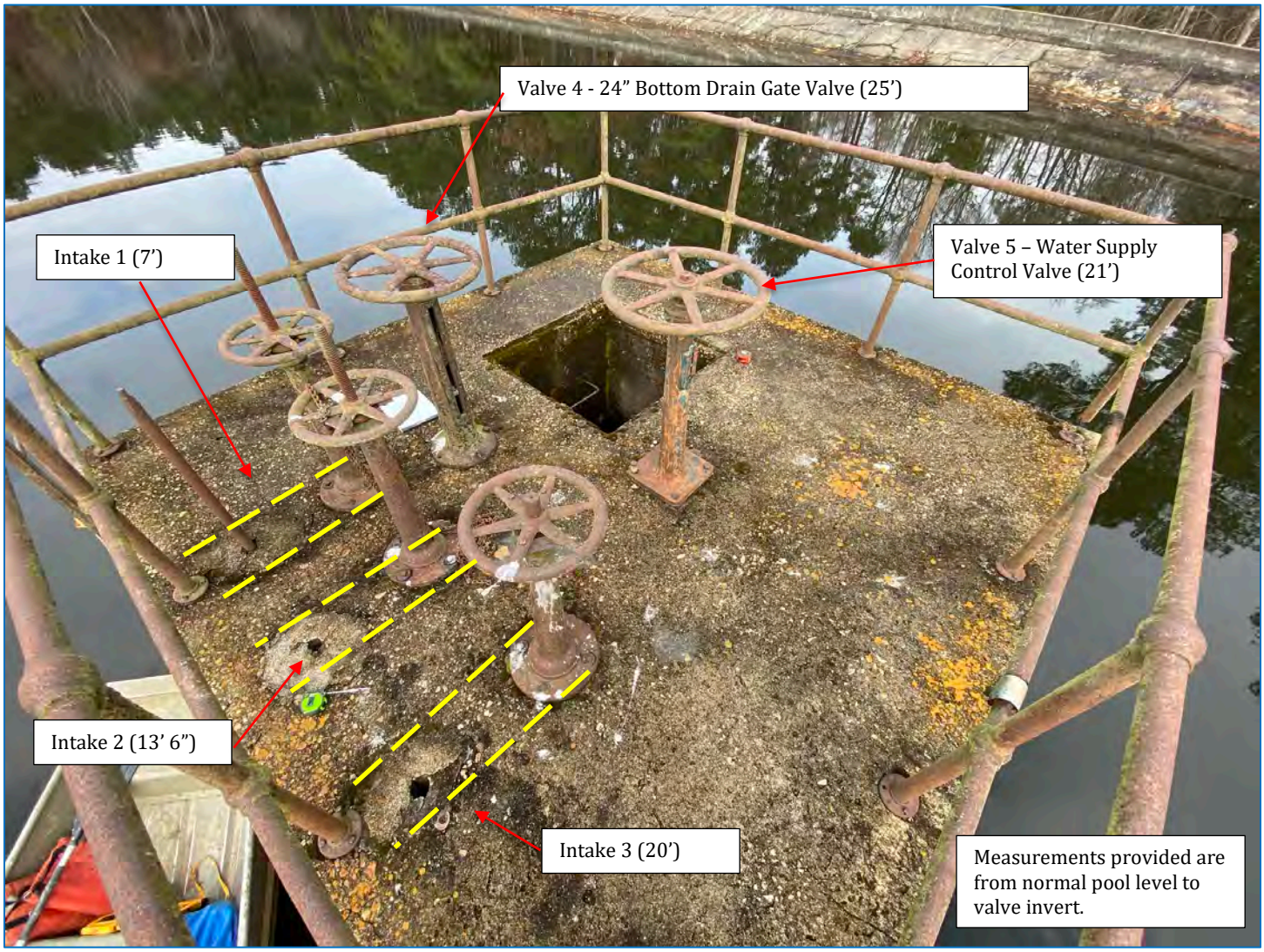


Figure 14 - Top of Intake Tower

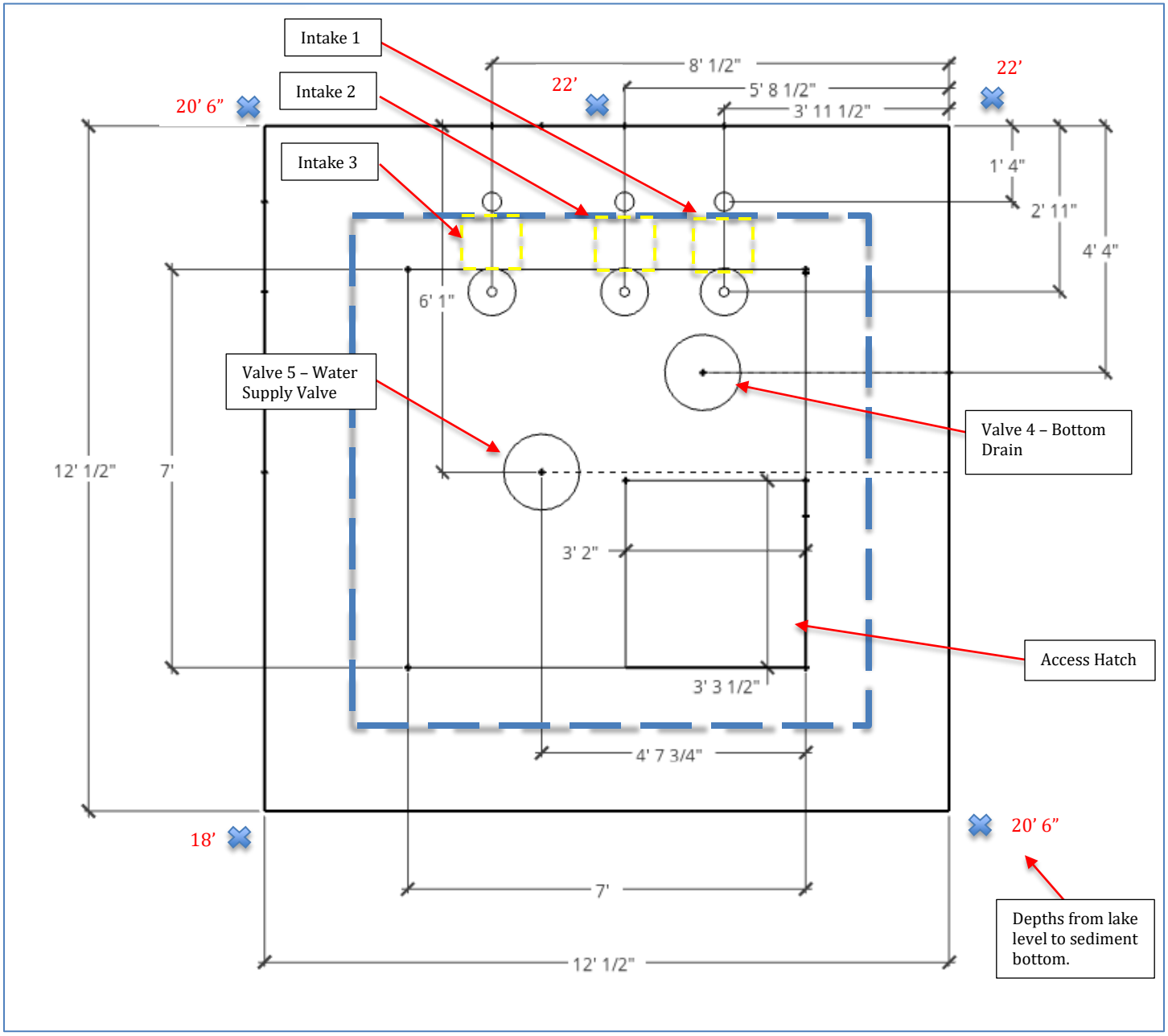


Figure 15 - Top of Tower (operating floor) layout

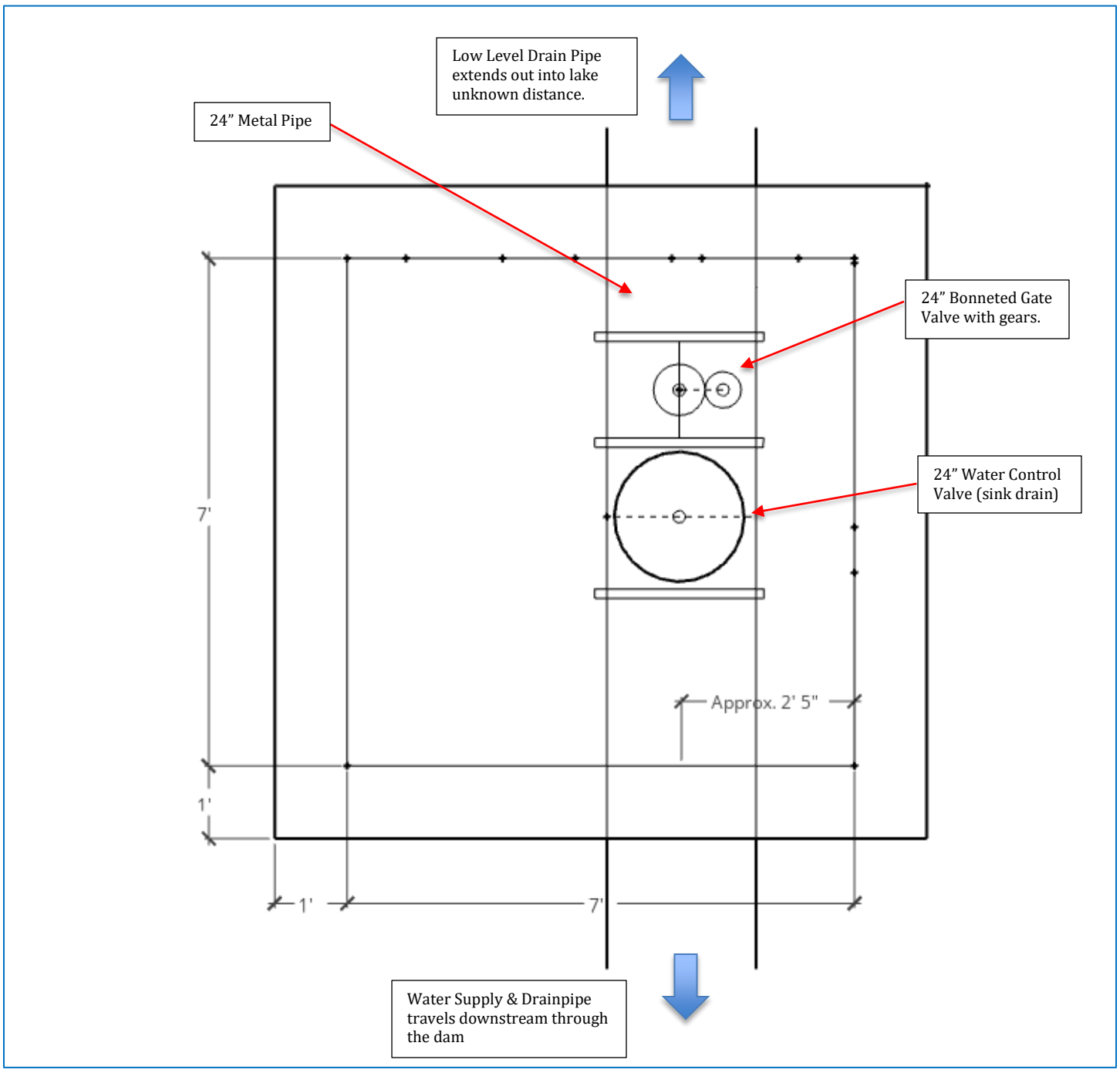


Figure 16 - Interior Bottom of Tower Layout

Intake Structure – Concrete Tower

Tower Condition Rating: **Fair**

Description:

Marine growth covered most of the surfaces underwater. The diver wiped clean the tower in several areas and no issues observed. No major structural issues were observed. Measurements were recorded from the tower corners down to the lake water surface and all four measurements were within ¼" of each other indicating the tower is fairly level. The distance from top of tower (operating floor) to normal pool was 42.5".

Sediment has collected around the riser tower. Depth measurements were recorded and shown on Figure 15. The depth along the upstream/lake side tower face was approximately 22'. The sediment was approximately 12" below intake 3, but 3' above the low-level bottom drain invert.

The diver reported 6 to 8 inches of light sediment in the bottom of the tower. Two large stones were also noted.

- The concrete surfaces surrounding the tower at the waterline showed signs of corrosion (Figure 17 & 18). The aggregate was exposed but no reinforcing was observed
- On the upstream tower exterior face, the concrete was spalled beneath each of the three operator holes for the water supply inlets (figure 19, 20, 21).
- Concrete was spalled on the interior tower ceiling directly beneath valve 5 (Figure 22)

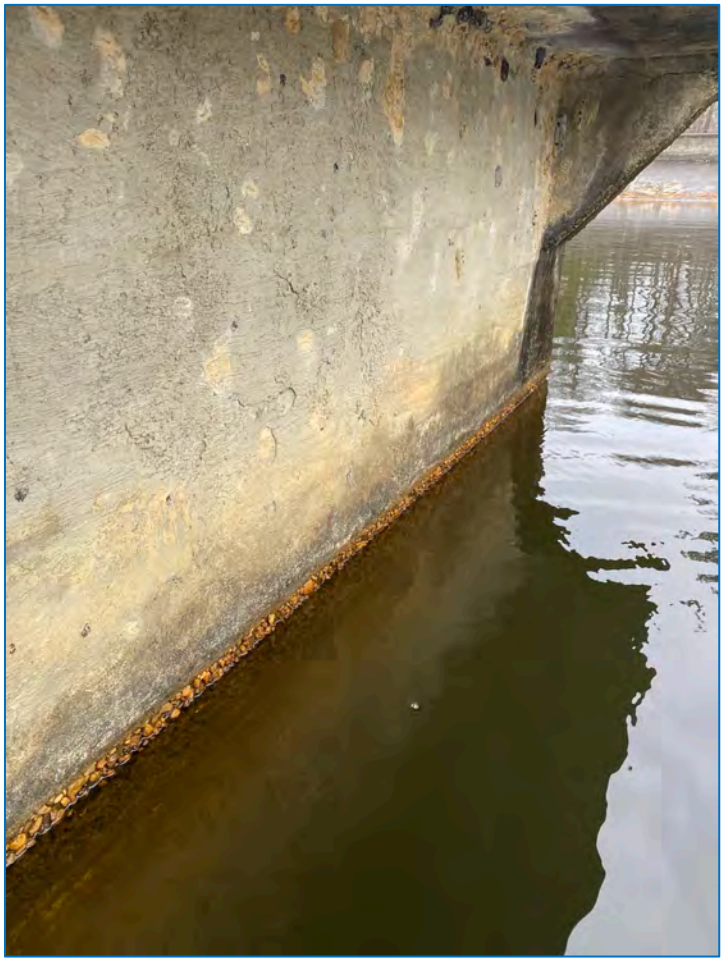


Figure 17 – Right side tower face at water surface

Figure 18 – Left side tower face

Figure 19 – Damage beneath Intake 2 Operator on exterior face

Figure 20 – Damage beneath Intake 1 Operator on exterior face

Figure 21 – Damage beneath Intake 3 Operator on exterior face

Figure 22 – Damage to concrete beneath Valve 5 operator

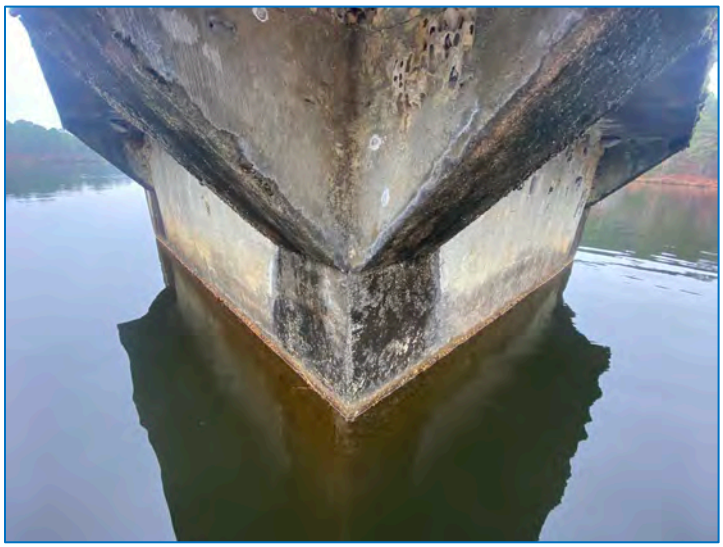


Figure 23 – Right/Downstream Tower Corner

Figure 24 – Downstream Tower Exterior Face

Ladder & Railings

Condition Rating: **Poor**

Description:

The access ladder on the upstream left side corner was loose (likely as designed) but secure. Minor deterioration was noted above water. The ladder extends down several inches below the lake surface and stops. It's unclear if a section of the ladder has broken off or simply the ends are heavily corroded. Access onto the tower was awkward, but functional.

The metal handrails on the access platform were secure overall, however each corner post was compromised. Two of the posts were deteriorated and broken free while the other two appeared to have pulled up from the concrete.

A square section of metal grating was found inside the tower at the bottom. It appears to have covered the square access opening on top of the tower. The metal was heavily deteriorated.

Figure 25 - Access Ladder to tower

Figure 26 – Handrail

Water Intake Trash Screen

Condition Rating: **Serious**

Description:

A large trash screen is located over the upstream tower face. This screen was designed to protect the three water supply intakes.

Several a large angle supports make of the rack frame and run horizontally across the supply inlet face. The horizontal bars appeared to be securely fastened into the concrete tower. Flat bars are attached to the horizontal bars and run vertically across these supports.

Roughly 50% of the rack is missing due to deterioration. The sections likely fell into the sediment. The rest of the metal was heavily corroded, especially near the water surface. The rack at lower depths appeared to be in better condition.

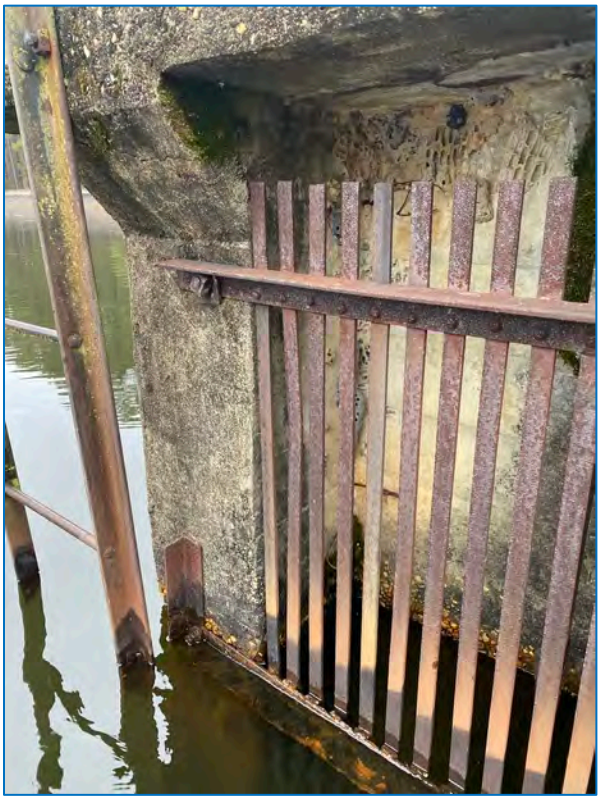


Figure 27 - Debris screen above water

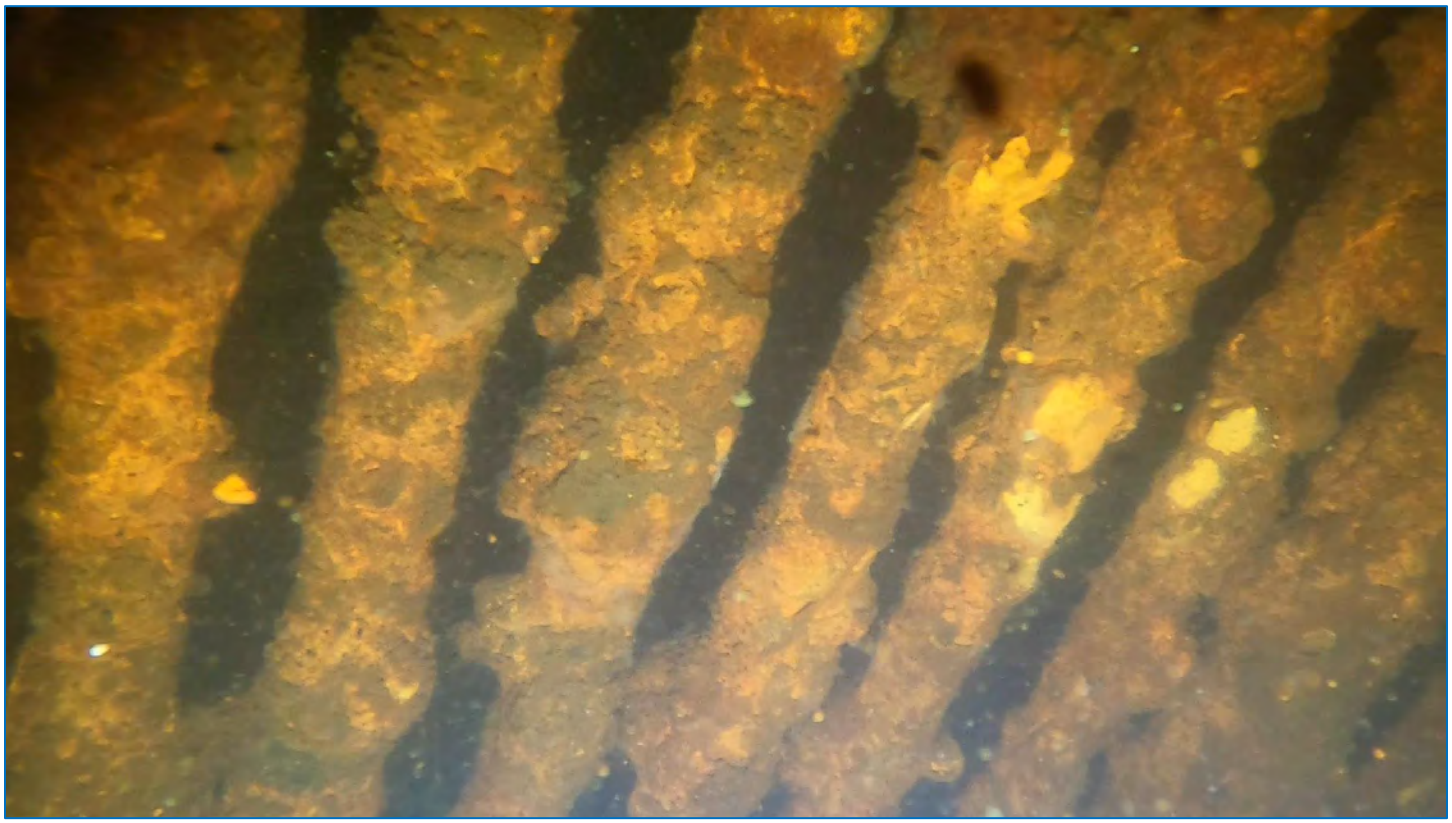


Figure 28 - Typical view of vertical flat bar that make of the debris screen near surface, typical

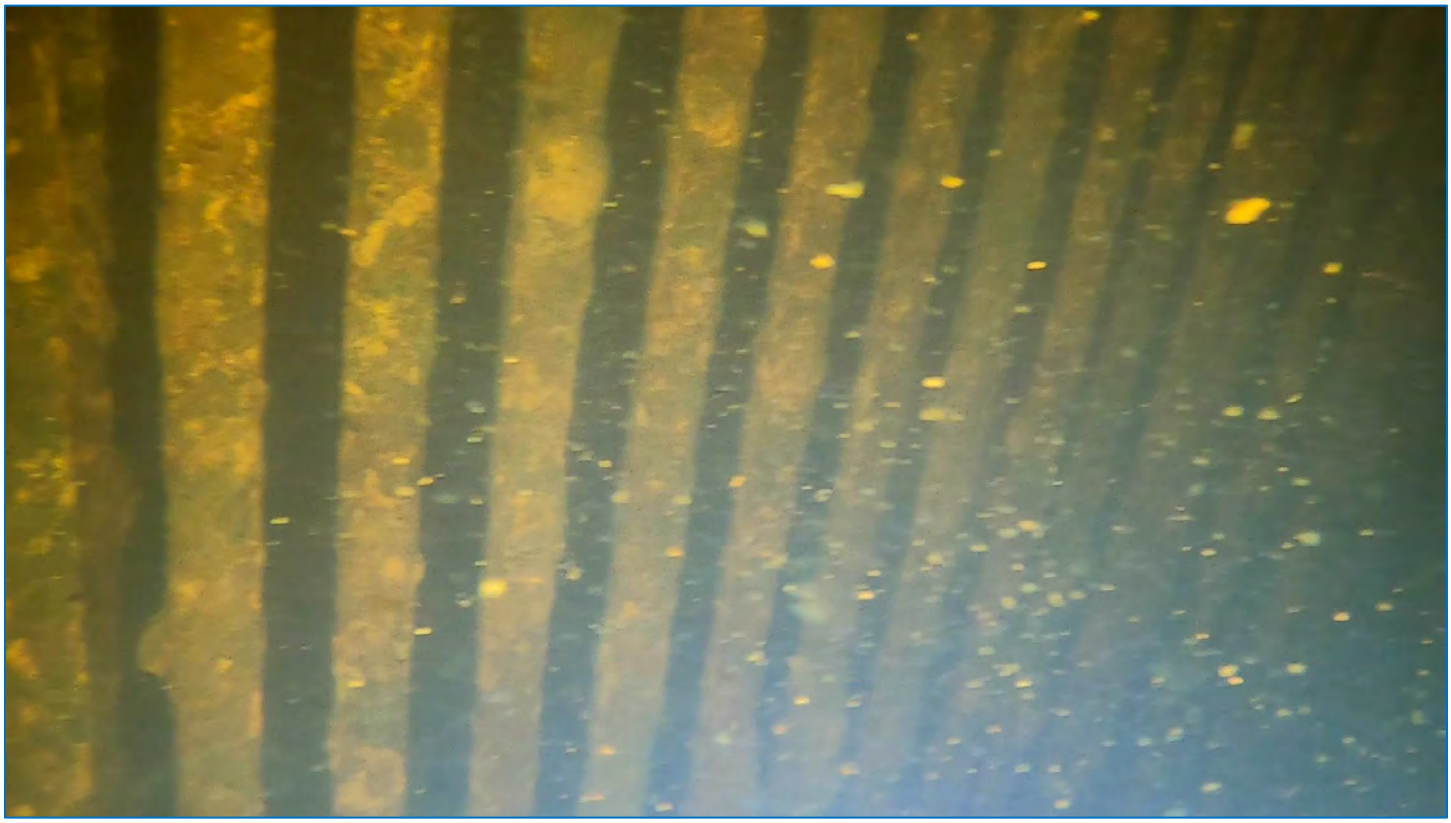


Figure 29 - Debris screen on upstream tower face, deeper depth, typical

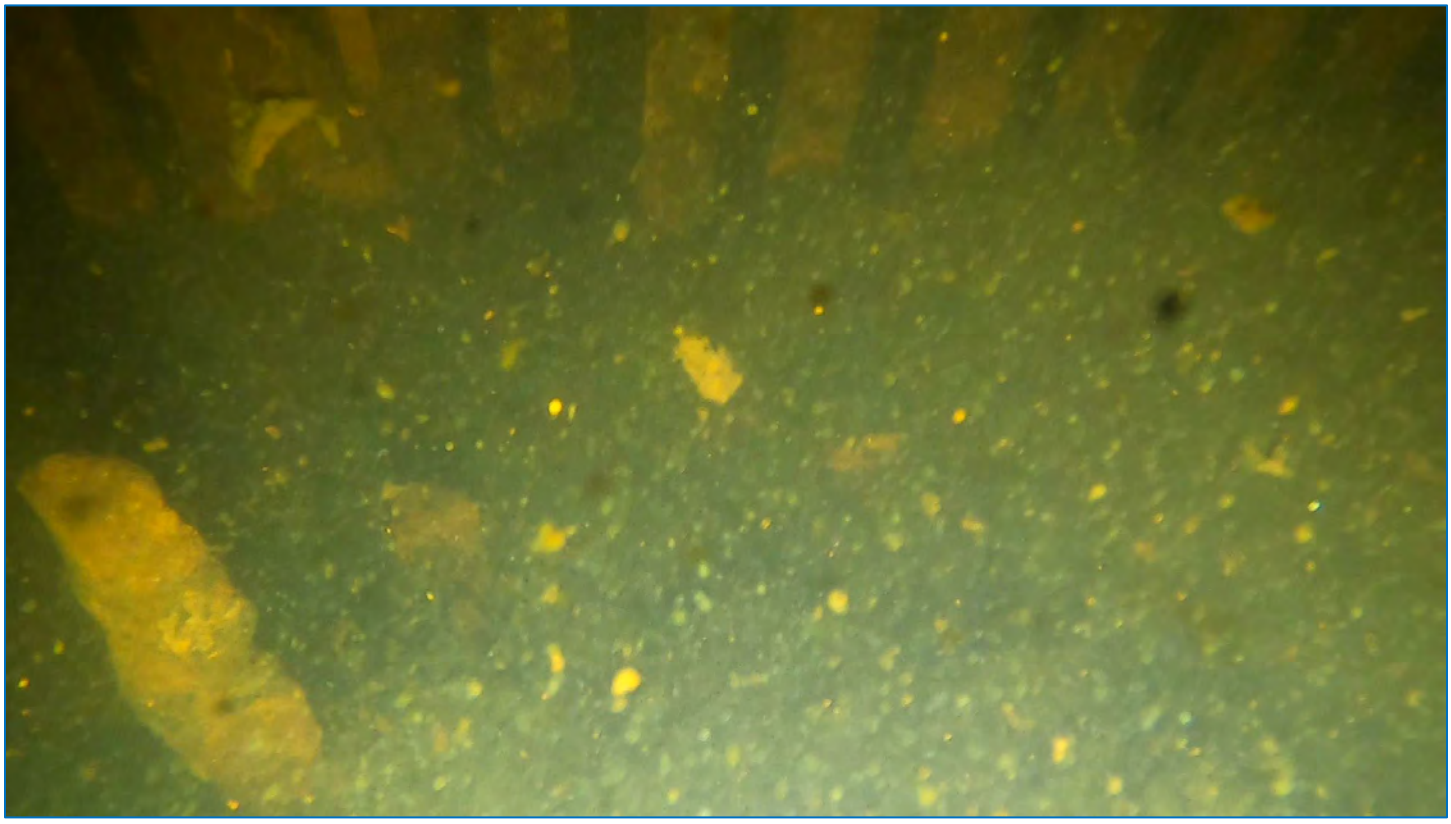


Figure 30 - Trash Screen disappears into sediment

Intake No. 1

Condition Rating: **Critical**

Description:

Intake No. 1 is located on the left side of the upstream tower face.

The invert is 7’ below normal pool and is controlled by a 16” diameter non rising sluice gate on the exterior and a 16” diameter rising stem sluice gate on the interior. The effective opening of the intake was measured to be 15 inches internal diameter.

The diver reported significant corrosion on all surfaces. The inner sluice gate appears to be bolted directly to the concrete tower face. The valve was found in the ¾ open position as reported by the diver and indicated by the amount of stem above the operator. The valve is controlled by a hand wheel operator. A mild steel stem travels down the tower interior to the sluice gate. The stem is heavily corroded at the waterline.

The exterior valve was full open. It is a non-rising stem sluice gate. A metal stem was noted sticking up through the hole in the operating floor. The top of the stem was threaded, likely to accommodate a handwheel. The stem travels down to the sluice gate and was heavily deteriorated.

Figure 31 - Intake 1

Field Measurement:

Operating floor to valve invert = 10’ 6”

Interior Wall Face to stem centerline = Approx. 6”

Stem Diameter = 1-1/8”

Figure 32 - Outer Valve Stem sticking up through hole in concrete tower

Figure 33 - View of stem coming through underside of tower

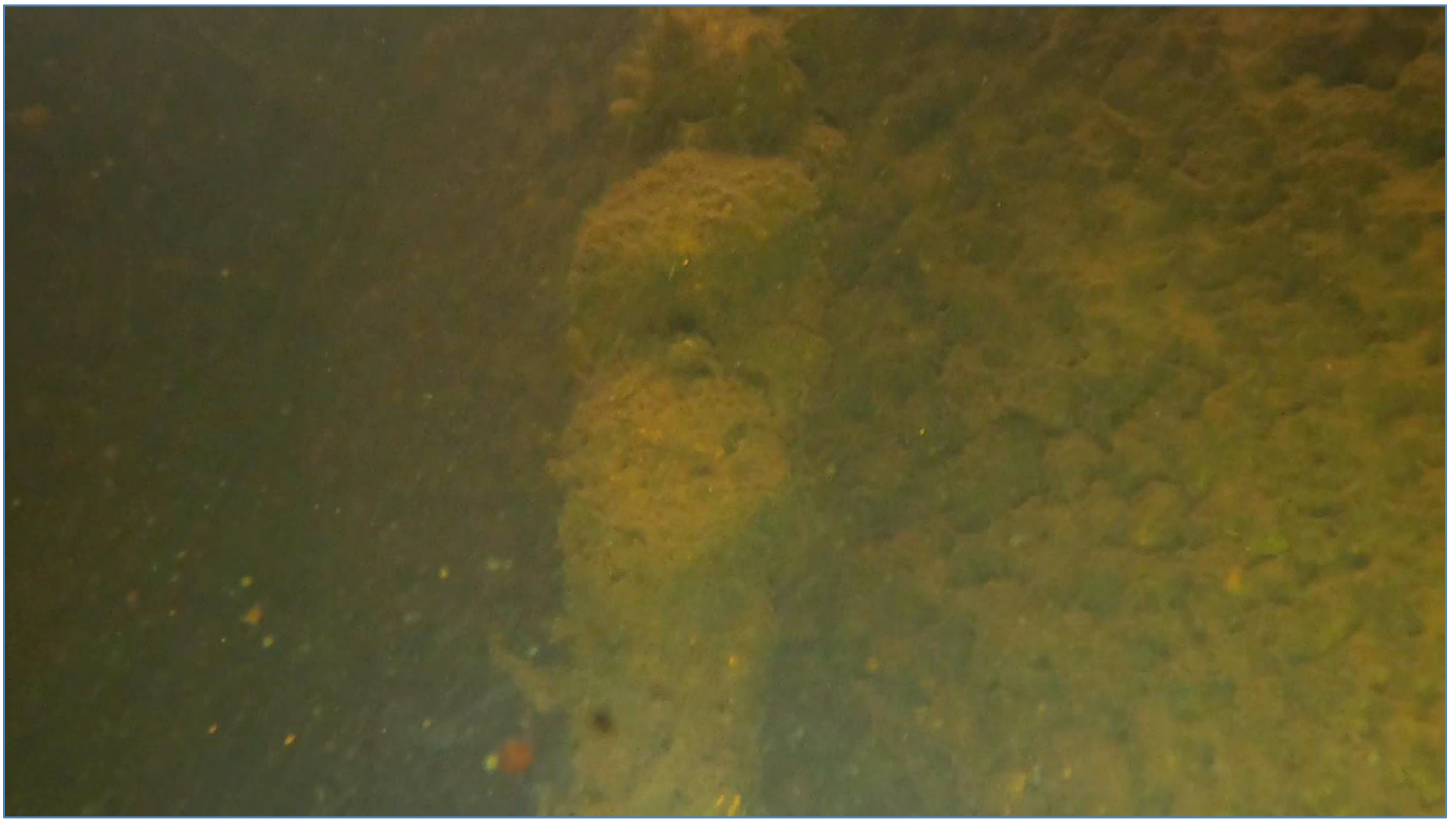


Figure 34 - Valve 1 Stem just below the water level

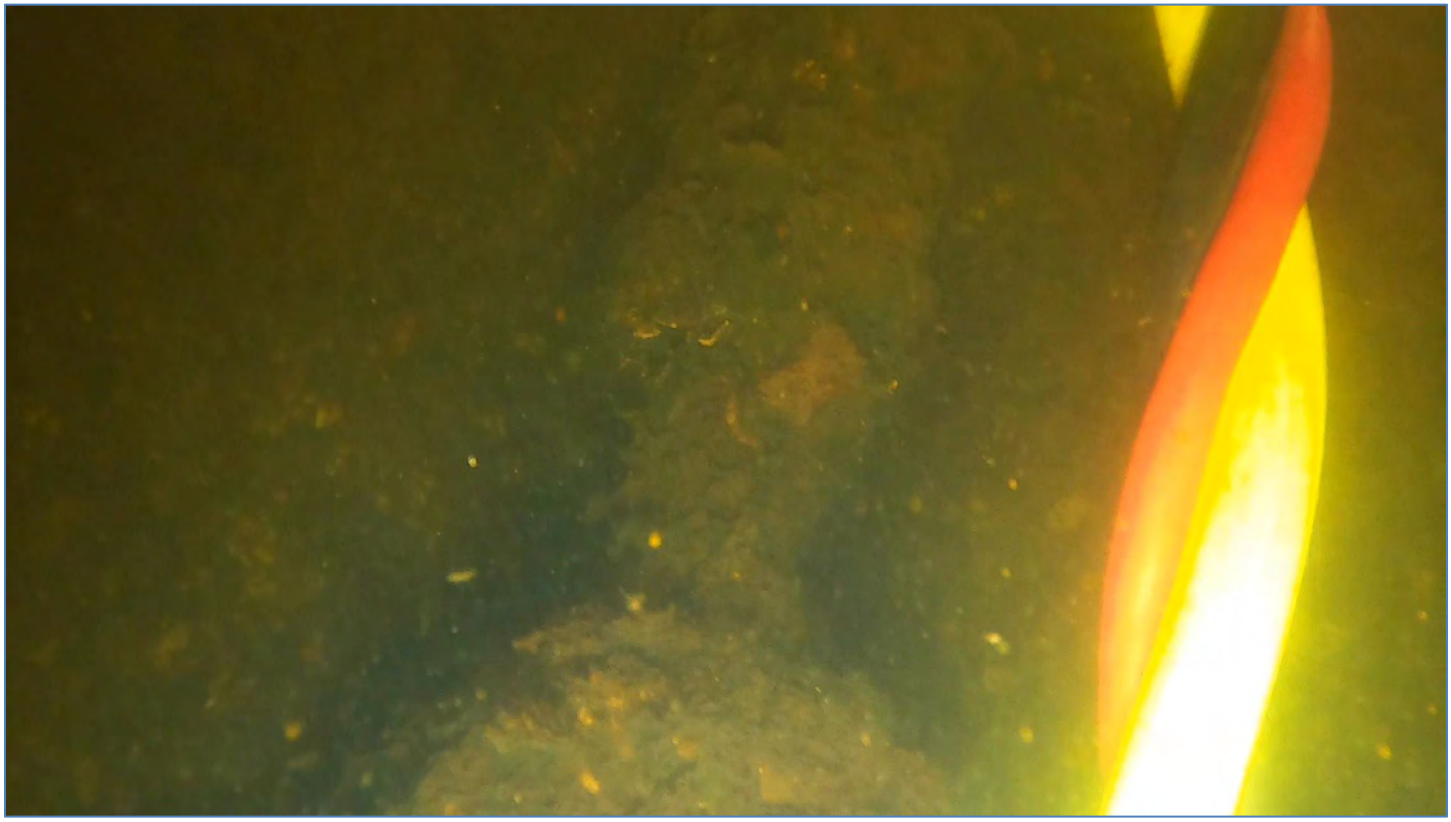


Figure 35 - Stem connection into the sluice gate

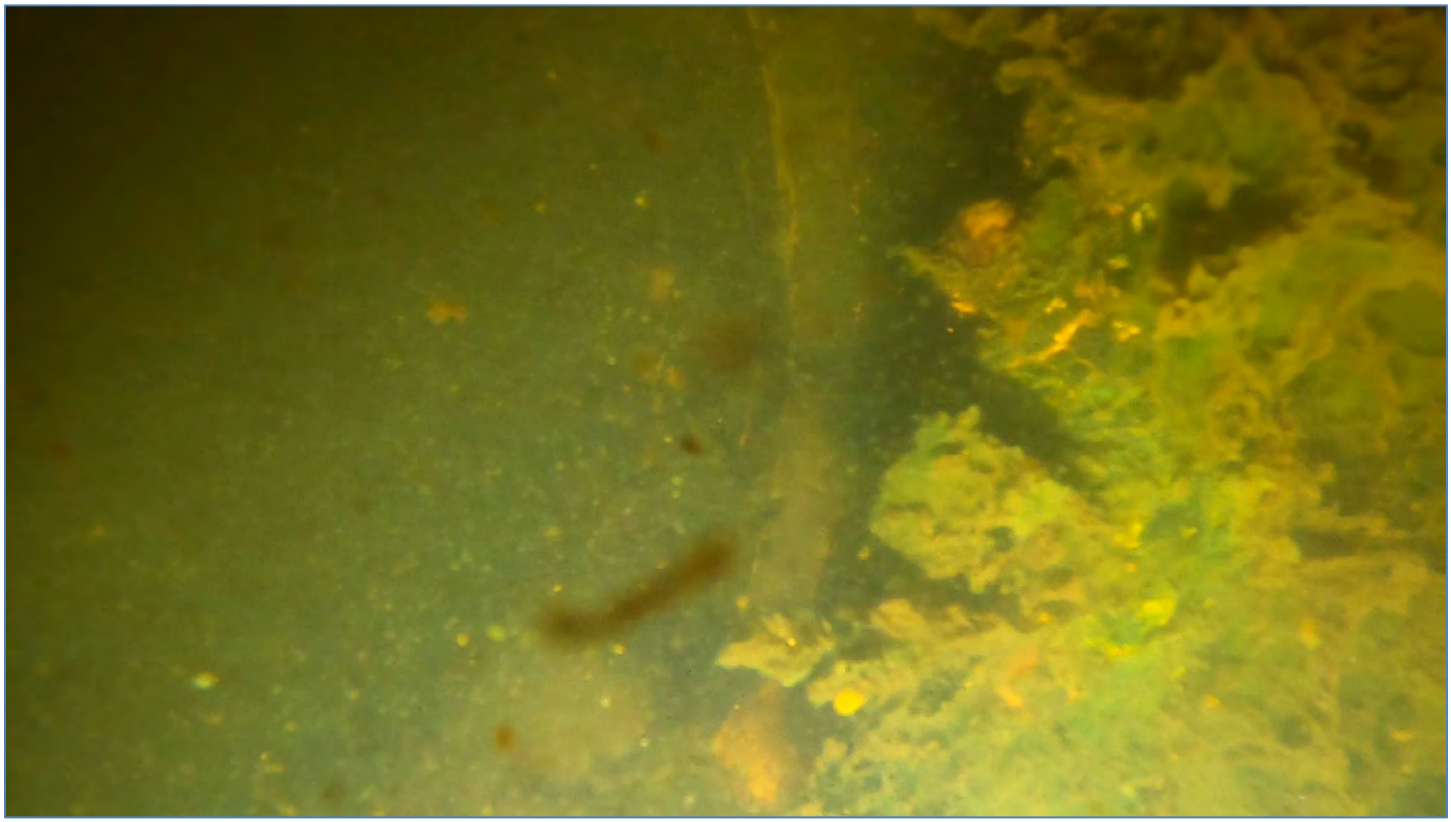


Figure 36 - Exterior Valve 1 fully open, note seat facing

Figure 37 - Interior Sluice Gate 1

Figure 38 - Bottom of Interior Sluice Gate 1 looking upstream through intake

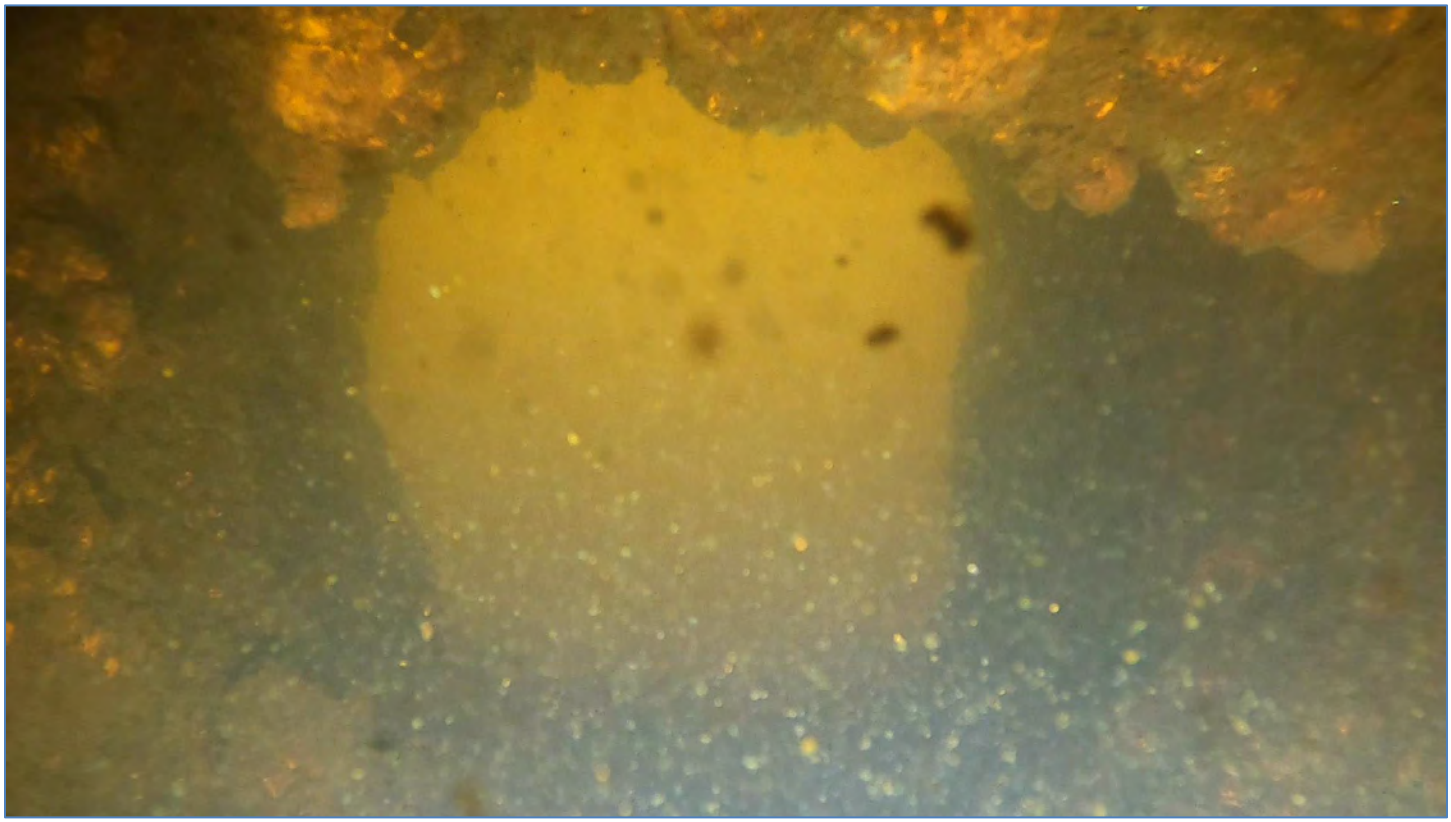


Figure 39 - Interior Sluice Gate 1 - 3/4 open

Intake No. 2

Condition Rating: **Critical**

Description:

Intake No. 2 is located on the middle of the upstream tower face.

The invert is 13’ 6” below normal pool and is controlled by a 16” diameter non rising sluice gate on the exterior and a 16” diameter rising stem sluice gate on the interior. The effective opening of the intake was measured to be 15 inches internal diameter.

Figure 40 - Intake 2 Inner Valve operator

The diver reported significant corrosion on all surfaces. The inner sluice gate appears to be bolted directly to the concrete tower face. The valve was found in the ½ open position as reported by the diver and indicated by the amount of stem above the operator. The valve is controlled by a hand wheel operator. A mild steel stem travels down the tower interior to the sluice gate. The stem is heavily corroded at the waterline.

The exterior valve appeared to be shut. The diver could not reach the gate slide on the exterior face due to the trash rack but looking upstream from inside the tower the valve appears closed. It is a non-rising stem sluice gate. The top portion of the metal stem was missing and not observed through the hole in the operating floor. A portion of the stem was visible below the water surface and is heavily deteriorated. A section of the stem was also found broken off and laying beside the valve.

Field Measurement:

Operating floor to valve invert = 17’

Interior Wall Face to stem centerline = Approx. 6”

Stem Diameter = 1-1/8”

Figure 41 - Exterior Valve Hole in Operating Floor, stem missing

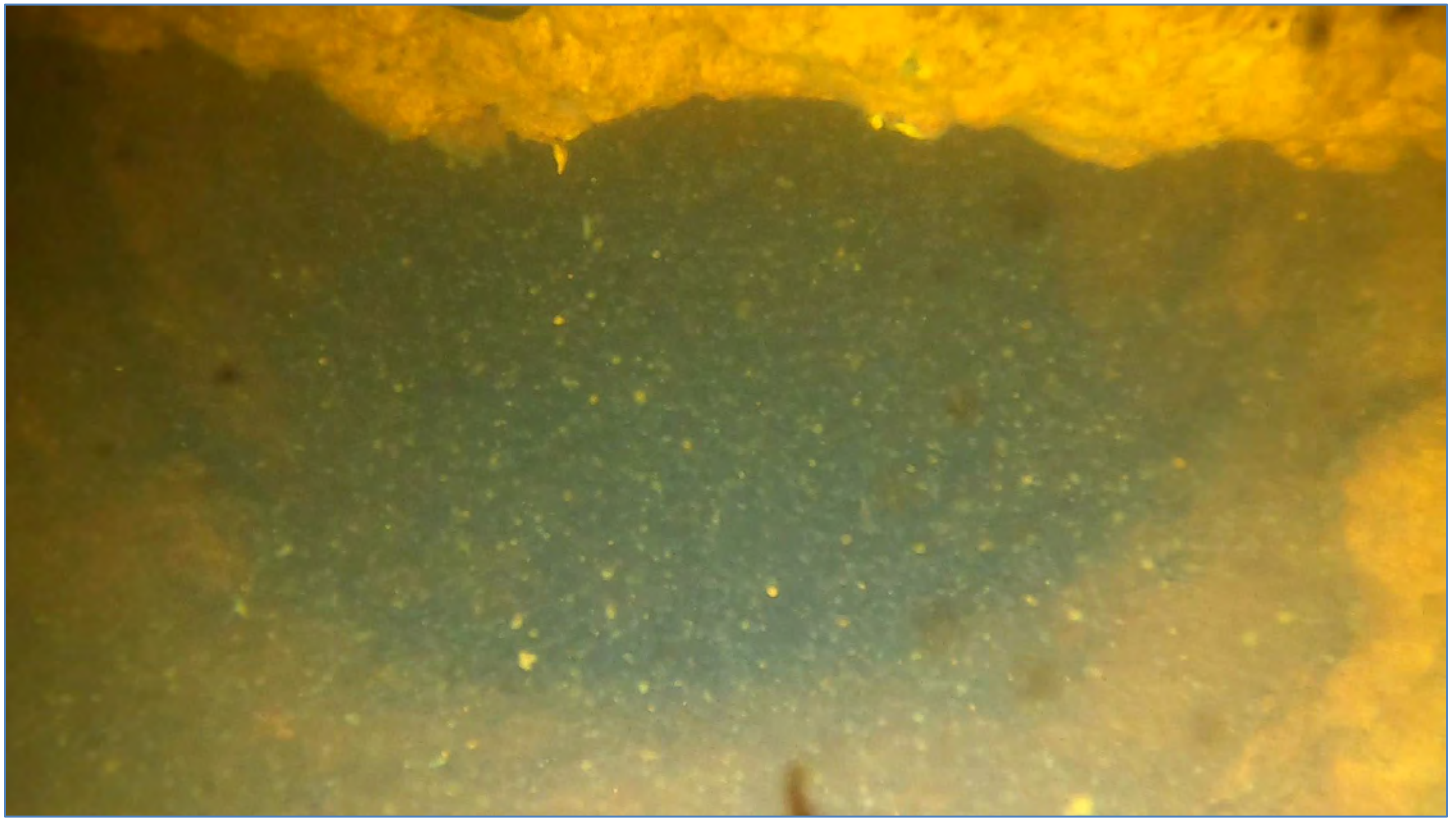


Figure 42 - Interior Valve Inlet 2, looking upstream through 1/2 open valve

Figure 43 - Stem connection into interior valve 2

Figure 44 - Stem for interior valve 2 heavily corroded.

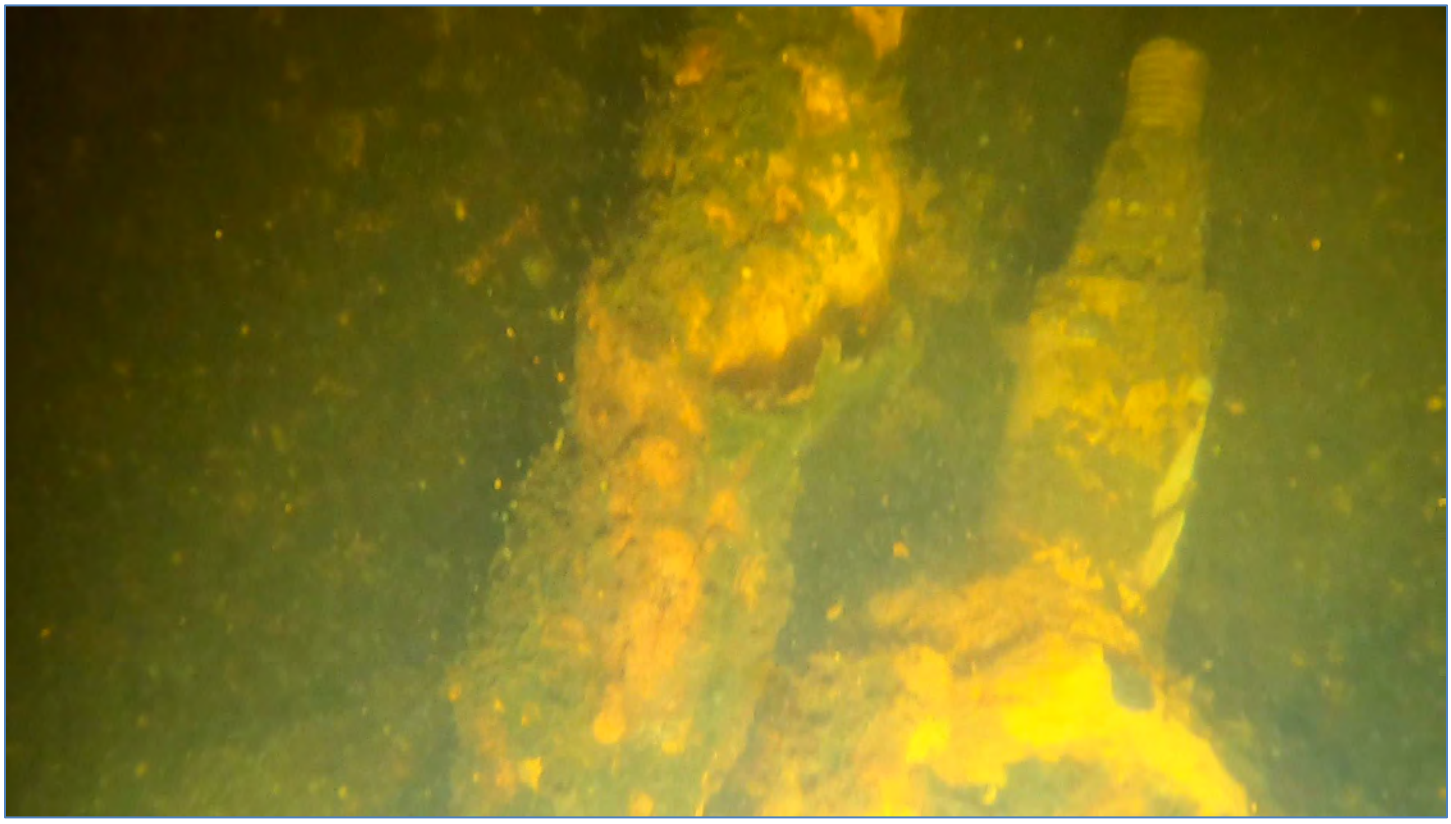


Figure 45 - Outer Valve, stem disconnected and leaning beside valve

Intake No. 3

Condition Rating: **Critical**

Description:

Intake No. 3 is located on the right side of the upstream tower face.

The invert is 20’ below normal pool and is controlled by a 16” diameter non rising sluice gate on the exterior and a 16” diameter rising stem sluice gate on the interior. The effective opening of the intake was measured to be 15 inches internal diameter.

Figure 46 - Interior Operator on Intake 3

The diver reported significant corrosion on all surfaces. The inner sluice gate appears to be bolted directly to the concrete tower face. The valve was found in the closed position as reported by the diver and indicated by the amount of stem above the operator. The valve is controlled by a hand wheel operator. A mild steel stem travels down the tower interior to the sluice gate. The stem is heavily corroded at the waterline and appears bent towards the tower wall. This is likely from over closing at some point in the past.

The exterior valve was shut as well. It is a non-rising stem sluice gate. The top portion of the metal stem was missing and not observed through the hole in the operating floor. The valve body is heavily deteriorated, however its condition improved slightly at deeper depths. The invert is roughly 12” above the lake bottom sediment.

Field Measurement:

Operating floor to valve invert = 23’ 6”

Interior Wall Face to stem centerline = Approx. 6”, however bent in several areas.

Stem Diameter = 1-1/8”

Figure 47 - Intake 3

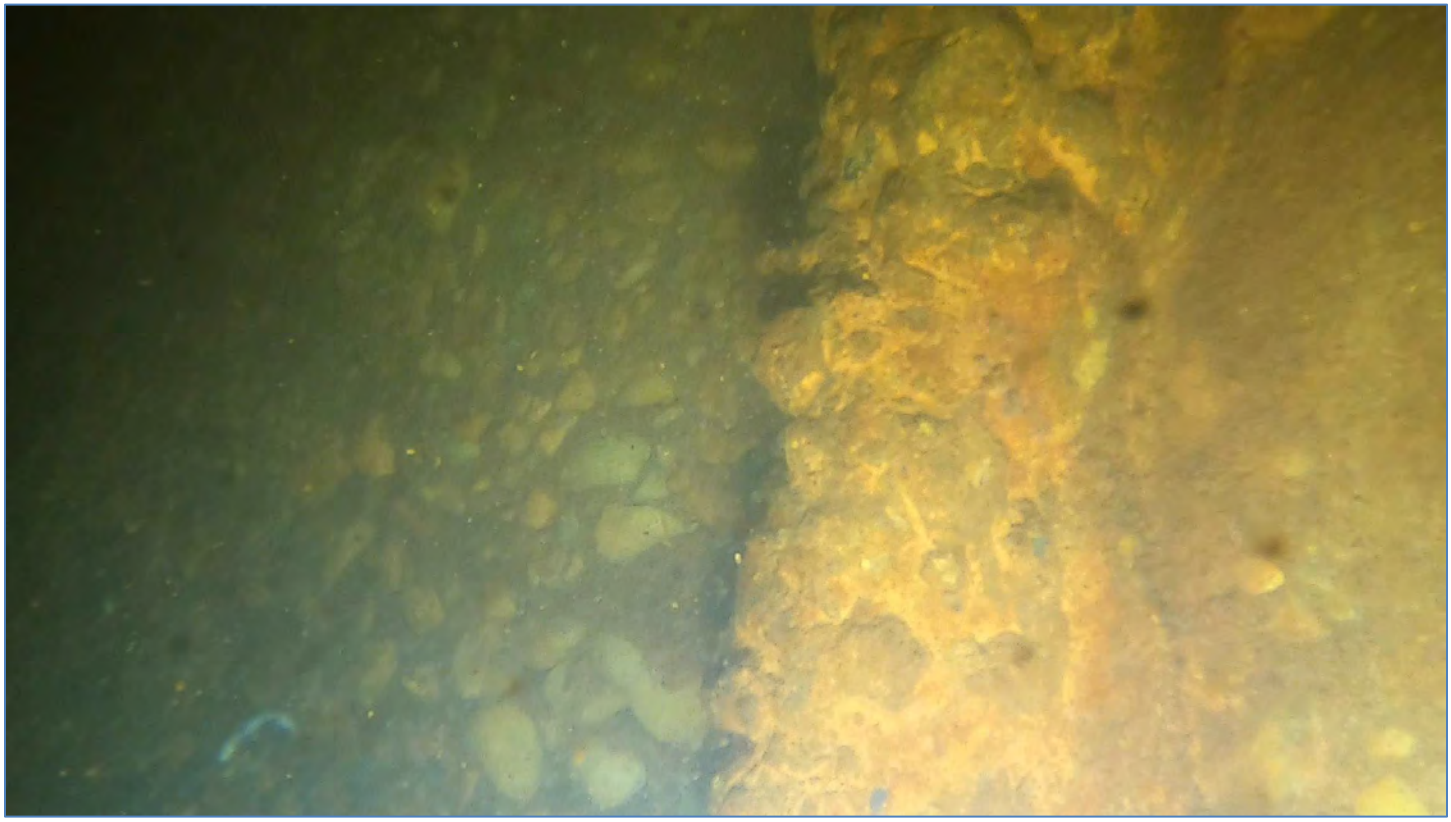


Figure 48 - Interior Valve Stem bent towards upstream tower face

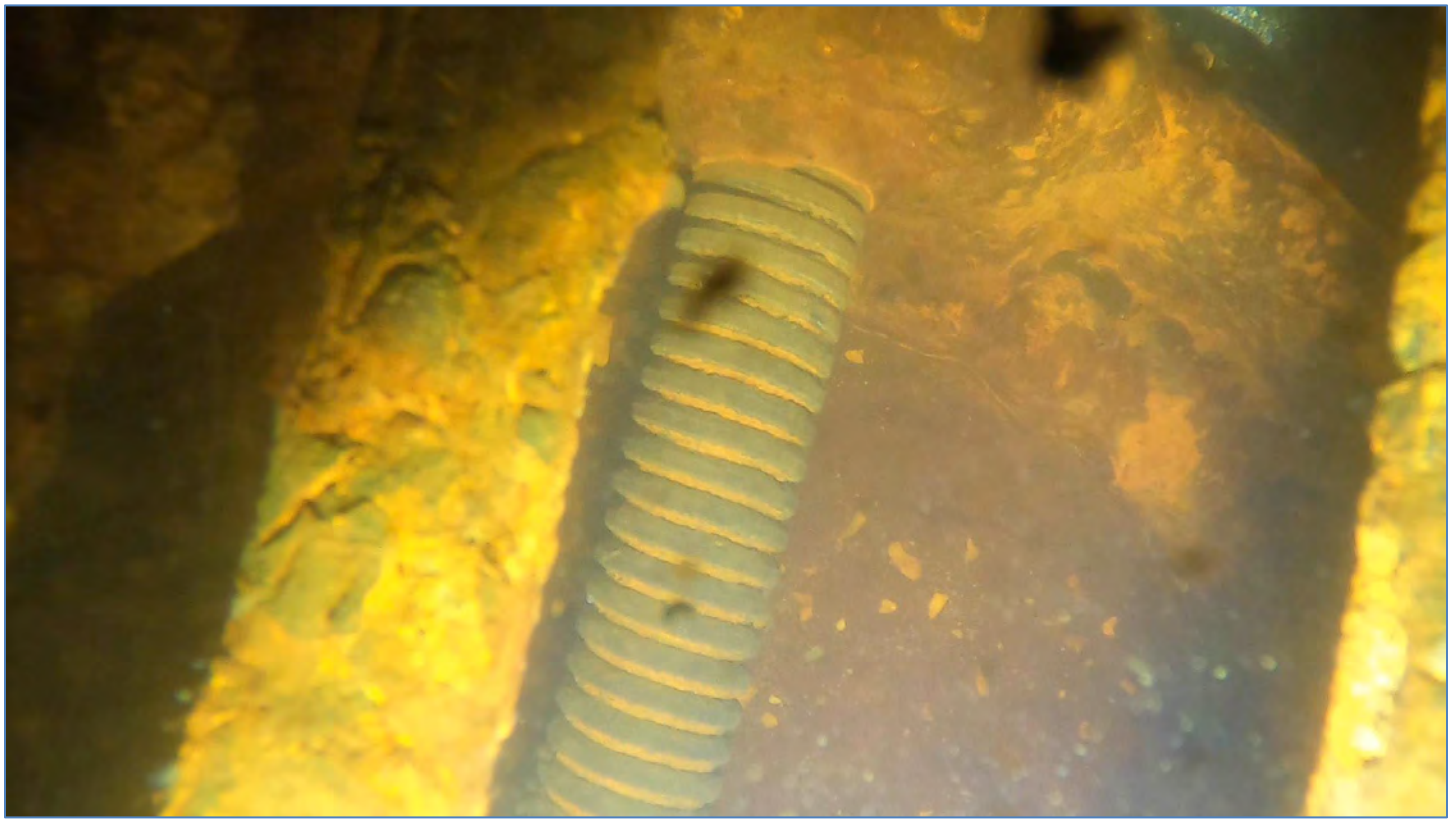


Figure 49 - Exterior Valve 3 threaded stem connection at valve

Figure 50 - Exterior Valve 3 thrust nut connection

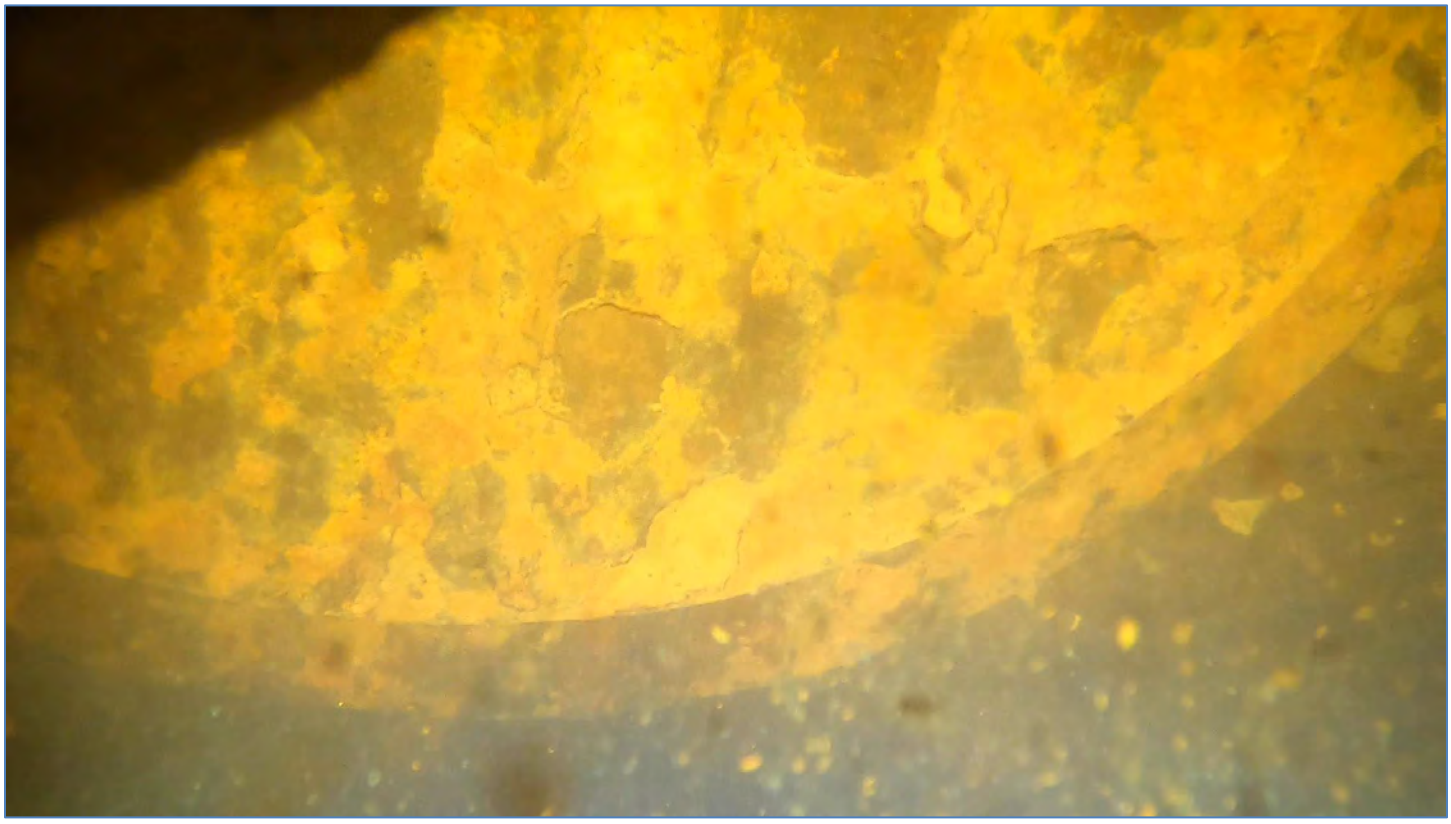


Figure 51 - Exterior Valve 3, Gate slide closed

Valve 4 – 24" Bottom Drain

Condition Rating: **Critical**

Description:

Valve 4 is a 24" diameter gate valve located at the bottom of the tower. The valve is bolted in line with the 24" water supply line. This valve serves as the low-level drain mechanism for the dam. The invert is approximately 25' below normal pool, which is also the invert of the water supply pipe. The 24" pipe travels upstream from Gate 4 through the upstream tower wall into the lake. It is unclear if the inlet to the low-level drain is at the bottom of the exterior tower face or the pipe travels out into the lake.

Based on depth measurements at the exterior tower face when compared to the bottom drain invert, the inlet is buried in 3' of sediment.

Gate 4 is controlled by a large handwheel operator located on top of the tower. A position indicator is built into the side of the operator pedestal. The indicator shows the gate to be ¼ open. The diver was not able to confirm the position of the valve because it is a self-contained bonneted inline valve. A mild steel stem travels down from the operator to the gate valve. The stem is broken at the waterline and heavily corroded below the water level. The stem travels down to a system of gears. The stem is offset to the left of the gate valve/water supply line centerline.

Figure 52 - 24" Bottom Drain Operator

The sluice was not operated due to the sediment levels around the tower and the fact the stem was broken.

Field Measurement:

Operating floor to valve invert = 28' 6"

Stem Diameter = 1 3/4"

Figure 53 - Gate 4 Handwheel

Figure 54 - Gate 4 Operator Pedestal, note ¼ open position

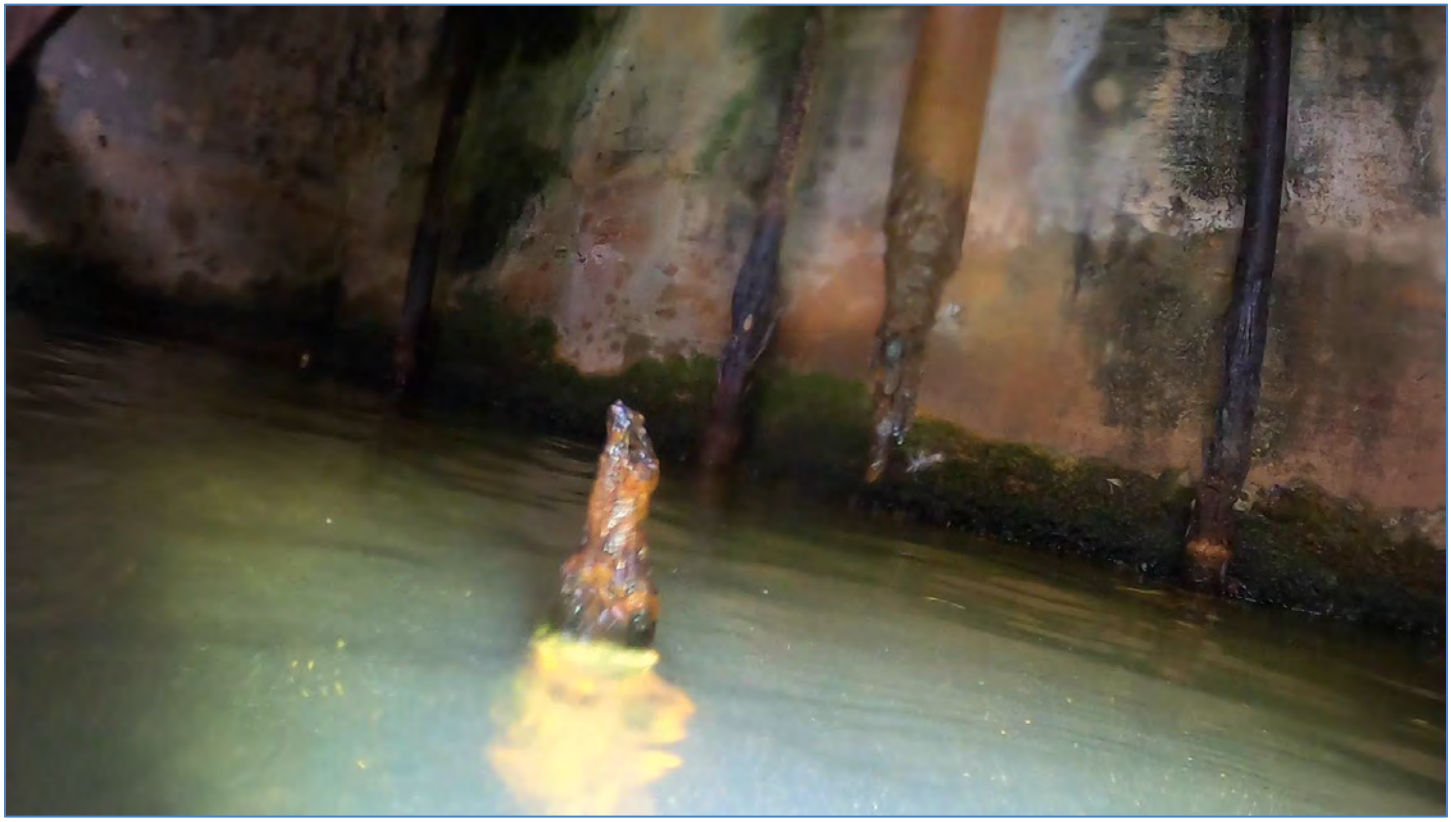


Figure 55 - Gate 4 Stem Broken at waterline

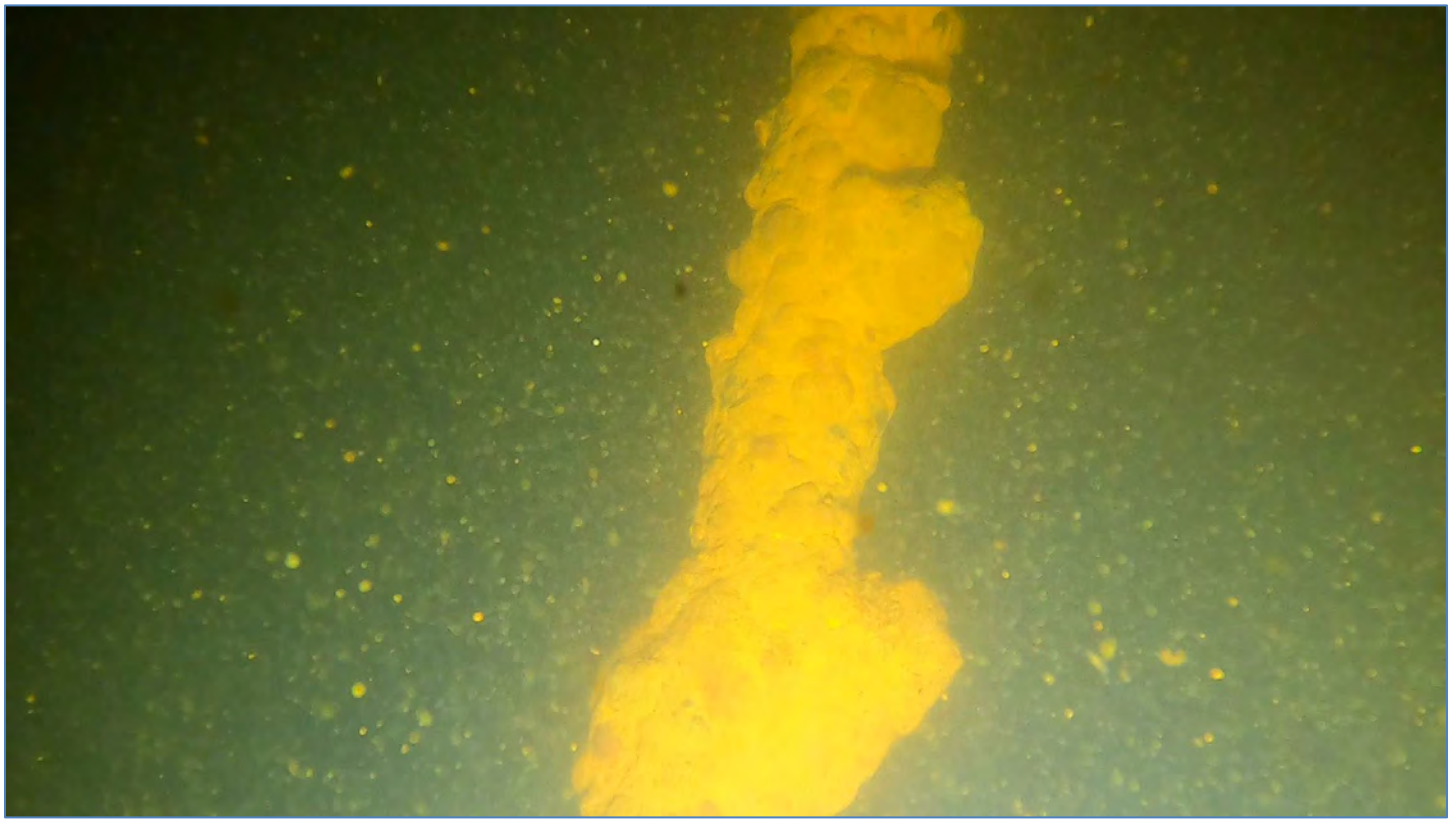


Figure 56 - Gate 4 stem underwater, note accumulation

Figure 57 - Stem connection into bevel gear

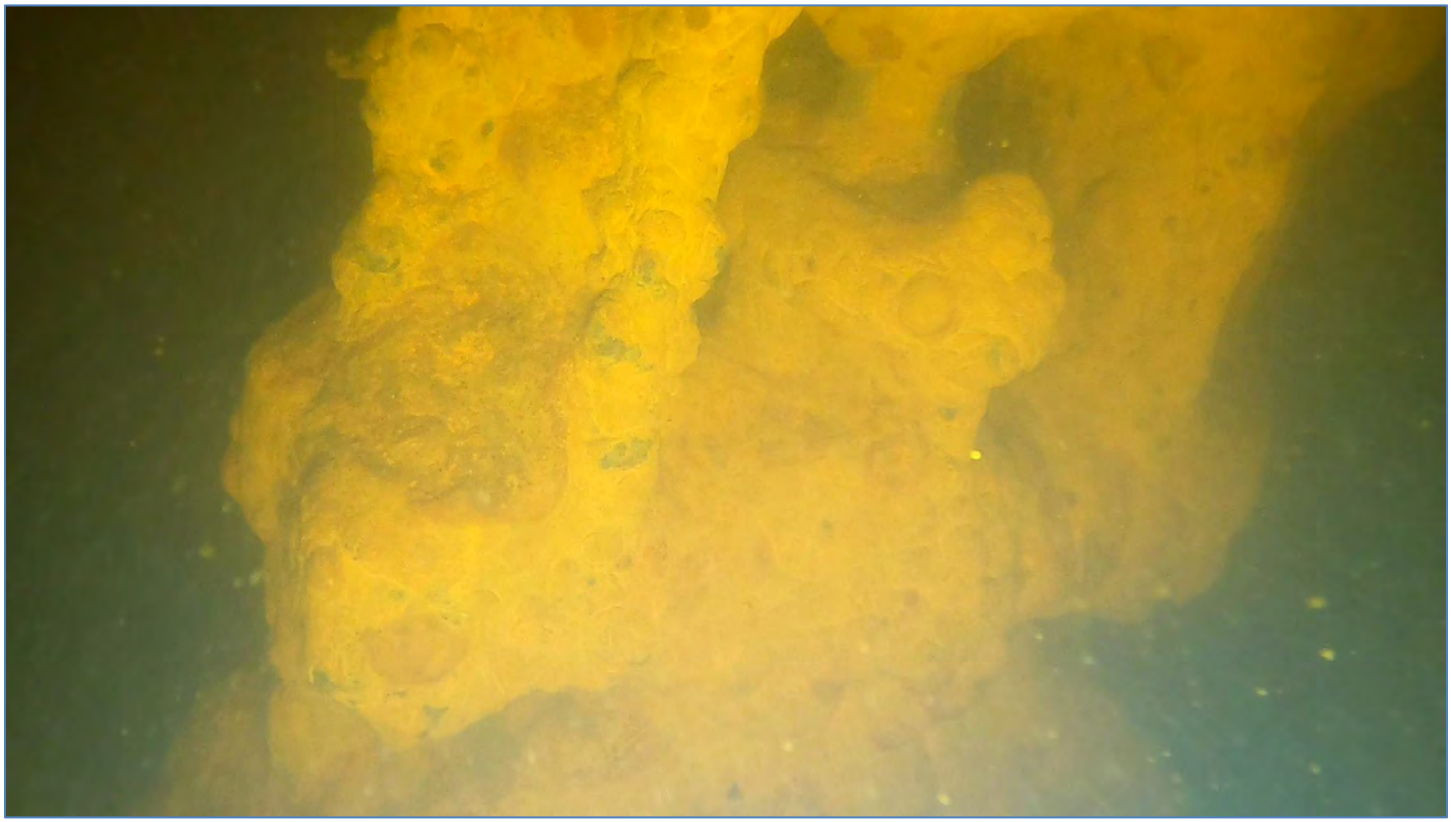


Figure 58 - Stem Connection into Gate Valve, located above bonnet

Figure 59 - Gate 4 and Gate 5

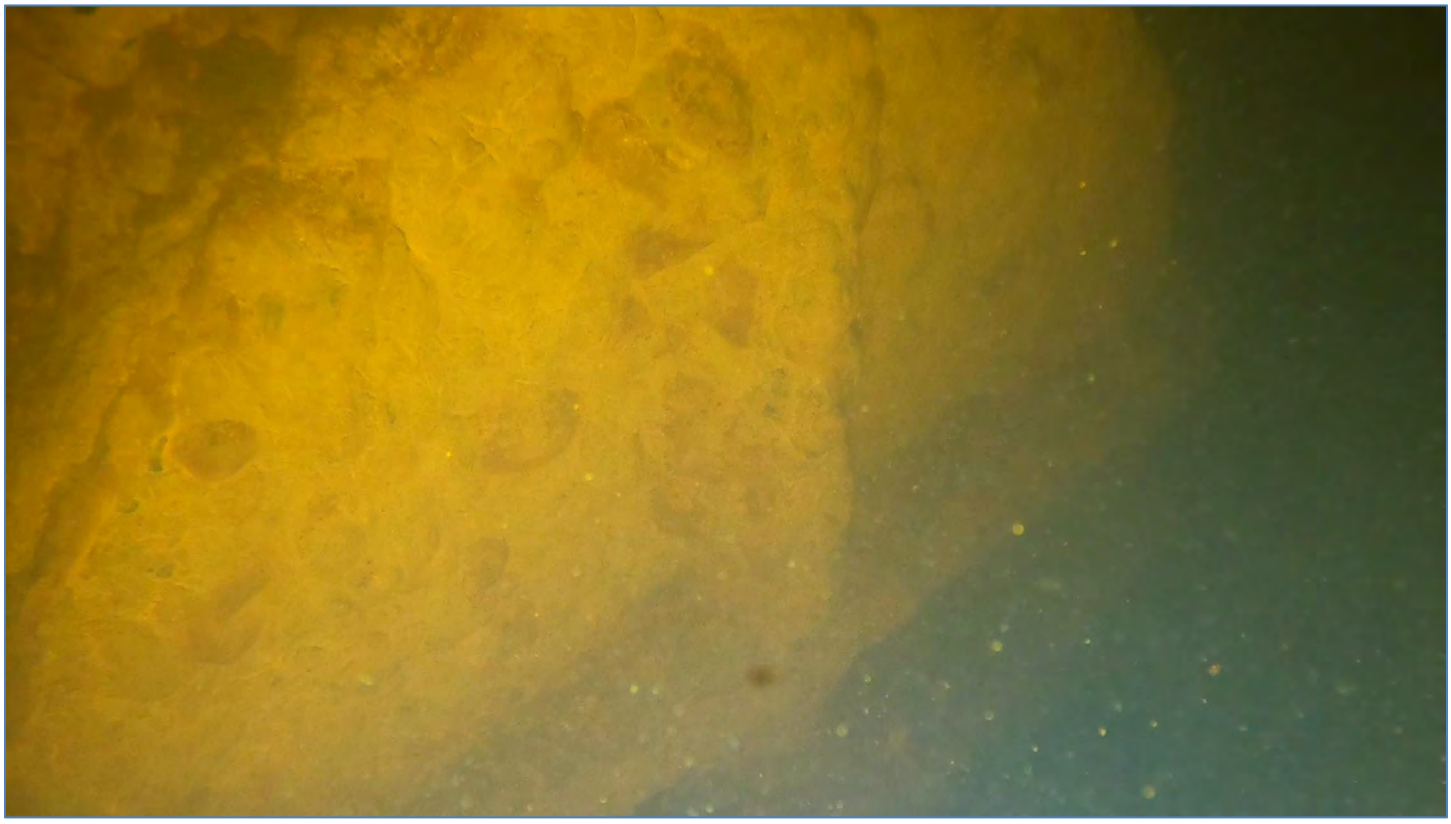


Figure 60 - Gate 4 Bonnet

Valve 5 – Water Supply Line Control Valve

Condition Rating: **Poor**

Description:

Valve 5 is a 24" valve located just downstream of the 24" low level drain. This valve controls water flow from the tower into the 24" water supply line that travels downstream. The invert is approximately 21' below normal pool.

The valve is unique in dam/water intake construction and operates similar to a sink/tub drain. The valve/pipe connection resembles a TEE fitting that has a flange-by-flange connection in line with the 24" water supply pipe. The top of the TEE connection is the valve component itself. The gate slide sits horizontally over the opening and travels vertically upwards to open and downwards to close. The slide is attached to a threaded stem that travels vertically within a self-contained frame.

The valve is controlled by a hand wheel operator with position indicator on the side of the pedestal. A mild steel stem extends through the operating tower floor, turns 90 degrees, then 90 degrees again before traveling straight down to the valve. A section of metal channel extends across the middle of the tower to support a stem guide.

Figure 61 - Gate 5 Operator, note pedestal indicator ¼ open

The valve was found in the fully closed position as reported by the diver; however the pedestal indicated the valve was open ¼.

The diver reported heavy marine growth and corrosion on all surfaces. Sections of the stem were missing 50% of their original profile, however no areas were reported to be broken.

Field Measurement:

Operating floor to valve invert = 24' 6"

Stem Diameter = 1-3/4"

Figure 62 - Gate 5 Pedestal Markings

Figure 63 - Gate 5 Stem, Guide, and metal support

Figure 64 - Gate 5 stem through operator floor

Figure 65 - 90-degree stem transition

Figure 66 - Metal Support

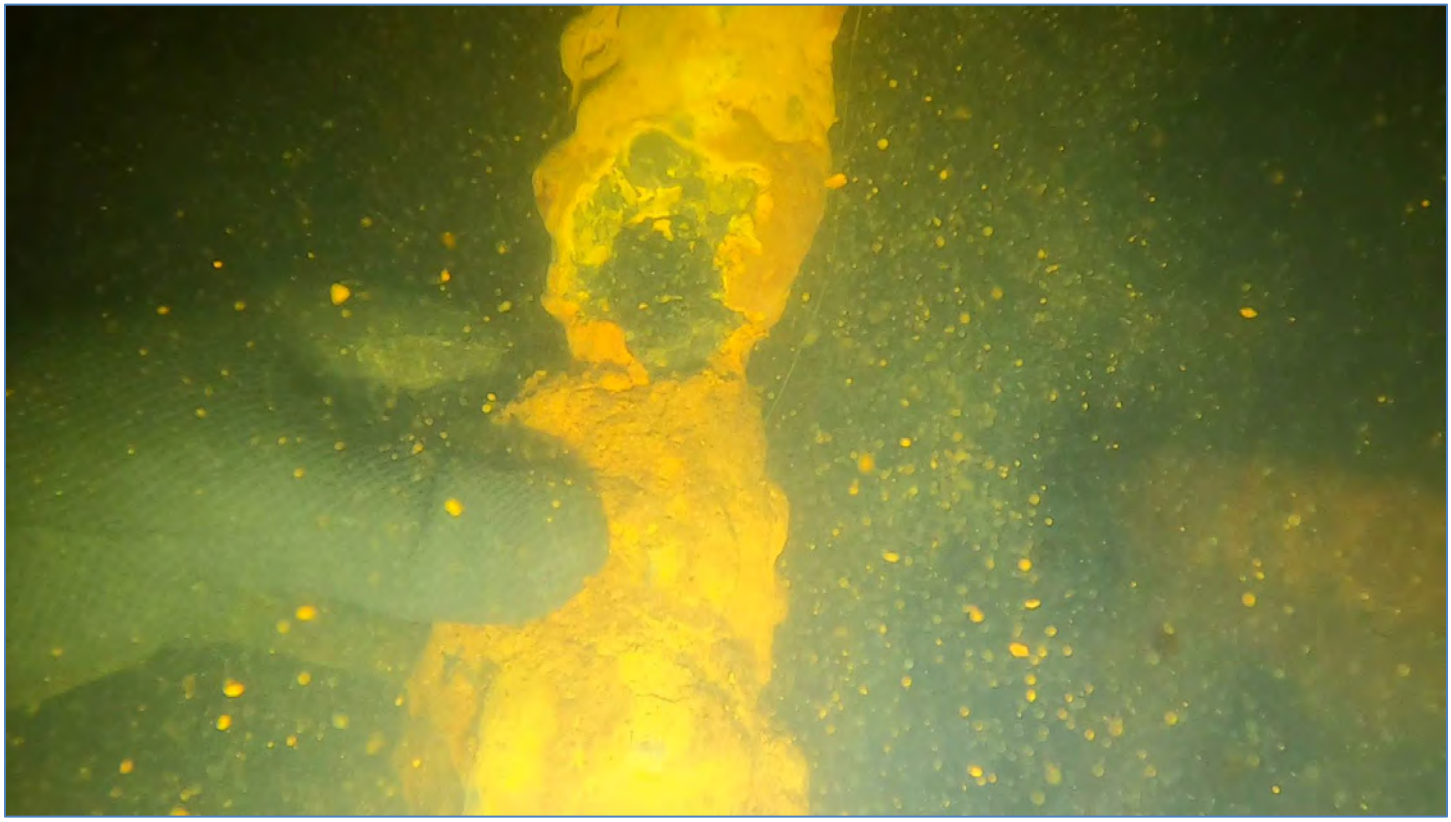


Figure 67 - Gate 5 stem several feet above gate frame, note deterioration

Figure 68 - Stem connection into gate operator

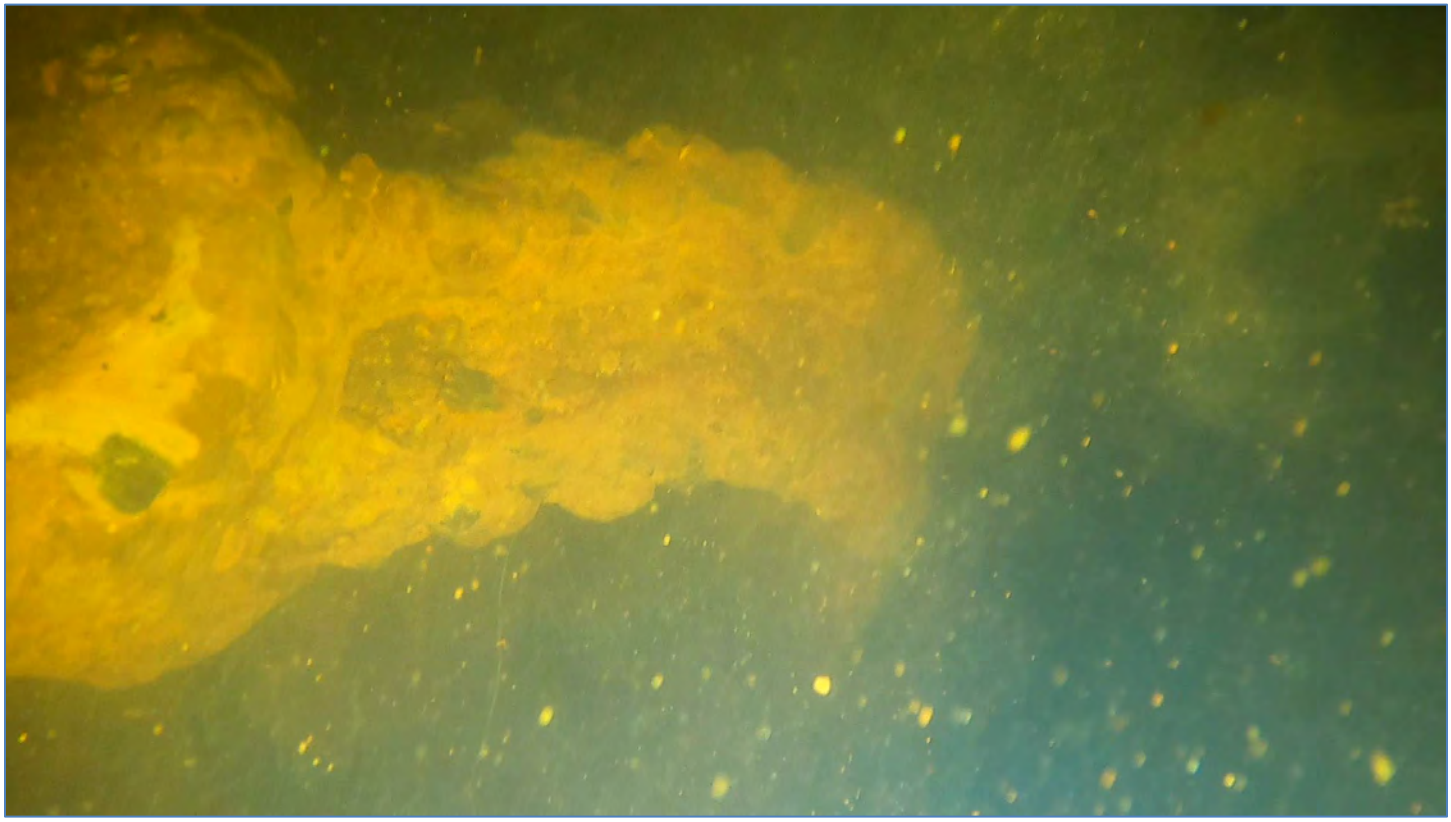


Figure 69 - Gate 5 yoke or frame

Figure 70 - Threaded stem section extends down past top gate yoke

Figure 71 - Threaded stem transition into Gate Slide or Top

Figure 72 - Top of Gate 5 slide

Outfall & Plunge Pool Area

Condition Rating: **Fair**

Description:

The 24" diameter water supply pipe noted in the bottom of the control tower runs directly through the tower from upstream to downstream. Based on the trajectory of the pipe from the tower, crews determined the discharge end was likely in the plunge pool at the base of the dam.

A crewmember got into the small pool at the toe of the dam and was able to confirm a roughly 24" metal pipe projecting through a concrete end wall. One to two inches of sediment was noted in the pipe, but overall, the pipe was open. Roots and vegetation were growing into the pipe. The top of the pipe was under roughly 12 inches of water. The downstream channel appears to be much higher than when originally installed, likely due to sediment build-up.

A valve box was observed roughly 15' upstream of the discharge end of the pipe. The valve box was offset from the water line by several feet. It is unclear if this is due to the valve box leaning or because of an offset valve configuration, such as a butterfly valve. No operating nut was observed down into the valve box.

The inspector stuck a 20' long pole upstream into the 24" pipe and no obstructions were encountered. The pole extended past the location of the valve box indicating this box is either not associated with the 24" line or the valve is open.

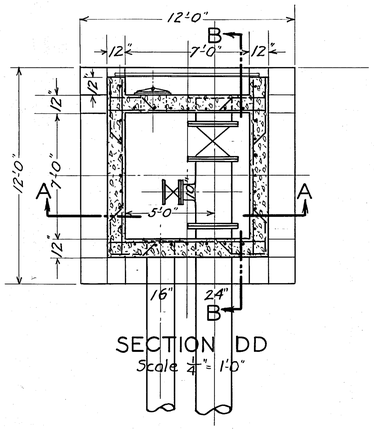
Figure 73 - Top of Dam looking downstream

Figure 74 - Discharge end of 24" Water Line

Figure 75 - Crewmember cleaning out and inspecting discharge end of 24" water line

Figure 76 - Top of Water Line Valve Box

Figure 77 - Looking down into valve box



SECTION DD
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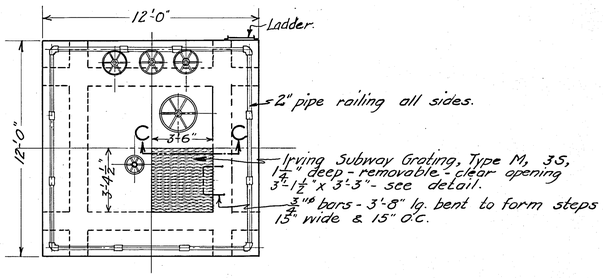

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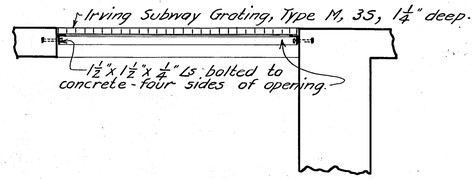

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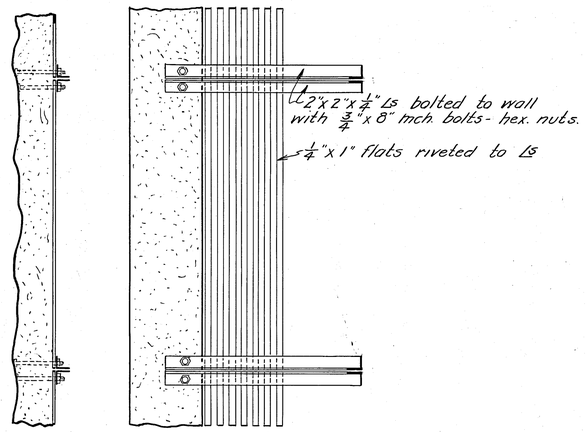

DETAIL OF SCREEN
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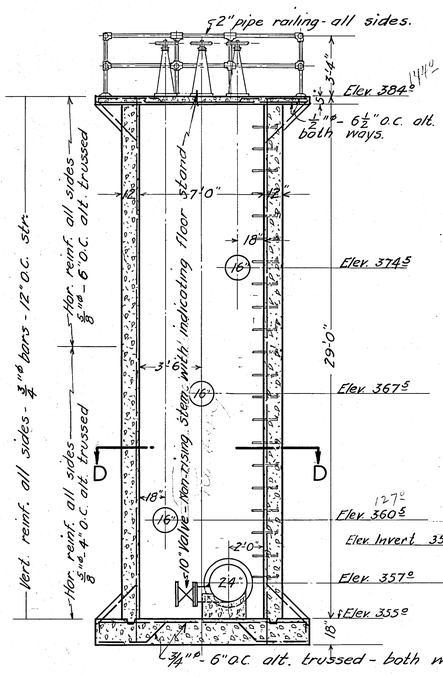

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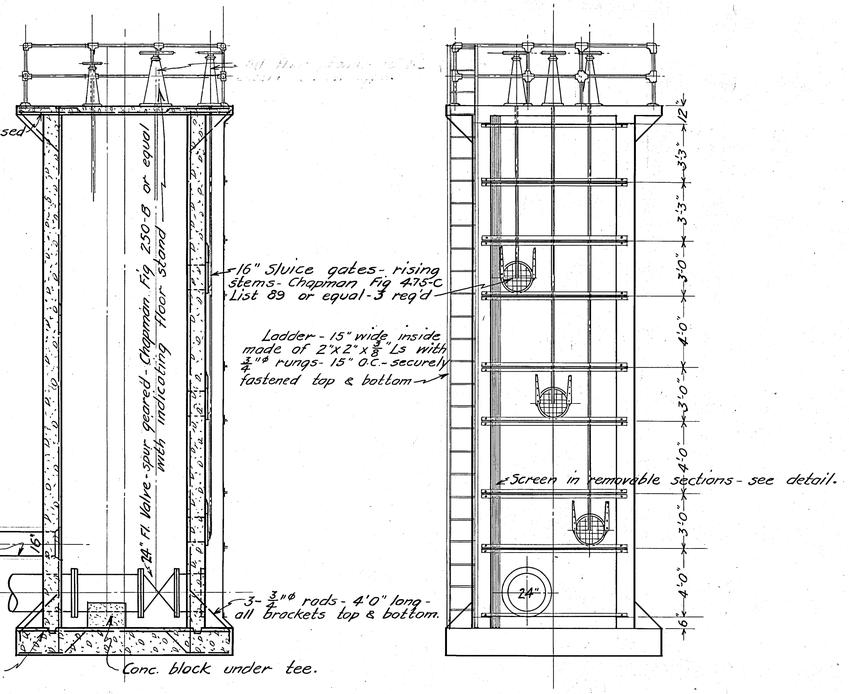

SECTION BB
Scale $\frac{1}{4}$"=1'-0"

UPSTREAM ELEVATION
Scale $\frac{1}{4}$"=1'-0"

SOUTHERN PINES, N.C.
WATERWORKS IMPROVEMENTS

GATE SHAFT
PLANS & SECTIONS

Scale $\frac{1}{4}$"=1'-0" July 1924

OFFICE OF
GILBERT C. WHITE CO.
CONSULTING ENGINEERS
DURHAM N.C.

23-10

PHILLIPS