CONTRACT DOCUMENTS

FOR

Geneva & Division 22 Reservoirs
Impressed Current Cathodic Protection Systems

(DISTRICT PROJECT #C2013)

Table of Contents

Lake Whatcom Water & Sewer District
1220 Lakeway Drive
Bellingham, WA 98229
(360) 734-9224, (360) 738-8250 Fax

Geneva & Division 22 Reservoirs
Impressed Current Cathodic Protection Systems
District Project #C2013

Request for Bid

Lake Whatcom Water & Sewer District
1220 Lakeway Drive
Bellingham, WA 98229
(360) 734-9224, (360) 738-8250 Fax

INSTRUCTIONS

Lake Whatcom Water and Sewer District ("District") has estimated the Work to be less than $50,000 and therefore does NOT need to comply with formal bidding procedures set forth in RCW 57.08.050. Instead, the District has chosen to solicit bids from contractors listed on the MRSC Small Works Roster for "Facility Construction, Repair and Maintenance" and subcategory "Cathodic Protection Installation and Maintenance" to perform the Work as defined in this Request for Bid.

The District intends to contract with an experienced, qualified Contractor for the complete and professional design and installation of two (2) impressed current cathodic protection systems for the interior submerged surfaces of two (2) steel water storage tanks. The work generally consists of the system design, installation, startup, training and one-year warranty inspection and reports. The District intends to execute a Small Works Contract with the Contractor that provides the best bid price for the defined Work. Lake Whatcom Water and Sewer District reserves the right to accept or reject any or all bids and to waive informalities or irregularities.

A non-mandatory pre-bid meeting will be held on Wednesday, September 2, 2020, 1:00 P.M. at the Geneva Reservoir (1010 Lakeview Street, Bellingham, WA). In accordance with CDC and State requirements, face masks are required and 6-foot social distancing from all persons will be enforced.

The Request for Bid includes the Contract Documents as listed on the Table of Contents.

Complete the Bid Proposal form and submit by email (kristin.hemenway@lwwsd.org), mail (1220 Lakeway Drive, Bellingham, WA 98229), or to the District Office using the exterior payment slot. The District will begin evaluation of bids on September 9, 2020 and select a contractor soon after. ***Bids will only be accepted from contractors listed on the above-mentioned small works roster by September 8, 2020.***

For questions on the project scope and bid process, contact Kristin Hemenway at 360-734-9224.

Geneva & Division 22 Reservoirs
Impressed Current Cathodic Protection Systems
District Project #C2013

Name of Firm _____

BID PROPOSAL (Bid Submittal Page 1 of 2)

SCHEDULE A (BASE BID):

Item	Description	Quantity	Unit	Unit Price	Amount
1	Geneva Reservoir Impressed Current Cathodic Protection System	1	LS		
1	Division 22 Reservoir Impressed Current Cathodic Protection System	1	LS		
				Total Quote:	**$**

(do not include Washington State Sales Tax)

Time for Completion

The undersigned hereby agrees to substantially complete all the Work (and accepted alternates**) within 90 calendar days** after the date of Notice to Proceed; and to achieve Final Completion within **10 calendar days** of Substantial Completion.

Work Window Limitation Seasonal clearing activity limitations established by Whatcom County Code 20.51.410 are in force. Clearing activity, which includes trench excavation/backfill and other land disturbance, that will result in exposed soils exceeding 500 square feet are not permitted from October 1 through May 31. Whatcom County measures the total project land disturbance area to determine the square footage threshold, not individual work sites or sequential trenching/backfill. **To meet this requirement the contractor must complete all excavation and land disturbance activities on the project between May 31 and October 1, except for the last 500 square feet.**

Receipt of Addenda

Receipt of the following addenda is acknowledged:

Addendum No. ____ Addendum No. ____ Addendum No. ____
Addendum No. ____ Addendum No. ____ Addendum No. ____

Applicable Prevailing Wage Rages

State of Washington prevailing wage rates for this public works project located in Whatcom County may be found at the following website address of the Department of Labor and Industries: https://fortress.wa.gov/lni/wagelookup/prvWagelookup.aspx. Based on the Bid submittal deadline for this project, the applicable effective date for prevailing wages for this project is **August 1, 2020**.

Geneva & Division 22 Reservoirs
Impressed Current Cathodic Protection Systems
District Project #C2013

Name of Firm _____

Non-Collusion Declaration: By signing below, I hereby declare that I, firm, association or corporation has (have) not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action restraining free competitive bidding for this project.

In addition, by signing below I hereby declare that: Within the three-year period immediately preceding the date of the bid solicitation, I, firm, association or corporation has (have) not have been determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

I certify under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

Check One: Sole Proprietorship ☐ Partnership ☐ Joint Venture ☐ Corporation ☐

State of Incorporation, or if not a corporation, State where business entity was formed:

_____

If a co-partnership, give firm name under which business is transacted:

_____

Signed by _____, Official Capacity _____

Print Name _____

Date of Execution _____

Place of Execution _____

** If a corporation, proposal must be executed in the corporate name by the president or vice-president (or any other corporate officer accompanied by evidence of authority to sign). If a co-partnership, proposal must be executed by a partner.*

Address _____

City _____ State _____ Zip Code _____

Telephone _____ FAX _____

State of Washington Contractor's License No. _____

Federal Tax ID # _____ e-mail address: _____

Employment Security Department No. _____

SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA

Following the Bid opening, upon Owner's request, the apparent low Bidder(s) must supply the requested information as identified herein within two (2) business days of request by Owner. Withholding information or failure to submit all the information requested within the time provided shall render the Bid non-responsive.

The Owner will make a determination whether or not the apparent low Bidder is responsible, taking into account all the information submitted by the apparent low Bidder(s) in response to this request. The Owner will notify the Bidder of its determination in writing, including the reasons for its determination. Within three (3) days after receipt of the determination, if the Bidder is determined not responsible, the Bidder may withdraw its Bid or request an appeal hearing. The Bidder may also present additional information pursuant to RCW 39.04.350 (2)(d). If the Bidder requests an appeal hearing, the Owner will schedule said hearing at a Board of Commissioner meeting, to be heard not later than two (2) weeks after receipt of Bidder's request. The appeal hearing members will be the Board of Commissioners. The Board will issue a Final Determination after reviewing information presented at the appeal hearing. If the Final Determination affirms that the Bidder is not responsible, the Owner will not execute a Contract for the Project with any other Bidder until two (2) business days after the Bidder determined to be not responsible has received the Final Determination. The Final Determination is specific to this Project, and will have no effect on other or future projects.

The following supplemental Bidder responsibility criteria and requested supporting documentation are established for this Project. To be responsible, a Bidder must substantially meet the responsibility criteria established below.

1. Previous Experience

Previous Experience Criterion:

The Bidder should have experience over the most recent past five (5) years with successfully completing public works projects similar in size and complexity to the current Project. The Contractor's Superintendent and Project Manager should also have experience within the past five (5) years successfully managing to completion public works projects of similar size and complexity to the current Project.

Previous Experience Documentation:

□	Experience of Contractor:	Provide a list of public works construction contracts similar in size and complexity your firm has completed in each of the past five (5) years, giving the name of the project, name, address, and phone number of owner, and architect/engineer, contract amount, date of completion, and percentage of the cost of the work performed with your own forces. This information will be used for references.
□	Experience of Designer:	Submit resume and references of the person proposed by the Bidder to design the work. Resume and references should demonstrate Designer has designed public works projects of

		similar complexity and similar size, and successfully completed the project(s) within the last five (5) years.
□	Experience of Superintendent:	Submit resume and references of the person proposed by the Bidder to superintend the work. Resume and references should demonstrate Superintendent has managed public works projects of similar complexity and similar size, and successfully completed the project(s) within the last five (5) years.
□	Experience of Project Manager	Submit resume and references of the person proposed by the Bidder to manage the project. Resume and references should demonstrate Project Manager has managed public works projects of similar complexity and similar size, and successfully completed the project(s) within the last five (5) years.

PERFORMANCE BOND

KNOW ALL PEOPLE BY THESE PRESENTS, that _____ the

CONTRACTOR, hereinafter known as PRINCIPAL, and _____ hereinafter known as SURETY, are held and firmly bound to the Lake Whatcom Water and Sewer District hereinafter known as

OWNER, in the penal sum of _____

_____ dollars (including Washington State Sales Tax) for the payment of which sum well and truly to be made, we do jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the PRINCIPAL entered into a Contract

with the OWNER dated the _____ day of_____ _____,20____ to construct the

(*Project Title*): _____, and which Agreement is on file at the OWNER's office and by this reference is made a part hereof.

WHEREAS, said PRINCIPAL is required under the terms of said Agreement to furnish a bond for the faithful **performance** of said Agreement:

NOW, THEREFORE, if the Principal shall well, truly, and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract, the SPECIFICATIONS accompanying the Contract, or to the WORK to be performed under the Contract shall in any way affect its obligation on this BOND, and waives notice of any change, extension of time, alteration or addition to the terms of the Contract or the WORK performed. The Surety agrees that modifications and changes to the terms and conditions of the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on this BOND and notice to Surety is not required for such increased obligation.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, the duly authorized officers of PRINCIPAL and of SURETY execute this instrument in three counterparts, each one of which shall be deemed an original, this the_____ day of_____, 20____.

_____	_____
PRINCIPAL	SURETY
_____	_____
By	By
_____	_____
Title	Title
_____	_____
Address of PRINCIPAL	Address of SURETY

Note: Date of Bond must not be prior to date of Contract. If PRINCIPAL is a Partnership, all Partners should execute bond. Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Washington. A power of attorney must be provided which appoints the SURETY's true and lawful attorney-in-fact to make, execute, seal and deliver this bond.

PAYMENT BOND

KNOW ALL PEOPLE BY THESE PRESENTS, that _____ ____ the

CONTRACTOR, hereinafter known as PRINCIPAL, and _____ hereinafter known as SURETY, are held and firmly bound to the Lake Whatcom Water and Sewer District hereinafter known as

OWNER, in the penal sum of _____

_____ dollars (including Washington State Sales Tax) for the payment of which sum well and truly to be made, we do jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the PRINCIPAL entered into a Contract

with the OWNER dated the _____ day of_____, 20____ to construct the

(*Project Title*): _____, and which Agreement is on file at the OWNER's office and by this reference is made a part hereof.

WHEREAS, said PRINCIPAL is required under the terms of said Agreement to furnish a bond for the faithful **payment** of all laborers, mechanics, subcontractors, materialmen and all persons who shall supply said Principal or said subcontractors with provisions and supplies for the carrying on of work under said Contract:

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said Contract and pay all laborers, mechanics, subcontractors, materialmen and all persons who shall supply said Principal or said subcontractors with provisions and supplies for the carrying on of such work during the original term of said Contract and any extension thereof that may be granted by the Lake Whatcom Water and Sewer District, and during the life of any guaranty required under the Contract and shall well and truly perform and fulfill the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract and pay all laborers, mechanics, subcontractors, materialmen and all persons who supply said Principal or said subcontractors with provisions and supplies for the carrying on of such modifications which may hereafter be made, then this obligation to be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract, the SPECIFICATIONS accompanying the Contract, or to the WORK to be performed under the Contract shall in any way affect its obligation on this BOND, and waives notice of any change, extension of time, alteration or addition to the terms of the Contract or the WORK performed. The Surety agrees that modifications and changes to the terms and conditions of the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on this BOND and notice to Surety is not required for such increased obligation.

PROVIDED, FURTHER, this Bond is executed pursuant to RCW Chapter 39.08.

IN WITNESS WHEREOF, the duly authorized officers of PRINCIPAL and of SURETY execute this instrument in three

counterparts, each one of which shall be deemed an original, this the_____ _____ day of_____,

20_____.

_____	_____
PRINCIPAL	SURETY
_____	_____
By	By
_____	_____
Title	Title
_____	_____
Address of PRINCIPAL	Address of SURETY

Note: Date of Bond must not be prior to date of Contract. If PRINCIPAL is a Partnership, all Partners should execute bond. Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Washington. A power of attorney must be provided which appoints the SURETY's true and lawful attorney-in-fact to make, execute, seal and deliver this bond.

LAKE WHATCOM WATER AND SEWER DISTRICT
CONTRACT

THIS AGREEMENT is made on **MONTH & DAY**, **2020**, between LAKE WHATCOM WATER AND SEWER DISTRICT ("DISTRICT"), a Washington special purpose district and **NAME OF CONTRACTOR** ("CONTRACTOR").

In consideration of the terms and conditions contained in this Contract and attached to it, the parties agree as follows:

1. PROJECT

Contractor shall do all work and furnish all tools, materials, and equipment for the District's public works project known as **Geneva & Division 22 Reservoir Impressed Current Cathodic Protection Systems (District Project #C2013)** ("Project") in accordance with and as more fully described in the Contract Documents and Project Specifications, attached.

2. WORK

The term Work, as used in this Contract, means the construction and services necessary or incidental to fulfill Contractor's obligations in conformance with this Contract.

3. PROJECT COST

The District shall pay Contractor not to exceed _____ ($_____.____) plus Washington State sales tax of **8.5 %** for a total of _____ _____ $_____.____ ("Project Cost"), subject to the terms herein. The Project Cost includes the cost of all Work, materials, fees, and expenses required for completion of the Project including without limitation labor, materials, overhead, administrative, and permit and regulatory costs, as stated in the Bid Proposal and Attachments hereto, unless otherwise agreed to by the parties in writing.

4. PAYMENT TERMS

The Project Cost shall be payable in the following manner: On or before the 26th day of each month, Contractor shall submit a detailed monthly pay application for all services provided describing in reasonable and understandable detail the Work completed during the previous month, the progress of the Work, and the requested payment in an amount proportionate to the Work completed. The District shall issue a warrant for payment of approved Work contained in the application within thirty (30) days after approval of the pay application, pursuant to the terms below:

a. In cases of single payment, the District shall make payment only after all appropriate releases are submitted.

b. In cases of multiple payments, the District shall retain monies as required by RCW 60.28 and pay the retainage as provided therein.

5. CHANGE IN THE WORK

Change in the Work, Project Cost, or Contract Time shall be incorporated into the Contract through the execution of Change Orders signed by the Contractor and District.

a. **Change Order Processing**. The District may at any time order additions, deletions, revisions, or other changes in the Work. The Contractor will prepare and submit a Change Order Proposal to the District for consideration that details changes to the Work, Project Cost or Contract Time. If the District approves the Change Order Proposal it shall be attached to a Change Order form signed first by the Contractor, then by the District.

b. **Changed or Unforeseen Conditions**. During the course of Work the Contractor may discover changed or unforeseen conditions not anticipated by either party. If changed or unforeseen conditions are discovered that might affect the Work, Project Cost, or Contract Time, the Contractor shall immediately inform the District on the day of discovery. If District determines Work must continue, the District will authorize a Field Authorization allowing the Contractor to continue with Work on a time and materials basis not to exceed an estimated amount agreed to onsite by the Contractor and District. The Contractor shall submit detailed labor, equipment, and material cost documentation to the District for review within five (5) business days of the event to the District. If approved by the District, the District will prepare a Change Order form attaching Field Authorization with backup documentation for Change Order Processing. Contractor agrees to 15% overhead and 6% profit charged on Field Authorization labor, equipment, and material costs. Failure to provide Notice and cost documentation under the terms of this Contract constitutes a full and complete waiver of such claim. In no case, shall a claim for equitable adjustment be allowed if submitted after the Project has reached final acceptance by the District.

6. COMPLETION DEADLINE/LIQUIDATED DAMAGES

Contractor shall commence work under this Contract upon receipt of notice to proceed from the District. The Project must be completed no later than **90** calendar days after receipt of notice to proceed. If the Project is not completed by

such date, then, because of the difficulty in computing the actual damages to the District arising from any delay in completing the Project Work, it is agreed by the parties that Contractor shall pay the District liquidated damages as computed below for each calendar day the Work remains incomplete after expiration of the specified completion date. The parties agree that such amount represents a reasonable forecast of the actual damages the District will suffer by failure of the Contractor to complete the Work within the agreed upon time. The execution of this Contract constitutes acknowledgement by the Contractor that the Contractor has ascertained and agrees that the District will actually suffer damages as computed by the following formula:

LD = (0.15*C)/T

Where: LD = liquidated damages per calendar day (rounded to nearest dollar)
C = original Contract Award Amount
T = original Contract Time in calendar days for achieving Substantial Completion

7. WARRANTY

Contractor warrants that all materials and equipment shall be new unless otherwise specified, of good quality, and free from defective workmanship and materials. Contractor further warrants that the Work shall be free from defects in workmanship and material, and shall transfer to the District all written warranties related to the Work performed and equipment installed. The foregoing Contractor's warranty shall remain in effect for one (1) year following final acceptance.

8. PREVAILING WAGES

The Contractor shall pay prevailing wages as required and shall comply with RCW 39.12 and RCW 49.28. Notice of intent to pay prevailing wages and prevailing wage rates for the Project must be posted for the benefit of workers. The Contractor shall submit a statement of intent to pay prevailing wages, approved by the industrial statistician of the Department of Labor and Industries, with its first (or only) pay request. At the completion of the Project, the Contractor and its subcontractors shall also submit Affidavits of Wages Paid to the Department of Labor and Industries for certification. Final payment on the Contract shall be withheld until the District receives certification from the Department of Labor and Industries that prevailing wage requirements have been satisfied.

9. PAYROLL RECORDS

a. In accordance with RCW 39.12.120, each contractor, subcontractor, or employer shall keep accurate payroll records for three years from the date of acceptance of the public works project by the contract awarding agency, showing the employee's full name, address, social security number, trade or occupation, classification, straight and overtime rates, hourly rate of usual benefits, and hours worked each day and week, including any employee authorizations executed pursuant to RCW 49.28.065, and the actual gross wages, itemized deductions, withholdings, and net wages paid, for each laborer, worker, and mechanic employed by the contractor for work performed on a public works project.

b. A contractor, subcontractor, or employer shall file a copy of its certified payroll records using the department of labor and industries' online system at least once per month. If the department of labor and industries' online system is not used, a contractor, subcontractor, or employer shall file a copy of its certified payroll records directly with the department of labor and industries in a format approved by the department of labor and industries at least once per month.

c. A contractor, subcontractor, or employer's noncompliance with this section constitutes a violation of RCW 39.12.050.

10. BONDS

Contractor shall provide performance bond and payment bond for the faithful performance and payment of all its obligations under this Contract and in accordance with RCW 39.08.010. The performance bond shall remain in effect to guarantee the repair and replacement of defective equipment, materials, and workmanship and payment of damages sustained by the District on account of such defects, discovered within one (1) year after final acceptance by the District. In lieu of performance and payment bonds for Contracts up to $35,000, Contractor may authorize the District to retain 50% of the Contract amount for a period of thirty days after the date of final acceptance as provided for under RCW 39.08.010.

11. INDEMNIFICATION

Contractor and its subcontractors shall defend, indemnify, and hold harmless the District, its commissioners, officers, managers, employees, engineers, agents, and volunteers from and against any and all demands, claims, losses, injuries, damages, liabilities, suits, judgment, reasonable attorneys' fees and costs, and other expenses of any kind on account of, relating to, or arising out of Contractor's Work under this Contract, except to the extent such injuries or damages are caused by the negligence of the District. For the purposes of this indemnification, Contractor specifically and expressly

waives any immunity granted under the Washington Industrial Insurance Act, Title 51 RCW. This waiver has been mutually negotiated and agreed to by the parties. If a court of competent jurisdiction determines that this contract is subject to RCW 4.24.115, Contractor's obligation to defend, indemnify, and hold harmless the District, its officers, employees, agents and volunteers shall be limited to the extent of the District's negligence. The provisions of this paragraph shall survive the expiration or termination of this Contract.

12. INSURANCE

Contractor shall obtain, and keep in force during the term of this Contract, insurance policies as follows:

a. **Commercial General Liability**. Limits no less than $1,000,000.00 combined single limit per occurrence and $2,000,000.00 aggregate for personal injury, bodily injury and property damage. Coverage shall be as broad as Insurance Services Office form number (CG 00 01) covering Commercial General Liability.

b. **Automobile Liability Insurance**. Limits no less than $1,000,000.00 combined single limit per accident for bodily injury and property damage. Coverage shall be as broad as Insurance Services Office form number (CA 00 01) covering Business Auto Coverage, symbol 1 "any auto"; or the combination of symbols 2, 8, and 9.

c. **Workers' Compensation**. Coverage shall be at least as broad as Workers' Compensation coverage, as required by the Industrial Insurance Act of the State of Washington, as well as any similar coverage required for this work by applicable Federal Law.

d. **Employer's Liability or "Washington Stop Gap".** Coverage shall be at least as broad as the protection provided by the Workers Compensation policy Part 2 (Employers Liability) or, in states with monopolistic state funds, the protection provided by the "Stop Gap" endorsement to the general liability policy.

e. The insurance policies shall specifically name the District, its elected or appointed officials, officers, employees, and volunteers as insureds with regard to damages and defense of claims arising from (1) activities performed by or on behalf of the Contractor; or (2) products and completed operations of the Contractor; or (3) premises owned, leased, or used by the Contractor.

f. The insurance policies (1) shall state that coverage shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability; (2) shall be primary insurance with regard to the District; and (3) shall state that the District will be given at least 45 days' prior written notice of any cancellation, suspension or material change in coverage.

g. Before commencing work and services, Contractor shall provide to the District a Certificate of Insurance evidencing the required insurance accompanied by endorsements as are necessary to comply with the requirements of this section. The District reserves the right to request and receive a certified copy of all required insurance policies.

h. Any payment of deductible or self-insured retention shall be the sole responsibility of Contractor.

13. JOB SAFETY/HOUSEKEEPING

All Work done shall be done in a manner that minimizes interruptions or inconvenience to the public and/or District staff. All Work shall be carried on with due regard for the safety of the public, and Contractor shall maintain strict compliance with the appropriate provisions relating to control of traffic and pedestrians through work areas as set forth in the Manual on Uniform Traffic and Control Devices (current edition) as adopted by the Washington State Department of Transportation. Property and streets adjacent to the Project site shall be kept free and clear at all times from accumulations of mud, dirt, gravel, rock, and other matter. Contractor will be responsible for daily and final clean up and disposal of refuse, waste and debris produced by its operation. Refuse shall not be permitted to accumulate to the extent that it interferes with free access to the Project site. Should the District determine Contractor is not fulfilling its obligations in this regard, the District reserves the right to take such action as may be necessary, and to charge Contractor with any costs that may be incurred in any remedial action.

14. COMPLIANCE WITH CODES AND REGULATIONS

Contractor is expected to comply with all applicable statutes in performing Project Work, including, but not limited to all state and local laws, regulations, codes and standards that are applicable at the time Contractor performs work.

15. PERMITS, TAXES, TEMPORARY FUNCTIONS

Contractor shall secure and pay for all permits, fees and licenses necessary for the performance of this Contract. Contractor shall pay any and all federal, state and municipal taxes, including sales taxes, if any, for which Contractor may be liable in carrying out this Contract. Contractor shall be responsible for all temporary functions associated with its work, including but not limited to, lighting, wiring, protection, hoisting, scaffolding, rigging, flagman, drinking water, sanitation, storage, ventilation and heat.

16. TERMINATION

If Contractor: (1) fails to provide a sufficient number of properly skilled workers or a sufficient quantity of suitable materials or adequate equipment; (2) fails to diligently prosecute work according to the Project schedule; (3) causes, by act or omission, stoppage, delay, or interference of the Work; (4) fails to correct or repair any damaged or defective Work or materials; (5) fails to comply with any provisions of this Contract; (6) becomes insolvent or adjudged bankrupt; or (7) fails to make prompt payment to lower tier subcontractors or suppliers, then the District may terminate this Contract upon two (2) business days written notice to the Contractor. If Contractor fails to cure the default within the two (2) day notice period, then Owner may terminate this Contract for default.

17. GENERAL PROVISIONS

a. **Notices**. Any notice or demand desired or required to be given under this Contract shall be in writing and deemed given when personally delivered, sent by facsimile machine, or deposited in the United States Mail (or with an express courier), postage prepaid, sent certified or registered mail, and addressed to the parties as set forth below or to such other address as either party shall have previously designated by such a notice:

District:	Contractor:
Attn: General Manager	Attn: _____
Lake Whatcom Water and Sewer District	_____
1220 Lakeway Drive	_____
Bellingham, WA 98229	_____
Phone: (360) 734-9224	Phone: _____
Fax: (360) 738-8250	Fax: _____

b. **Relationship Between Parties**. The Contractor is an independent Contractor with regard to performance of the details of the Work. The Contractor is responsible for its acts or omissions and acts or omissions of its agents, employees, servants, subcontractors, or otherwise during the performance of this Contract. Work in progress is subject to District inspection and review at any time.

c. **Entire Agreement**. This Contract and its attachments contain the entire understanding between the District and Contractor relating to the Project which is the subject of this Contract. This Contract merges all prior discussions, negotiations, letters of understanding or other promises whether oral or in writing. Subsequent modification or amendment of this Contract shall be in writing and signed by the parties to this Contract.

d. **Modification**. No modification of this Contract and no waiver of rights under this Contract shall be valid or binding on the parties unless the same is in writing.

e. **Waiver**. Waiver of any breach or default hereunder shall not constitute a continuing waiver or a waiver of any subsequent breach either of the same or of another provision of this Contract.

f. **Assignment**. Neither party shall assign, transfer or otherwise dispose of this Contract in whole or in part to any individual, firm or corporation without the prior written consent of the other party. Subject to the provisions of the preceding sentence, this Contract shall be binding upon and inure to the benefit of the respective successors and assigns of the parties hereto: This Contract is made only for the benefit of the District and the Contractor and successors in interest and no third party or person shall have any rights hereunder whether by agency or as a third party beneficiary.

g. **Severability**. If any term, covenant or condition of this Contract is held by a court of competent jurisdiction to be invalid, the remainder of this Contract shall remain in effect.

h. **Dispute Resolution**. If any dispute, controversy, or claim arises out of this Contract, the parties agree to first try to settle the dispute, controversy, or claim in non-binding mediation with the assistance of a recognized professional mediation service. The parties shall each designate a representative with full settlement authority who will participate in the mediation. The parties shall bear all expenses associated with the mediation equally, except for attorneys' fees. Any Claim subject to, but not resolved by, mediation shall be subject to a private arbitration which, unless the parties mutually agree otherwise, shall be held in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement; however, irrespective of the size of the dispute, the arbitration proceedings will be conducted by a single arbitrator. A demand for arbitration shall be made in writing, and delivered to the other party to the Contract. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

i. **Jurisdiction/Law**. This Contract shall be governed by and construed in accordance with the laws of the State of Washington. Any suit to enforce or relating to this Contract, including the enforcement of any arbitration award, shall be brought in Whatcom County Superior Court, Whatcom County, Washington.

j. **Attorneys' Fees**. In the event that any party commences litigation against the other party relating to the performance, enforcement or breach of this Contract, the prevailing party in such action shall be entitled to all costs, including attorneys' fees, expert witness fees and costs and any such fees or costs incurred on appeal.

_____
("CONTRACTOR")

Contractor Registration Number: _____

Unified Business Identifier (UBI #): _____

Employment Security Department Number: _____

State Excise Tax Registration Number: _____

_____
(Signature)

_____
(Printed Name and Title)

Dated: _____

Lake Whatcom Water and Sewer District
("DISTRICT")

_____
Justin Clary, General Manager

Dated: _____

Project Information and Specifications

Vicinity Map
Bellingham, WA

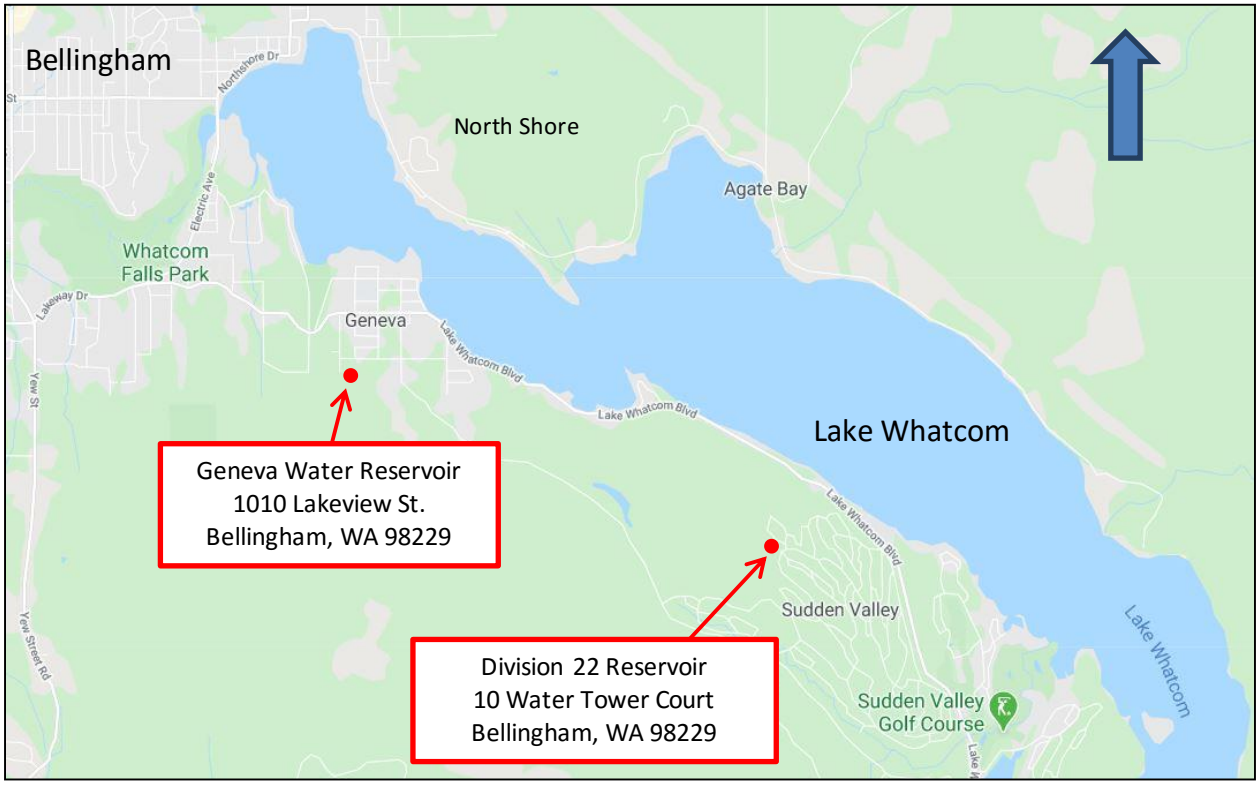

Figure 1: Vicinity Map with Reservoir Locations

I. SUMMARY OF WORK

The Lake Whatcom Water and Sewer District (District/Owner) intends to contract with an experienced, qualified Designer/Contractor to provide the professional installation of two (2) impressed current cathodic protection systems to replace two (2) existing galvanic cathodic protection systems as part of the Geneva and Division 22 Water Reservoirs Impressed Current Cathodic Protection System Project (Project). The work generally consists of the design and installation of two (2) fully functional automatically controlled, impressed-current cathodic protection systems for the interior submerged surfaces of steel water storage tanks in accordance with the project plans and specifications. The existing reservoir coatings are failing and due to timing and phasing of other capital improvement projects, recoating of the reservoirs is not possible at this time. The work areas are located within the boundaries of Lake Whatcom Water and Sewer District in the Sudden Valley and Geneva neighborhoods in Bellingham, Washington.

The contract is a performance based contract with general details provided herein to describe the final product and technical specifications provided to describe equipment, material and general construction requirements. At the completion of the project the District will have two (2) fully functional automatically controlled, impressed-current cathodic protection systems for

the interior submerged surfaces of steel water storage tanks. The Contractor's means, methods, quantities and many construction elements are left to the Contractor to determine in order to furnish a product to meet the requirements detailed herein.

The contractor and all subcontractors shall be firm(s) experienced in the professional installation of the work they perform.

II. PROJECT SPECIFICATIONS

1.0 GENERAL REQUIREMENTS

The Project includes, but is not limited to, the complete and professional installation of the following items of work, in accordance with the project plans and specifications:

- Design, furnish and install two (2) complete, automatically controlled, impressed-current cathodic protection systems for the interior submerged surfaces of steel water storage tanks, in accordance with ANSI/AWWA Standard D104-17.
- Both reservoirs must remain in operation for the entirety of the project and cannot be drained at any time.
- Designer/contractor pre-design evaluation required at each site to obtain water samples for chemical analysis, measure water resistivity, verify quantities and dimensions, evaluate and determine current condition of coatings to determine the percentage of the submerged, bare steel to protect, determine operating temperature and flow rate, water turbulence, etc.
- All permits.
- Design shall provide a 20-year design life.
- The system design shall accommodate existing tank conditions and features, and shall utilize existing galvanic cathodic protection system handholes for access points. No supports or attachments can be welded onto the reservoirs.
- District to provide dedicated 15 amp circuit breakers at each site.
- Furnish and install AC power from the aforementioned 15 amp circuit breaker to the rectifier unit at each site. See Attachment A for information.
- Furnish and install an automatically controlled rectifier unit and rectifier support system at each water storage reservoir.
- Furnish and install conduits with cathodic protection system wiring from the rectifier, up the side of the reservoir and atop the reservoir to power the cathodic protection systems. These conduit locations are not details in the project plans. It is up to the Designer/Contractor to determine the conduit route utilizing existing attachments to the reservoirs. Conduits can be installed atop existing reservoir concrete foundations.
- No welding, drilling or modifications of any kind will be allowed to be made on the walls or roof of the welded steel reservoir, unless written approval is obtained from the District.
- Furnish and install a long-life anode and vertical anode suspension system at each water storage reservoir. The Contractor, at the contractor's option and if the contractor

determines that re-use is acceptable, may re-use or modify as needed the existing supports installed at each water storage reservoir for the existing galvanic cathodic protection system.

- All materials in the interior of the water storage tanks shall be NSF/ANSI 61 Drinking Water System certified.
- All work shall be performed so that tank and/or water disinfection is not required. All costs for tank disinfection due to contractor negligence shall be borne by the contractor and such work shall be performed in accordance with AWWA C652-11, Disinfection of Water Storage Facilities.
- Water storage tanks shall remain water-tight, sealed to the environment and all modifications shall meet the Washington State Department of Health, Office of Drinking Water requirements.
- Full removal of existing galvanic cathodic protection systems, leaving in place only handhole covers that must remain in place to seal the reservoir. Salvage all system components and deliver to the District.
- System startup (to include energizing, testing and adjusting to optimize performance).
- System startup reports.
- As-built construction records.
- Operation and maintenance manuals.
- Warranty.
- One-year warranty inspection and testing with reports furnished to the District.
- See Attachment A for reservoir information.

1.1 Contractor's Responsibility

The work included in this contract is shown on the contract plans and described in these project specifications. All work incidental and necessary to the completion of the work described and shown shall be performed by the Contractor. In submitting a bid for the this project, the Bidder warrants that they are an expert in this and related work, that they understand the process and functions shown, and that the various work and processes not shown but necessary for the success of this project will be provided by the Contractor.

All details, materials, methods and equipment required to complete the Work are not detailed and fully described in the contract documents. If not defined in the contract documents, Contractor shall furnish, install and perform the Work using workmanship, materials, equipment, and methods that are industry standards used by professionals regularly performing this type of work.

Contractor shall provide all labor, equipment, materials, supervision, tools, supplies, insurance, permits and all costs associated with all other items necessary to perform the work described in the Project Specifications and shown on the project drawings.

It shall be assumed that Contractor visited the project site to confirm project requirements and existing reservoir and site conditions, dimensions and to ascertain quantities. If desired, contact the District to schedule a site visit to view the work sites before the bid submittal date.

1.2 Standards

Work shall meet the following standards, including, but not limited to:

A. ANSI/NSF 61 - Drinking Water System Components per Washington WAC-246-290-220 State Citation and UL Classified
B. AWWA D100 - Welded Steel Tanks for Water Storage
C. AWWA D102 - Coating Steel Water Storage Tanks
D. AWWA D104 - Automatically Controlled Impressed-Current Cathodic Protection for the Interior of Steel Water Tanks
E. AWWA C652 - Disinfection of Water Storage Facilities
F. NACE SP0388 - Impressed Current Cathodic Protection of Internal Submerged Surfaces of Steel Water Storage Tanks
G. Washington State Department of Labor and Industries, Electrical Laws and Rules
H. NEC 70 - National Electrical Code (latest revision)
I. U.S. Coast Guard and OSHA Standards for Commercial Diving Operations
J. ASTM B 348 - Titanium and Titanium Alloy Bars and Billets
K. ASTM D 1248 – Polyethylene Plastic Extrusion Material
L. ASTM D 3359 - Measuring Adhesion by Tape
M. UL 83 - Thermoplastic-Insulated Wires
N. UL 467 - Bonding and Grounding Equipment
O. UL 486A - Wire Connectors and Soldering Lugs for Use with Copper Conductors
P. UL 506 - Specialty Transformers

1.3 Progress and Completion

The project Time for Completion is 90 calendar days. Contractor shall diligently prosecute the work with adequate forces to achieve completion within the Time for Completion.

1.4 Preconstruction Meeting

A teleconference, video conference or on site preconstruction meeting is required with the Contractor and Lake Whatcom Water and Sewer District staff a minimum of 2-days before the start of construction.

1.5 Compliance with Regulations

All work must comply with Whatcom County Planning & Development Services and all other State or County regulations.

1.6 Temporary Erosion and Sedimentation Control (TESC)

Contractor shall, where required to perform the work, provide all Temporary Erosion and Sedimentation Control (TESC) in accordance with the 2019 Storm Water Management Manual for Western Washington (SWMMWW), Volume II, by the Washington State Department of Ecology, Publication Number 14-10-055. Contractor shall use Best Management Practices (BMPS) described therein.

1.7 Utility Services and Use of District Water

Contractor shall be responsible for furnishing, maintaining and providing all utility needs throughout the duration of the construction, including but not limited to: portable sanitation services and portable power generation.

Use of District water. When needed to perform the Contractor's work, and where available, the Contractor will be allowed to use Owner's water supplied from an Owner's fire hydrant near the site. The Contractor shall only connect to the fire hydrant when approved and only when connected to an approved double-check device and District-supplied water usage meter. The Contractor must provide all necessary clean fittings, hoses and equipment. Only the Owner is permitted to operate water valves. The Contractor will not be responsible for water consumption charges for use of Owner's water. If a fire hydrant is not conveniently located for the Contractor's use, the Contractor shall provide its own source of water at no additional cost to the Owner.

1.8 Site control

Protect in place all adjacent property and structures. Contractor shall be responsible for repair/replacement of all damage and shall restore to pre-construction conditions.

The Contractor shall maintain the area in a clean condition during construction. The site shall be cleared of all rubbish, debris and equipment and shall be left in a neat condition with surfaces restored to pre-construction conditions or to the restoration requirements detailed in the plans and specifications.

1.9 Traffic Control

Any traffic control activities required during construction shall be consistent with the Uniform Traffic Control Manual, latest edition, and applicable codes and permits.

Traffic control and approved traffic control plans, shall maintain traffic flow with a minimum of one travel lane open to traffic at all times, at each repair location. Except, where allowed by the governing authority, the contractor can delay traffic for up to 3 minutes.

If flaggers are used, orientation meeting per WAC 296-155-305 shall be held each time a new flagger is introduced to the site or if site conditions change significantly. The Contractor is responsible for scheduling such meetings.

Traffic control shall be considered incidental to each bid item unit price for all work.

1.10 Shop Drawings / Submittals.

Contractor shall provide the following project submittals:

1.10.1 Schedule. The contractor shall submit a detailed schedule of work to present at the preconstruction meeting.

1.10.2 Project Data Submittals. The contractor shall submit Product Manufacturer's technical data, material type and manufacturer, ASTM references, catalogue cuts or brochures and manufacturer's requirements including, but not limited to; installation methods and

requirements, storage, handling, temperature control, curing, field testing processes and procedures, equipment requirements, service reconnections and trimming and manufacturer's documentation and certification that materials and products are in conformance with appropriate standards and these specifications.

Submittal data shall include sufficient information to determine if it is in compliance with the project requirements. Submittal review does not relieve the Contractor from responsibility for errors or omissions, or responsibility for consequences due to deviations from the contract documents. Acceptable submittals will be reviewed as promptly as possible and transmitted to the Contractor no later than 14 calendar days after receipt.

By approving and submitting shop drawings, the Contractor warrants they have determined and verified all field measurements, field construction criteria, materials, catalog numbers, and similar data, and have checked and coordinated each shop drawing with required work and with the contract documents.

Lake Whatcom Water and Sewer District
1220 Lakeway Drive
Bellingham, WA 98229
Attn: Construction Engineer
E-mail: KH@lwwsd.org

1.10.3 Design and Design Calculations. The contractor shall submit system design calculations and construction drawings. All design shall be prepared and stamped by a Washington State licensed Professional Engineer and NACE International Cathodic Protection Specialist having a minimum of five (5) years' experience in design of cathodic protection systems for water storage tanks.

Design information shall, at minimum, include the following: a description and requirements of the anode material, size, configuration and suspension system, a description of the quantity and location of the anodes, a statement of the design basis of the system including tank size and configuration, all water properties, design percentage of bare steel surface protected, design life of anodes and cathodic polarization characteristics.

1.10.4 Operation and Maintenance Manuals. The contractor shall submit system Operation & Maintenance Manuals, which include as-built system information and drawings.

1.11 Substitutions

Any product or construction method that does not meet these specifications will be considered a substitution. Substitutions must be approved prior to their installation or use on this project.

1.12 Construction Record Drawings

Prior to receiving final payment for the work, the Contractor shall deliver a complete set of acceptable "as-constructed" records to the Owner. Plans shall be made on a clean, unmarked print(s) for this project and shall clearly show deleted items and new or modified items (in red). The Contractor shall provide "as-built" information on all items and work shown on the plans

showing details of the finished product including dimensions, locations, outlines, changes, manufacturers, etc. The information must be in sufficient detail to allow the Owner's personnel to locate, maintain, and operate the finished product and its various components.

All costs associated with construction record drawings shall be considered incidental to the project pay items.

1.13 Salvage, Haul-Off and Disposal

Contractor shall coordinate salvage of all removed materials with the District. All materials that are not salvaged to the District, shall be removed from the site and hauled off and disposed of in a Whatcom County approved disposal location.

2.0 UTILITY WORK

2.1 SITE WORK

Provide all excavation, trenching, backfill and surface restoration required for the electrical work including all site temporary erosion and sediment control at work areas in accordance with state and local requirements.

Trenching shall be to depths as required by Code. Trench width and length as required by the installation or as shown. Trench bottom shall be free of debris and graded smooth. Where trench bottom is rock or rocky, or contains debris larger than 1 inch or material with sharp edges, over excavate 3 inches and fill with 3 inches of sand. Separation between new electrical utilities and other utilities shall be 12 inches minimum, except gas line separation shall be 12 inches both vertical and horizontal. Perform crossing of concrete or asphalt only after surface material has been saw cut to required width and removed.

Backfill around raceways shall be 3-inches of pea gravel or sand for systems of 600 volt or less. Provide red marker tape over raceways below grade. Place backfill material to obtain a minimum degree of compaction of 90 percent of maximum density at optimum moisture content. Moisten backfill material as required to obtain proper compaction. Do not use broken pavement, concrete, sod, roots or debris for backfill.

Place gravel backfill around utility vaults in accordance with WSDOT 9-03.4(2) (5/8" crushed backfill) and compact to 90 percent of maximum density at optimum moisture content. Cable/wires shall be continuous from the equipment to the termination inside the pump station electrical panel.

Electrical, detectable marking tape shall be used for all underground conduit installation and shall be red for electrical, installed in accordance with District standards.

Finish the site; backfill all excavations and restore disturbed surfaces with gravel.

3.0 ELECTRICAL

Contractor shall perform the work necessary for furnishing and installing electrical equipment in accordance with the latest edition of the National Electric Code, National Electrical Safety Code, Washington State Electrical Code, NFPA 70, local codes and ordinances, UL listing requirements and manufacturer's instructions. All electrical products shall bear a label from a certified testing laboratory recognized by the State of Washington. All work shall be accomplished without altering the UL Listing of any existing or proposed electrical components.

3.1 Cathodic Protection System Materials, Equipment and General.

Use equipment, materials and wiring methods suitable for the types of locations in which they will be located, as defined in the definitions above, and in accordance with the manufacturer's recommendations. For any conflict between these specifications and the manufacturer's recommendations, the Contractor shall request clarification from the District.

All system components shall meet or exceed the specifications provided for system components in ANSI/AWWA Standard D104-17, or the most current standard.

All materials in contact with the water or exposed to the interior of the tank shall be classified in accordance with ANSI/NSF 61"Drinking Water System Components and disinfected prior to installation. This requirement shall be met under testing conducted by a product certification organization accredited for this purpose by the American National Standards Institute. The contractor shall submit a copy of company registration and materials certificate to Lake Whatcom Water and Sewer District verifying ANSI/NSF 61 system components classification

The District electrician will make all final electrical terminations to existing District system(s). Contractor shall schedule, coordinate and with the District electrician to complete this work.

3.2 Rectifier.

The rectifier unit shall be an automatically controlled, air cooled unit, potential control, with a fully magnetic circuit breaker, DC fuse, AC and DC lightning arrestors, and switched voltage and current output meters. The potential set limit shall be fully adjustable using a potentiometer with not less than 10 full turns. The DC output rating shall be 16 volts, 5 amps. The unit shall be UL-1012 or certified by a nationally recognized testing laboratory.

Controller. The automatic controller shall adjust current output to compensate for changes in water level, temperature of water, water chemistry, and cathodic polarization. With control from copper/copper sulfate reference electrodes with a minimum of two electrodes positioned in the tank. One cell is the operating cell and the other is for back up and testing. The reference electrodes shall constantly monitor the tank-to-water potential, free of IR drop. The automatic controller shall automatically adjust the current output to maintain the tank-to-water potential, free of IR drop, to a preset value. The controller shall operate within 25 mV of preset value and automatically limit current to a preset value. Controller shall use a digital potential meter to display tank-to-water potential, free of IR drop.

Rectifier Instrumentation. Rectifier shall be equipped with separate, continuously reading, digital voltmeter, ammeter, and potential meter. The rectifier shall be equipped with a Remote

Monitoring Connection. The rectifier shall be provided with a terminal block for future connection to a remote monitoring unit. The terminal strip shall have two separate terminals each, for monitoring of the rectifier DC output voltage and DC output current. Terminals for monitoring of IR drop free tank-to-water potential shall also be provided.

Potential Monitoring Alarm Circuit. The alarm circuit shall:

a. Monitor the tank-to- water potential, free of IR drop.

b. Provide adjustable high-low potential alarm limits with LED indicator.

c. Provide cabinet exterior door lights to indicate performance status.

The rectifier unit shall mount to a custom support assembly, per the Rectifier Support System specification, and furnished with suitable brackets for mounting. The enclosure shall be intended for outdoor use, weather sealed and not less than a 10 gauge steel cabinet with a tan-color powder coated cabinet. Hinges and all bolts shall be stainless steel. The front door and at least one side door or the front panel shall provide hinged access to provide access behind the main panel. Accessible panels shall have dead front construction. The enclosure shall be equipped with a pad-lockable draw latch. Latch shall be manufactured from stainless steel and shall accommodate a maximum 3/8-inch shackle padlock. The unit shall be rated for 120/ 240 volts (wired for low voltage) AC single phase power.

Operation & Maintenance Manual: an operation and maintenance manual shall be provided, including a schematic drawing detailing the specific rectifier configuration.

Manufacturers: Universal Rectifiers Inc., Rosenberg, TX, Model APAI 16-5AACJKNZZ (with Z representing multiple added options listed in the above specification, or equal.

Rectifier Support System. The rectifier support system shall, at minimum, consist of a 2-1/2-inch standard galvanized steel post, with cap, or approved alternate, and cross support system consisting of minimum 2-each, horizontal, 1-5/8-inch stainless steel unistrut. Secure rectifier equipment to unistruts.

Steel post shall be rigidly anchored to existing concrete foundation by means of suitable concrete anchors. Supports hall have a minimum of 2 anchors per support. Concrete anchor adhesive shall be Simpson SET-XP or Hilti Hit-RE500-SD or approved equal installed in accordance with the manufacturer's recommendations. Threaded rod shall be stainless steel. Holes shall be drilled with carbide-tipped drill bit. Holes shall be cleaned of dust and debris. Adhesive shall be inserted with a mixing nozzle. Embedment shall be minimum 3-inches, or as required for the full and rigid support of the post, unistrut and all equipment.

3.3 Long Life Reference Electrodes.

1. General. Reference electrodes shall be copper-copper sulfate electrodes, manufactured utilizing a 99.99% pure copper coiled element. The cells are to be manufactured to remain stable (plus or minus 10 mV) in fresh water for a minimum of 20 years.
2. Lead Wires. Reference cell lead wire shall be RHW.
3. Encapsulation. The reference electrode to lead wire connection shall be encapsulated to prevent water migration.

3.4 Anode Suspension System.

The anode suspension system shall be in accordance with ANSI/AWWA Standard D104, Section 4.2.4.2.2 Type C, Vertical System. The anode lead wire for vertical suspension shall be attached to a support bolted to the interior of the tank roof. Handhole assemblies (see note below) used for the installation of vertical anode suspension systems from the roof of the tank shall consist of a 6" diameter cover, rubber gasket, and a clamping bar with a stainless steel bolt assembly for each 5" diameter access opening. Cut steel shall be coated with primer.

Note: Contractor shall plan for the reuse / repurpose of the existing handholes at each reservoir currently in use for the existing galvanic cathodic protection systems. No new holes shall be drilled in the roof, unless approved by the District.

3.5 Anode Materials.

The anode shall be a copper cored, mixed metal oxide coated titanium wire and consist of the following:

1. Anode Substrate: The anode wire shall be drawn to a diameter of 0.062 inches from Grade 1 Titanium per ASTM B-348. The substrate shall be cleaned and the surface roughened. The cleaning shall remove all organic materials such as cutting oils, which could interfere with coating adhesion. Surface roughness shall be achieved by chemically etching the substrate as a minimum. Blasting the substrate may be used in addition to chemical etching, but not as a substitute. An anti-passivation layer shall be applied to the substrate prior to application of the mixed metal oxide coating.

2. Mixed Metal Oxide Coating: The prepared titanium substrate shall have an electrocatalytic coating applied. Coating composition shall be iridium oxide and tantalum oxide. Total coating loading requirements shall be coordinated with the manufacturer's proprietary information to achieve the required performance. The average gain rate for catalyst application shall not exceed 0.16 g/ft^2 (1.7 g/m^2) and the maximum gain rate for any single coat shall not exceed 0.25 g/ft^2 (2.7 g/m^2). Coating loading shall be measured using an X-ray gauge which is calibrated at least once per shift for the specific coating type. This test directly measures precious metal loading. Simple weight gain is not an acceptable measure. Adhesion of the catalytic coating shall be tested according to ASTM D 3359-83. The manufacturer shall certify conformance with the requirements.

3. Connections: All anode to header cable connections shall be sealed to prevent water penetration.

3.6 Cables/Wires Splices.

Install all cables/wires without splices unless necessary for installation and as approved by the District or allowable per ANSI/AWWA D104-17. Splices, when permitted, shall be in accordance with the splice or termination kit instructions and shall be watertight.

3.7 Fasteners.

Fasteners for securing equipment to walls, floors and the like shall meet the following requirements:

a. Under no circumstances shall the fasteners be of lesser strength or higher corrosive potential than the materials being connected.
b. Connection bolts, nuts and washers for all materials within a wetwell or in wet, damp or corrosive conditions shall be stainless steel, minimum grade 316. Bolts and nuts shall meet ASTM F593 and F594. All other connection bolts, nuts and washers shall be zinc plated and suitable for above and below grade locations as required.
c. Bolts into concrete and CMU shall be Concrete Anchors, Simpson Wedge-All anchors, Type 316 stainless steel, 1/4" for conduit supports and 3/8" for all other applications, and shall be installed in accordance with manufacturer's recommendations.
d. Bolts and nuts shall be long enough that at least two threads extend beyond the face of the tightened nut.

3.8 Wire Identification.

Identify each wire or cable at each termination and in each pull box using numbered and lettered wire markers. All electrically common conductors shall have the same number. Each electrically different conductor shall be uniquely numbered. Identify panelboard circuits using the panelboard identification and circuit number. Identify motor control circuits using the equipment identification number assigned to the control unit by the pump control panel manufacturer and the motor control unit terminal number. Identify other circuits as approved by the Engineer. Identify each wire or cable in each pull box with plastic sleeves having permanent markings. Conductors between terminals of different numbers shall have both terminal numbers shown at each conductor end. The terminal number closest to the end of the wire shall be the same as the terminal number.

3.9 Electrical Installation and Fit.

Ensure that all equipment and materials fit properly in their installations.

3.10 Cutting, drilling and welding.

Re-use of existing water storage reservoir cut-outs is preferred. If existing locations cannot be reused, and where proven by the Contractor and accepted by the District, Provide any cutting, drilling and welding that is required for the electrical construction work and allowable per the project specifications. Structural members shall not be cut or drilled.

Use a core drill whenever it is necessary to drill. All penetrations shall be sealed watertight

3.11 Grounding.

Grounding shall be as required by code.

3.12 Cable installation.

Cables shall be continuous from initiation to termination without splices except as approved by the District.

3.13 Conduit Supports, Ceiling Hangers and Misc. Hardware.

All conduit supports, ceiling hangers and any miscellaneous hardware, unless specified in otherwise in other sections, shall be hot dipped galvanized.

3.14 Conduit Sealants.

a. Moisture Barrier Types: Sealant shall be a non-toxic, non-shrink, non-hardening, putty type hand applied material providing an effective barrier under submerged conditions.
b. Fire Retardant Types: Fire stop material shall be a reusable, non-toxic, asbestos-free, expanding, putty type material with a 3-hour rating in accordance with UL 1479.
c. Install explosion proof seal-offs in hazardous areas as required by the NEC.

3.15 Galvanized Rigid Steel (GRS) Conduits.

GRS conduit shall be used in all locations unless approved otherwise. All conduits installed shall be neatly installed and formed as required to fit the shape of the structure and shall not interfere with existing equipment, pipes, conduits and cables. Liquid-tight flex conduit to the equipment shall transition to a PVC cored grip base fitting (CGB0).

GRS conduit shall be installed in and below all buildings, structures, in concrete and in corrosive areas for all power and instrumentation circuits. GRS conduit shall be used for all instrumentation (signal) circuits. Rigid conduit shall be steel, hot dipped galvanized inside and out. The GRS must meet USA Standards Institute C80-1 Underwriters Laboratories Standard UL6, and carry a UL label. Use cast threaded hub fittings and junction boxes for all rigid conduit except in locations not permitted by the N.E.C.

Field fit equipment and all conduit so that the new system does not interfere with existing equipment, conduits and access-ways. Vertical conduit runs shall be plumb and horizontal conduit runs shall be level. Support spacing for conduit secured along concrete foundations shall not exceed 10-feet. Conduits shall be field-bent to parallel the contour of surfaces.

Furnish and install junction boxes where required to meet electrical codes.

Install one (1) spare pull-string, 3/16 inch diameter nylon rope, in all conduits, for future District use.

Figure 2: Example of Conduit and Supports along Concrete Footing

3.16 Nonmetallic Conduit.

Not permitted for this project.

3.17 Flexible Metal Conduit.

Flexible conduit shall be interlocking single strip, hot dipped galvanized and shall have a polyvinyl chloride jacket extruded over the outside to form a flexible watertight raceway. Flexible conduit shall be American Brass Company Sealtite Type VA, General Electric Type UA or equal.

Flexible Metal Conduit shall be used for final connection to motors and vibrating equipment. Jacketed flex with threaded fittings shall be used outside and in wet corrosive atmosphere. The maximum length of flexible conduit shall be as allowed by NEC.

3.18 Acceptance of Work and Start-Up.

Testing shall not commence until the system has been polarized. Provide the District a minimum 2 working days' notice prior to system testing.

Contractor shall demonstrate, in the presence of the District inspector, that the installation of the equipment installed as part of the contractor's scope of work is fully functional, operational and accepted in accordance with required specifications, standards and permits.

Contractor shall provide an AFFIDAVIT OF COMPLIANCE certifying that the system has been designed and installed in accordance with the specifications and standards and shall be signed by a corrosion specialist and system installer.

3.19 Warranty.

All materials and labor shall be guaranteed for a period of one (1) year beginning from the date of final acceptance. At final acceptance the contractor will provide the District's operation and maintenance staff with a training class, up to 4-hours, on operations, troubleshooting, and maintenance.

4.0 SAFETY

In carrying out its responsibilities, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to materials, supplies, and equipment whether on site or stored off-site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them. For these purposes, the Contractor shall:

Follow Washington Industrial Safety and Health Act (WISHA) regional directives and provide a site-specific safety program that will require an accident prevention and hazard analysis plan for the contractor and each subcontractor on the work site. The Contractor shall develop and submit a site-specific safety plan (SSSP) to the Owner's representative for review prior to the initial scheduled pre-construction meeting. Owner shall have up to 5 working days to review and comment on the SSSP.

Provide adequate safety devices and measures including, but not limited to, the appropriate safety literature, notice, training, permits, placement and use of barricades, signs, signal lights, ladders, scaffolding, ventilation, air monitoring, necessary personal protective equipment for all employees, staging, runways, hoist, temporary lighting, grounded outlets, wiring, construction processes, and equipment required by Chapter 19.27 RCW, State Building Code (Uniform Building, Electrical, Mechanical, Fire, and Plumbing Codes); Chapter 212-12 WAC, Fire Marshal Standards, Chapter 49.17 RCW, WISHA; Chapter 296-155 WAC, Safety Standards for Construction Work; Chapter 296-65 WAC; WISHA Asbestos Standard; WAC 296-62-071, Respirator Standard; WAC 296-62, General Occupation Health Standards, WAC 296-24, General Safety and Health Standards, WAC 296-24, General Safety and Health Standards, Chapter 49.70 RCW, and Right to Know Act.

5.0 MEASUREMENT AND PAYMENT

The following is a list of bid items for the project. Payment for all work will be made at the contract unit price or lump sum price as indicated in the Bid Proposal. The contract price for each item constitutes full compensation for furnishing all equipment, labor, materials, transportation, appurtenances, and incidentals and performing all work necessary to complete the various bid items in accordance with the Contract Documents. Payment for each item shall be considered as full compensation, notwithstanding that minor features may not be mentioned herein.

BID ITEM NO. 1 – IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM – GENEVA RESERVOIR

Measurement. Will be measured per lump sum (LS).

Payment. The unit price for this bid item shall cover the complete costs of the work, including but not limited to all costs for the labor, equipment, materials, transportation, traffic control, permits, mobilization and demobilization, system design, system installation, written and digital reports, as-built records, operation and maintenance manuals, training, one-year warranty inspection and reports, demolition and salvage of existing galvanic cathodic protection system and incidentals for the IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM as described in the Project Specifications Sections and all other items of work not listed or not covered in other bid items but required to complete the bid item as described in the Project Specification's General Requirements.

BID ITEM NO. 2 – IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM – DIVISION 22 RESERVOIR

Measurement. Will be measured per lump sum (LS).

Payment. The unit price for this bid item shall cover the complete costs of the work, including but not limited to all costs for the labor, equipment, materials, transportation, traffic control, permits, mobilization and demobilization, system design, system installation, written and digital reports, as-built records, operation and maintenance manuals, training, one-year warranty inspection and reports, demolition and salvage of existing galvanic cathodic protection system and incidentals for the IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM as described in the Project Specifications Sections and all other items of work not listed or not covered in other bid items but required to complete the bid item as described in the Project Specification's General Requirements.

***** END OF PROJECT INFORMATION AND SPECIFICATIONS *****

Geneva & Division 22 Reservoirs
Impressed Current Cathodic Protection Systems

Attachment A

Geneva & Divison 22 Water Reservoirs
Impressed Current Cathodic Protection System Project
District Project #C2013

Attachment A – Reservoir Information

August 19, 2020

Reservoir Information

Reservoir 1: Geneva Reservoir

Address: 1010 Lakeview St. Bellingham, WA
Year Built: 1979
Diameter: 53'-0"
Height of Shell: 32'-8"
High Water Level: 31'-6"
Interior Coating Condition: Failing. Assume 50% Failure (for bidding purposes only)
Water Conductivity: To be determined by Contractor
Galvanic Cathodic Protection System: YES
Current Number of Galvanic CP System Handholes: 8
15 Amp Dedicated Breaker Location: Installed at panel in front of reservoir (see Figure 3).
Proposed Rectifier Location: Left side of existing panels.
In-ground Conduit Requirements: None
Other: No known submerged materials inside of reservoir consisting of other materials such as stainless steel, copper or brass. See underwater inspection photos that follow.

Figure 1: Exterior Geneva Reservoir

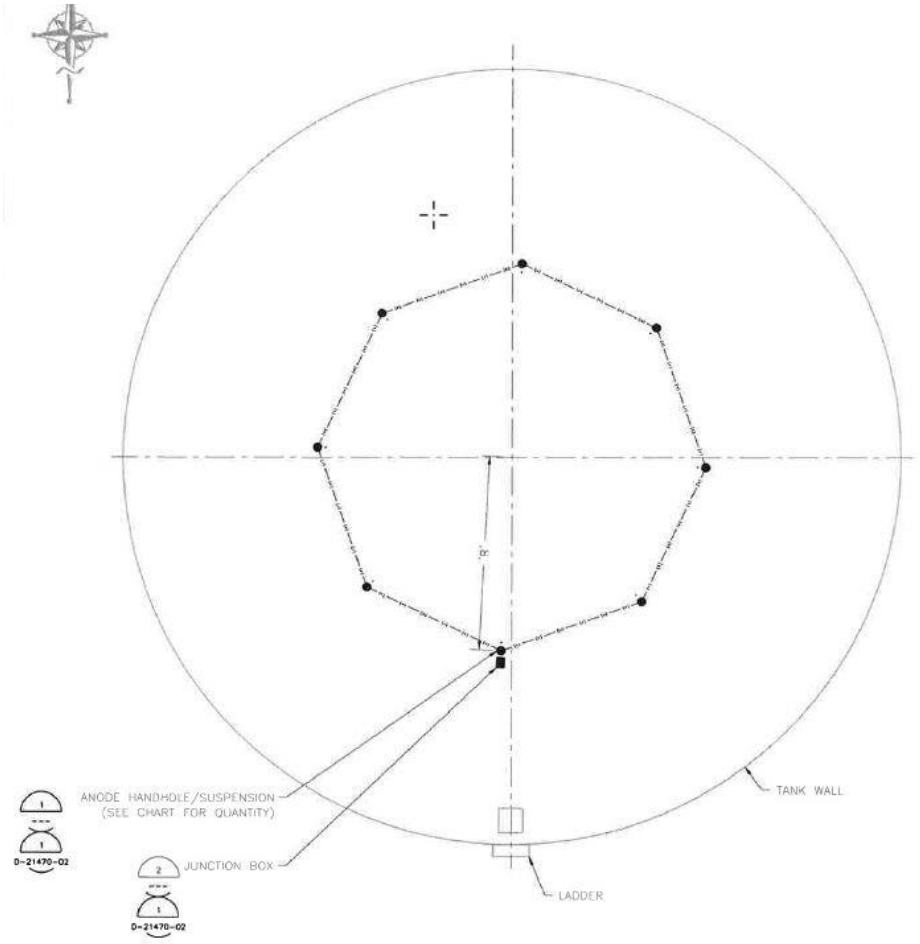

Figure 2: Plan View Geneva Reservoir
Galvanic Cathodic Protection System Handhole Locations (Installed 2014)

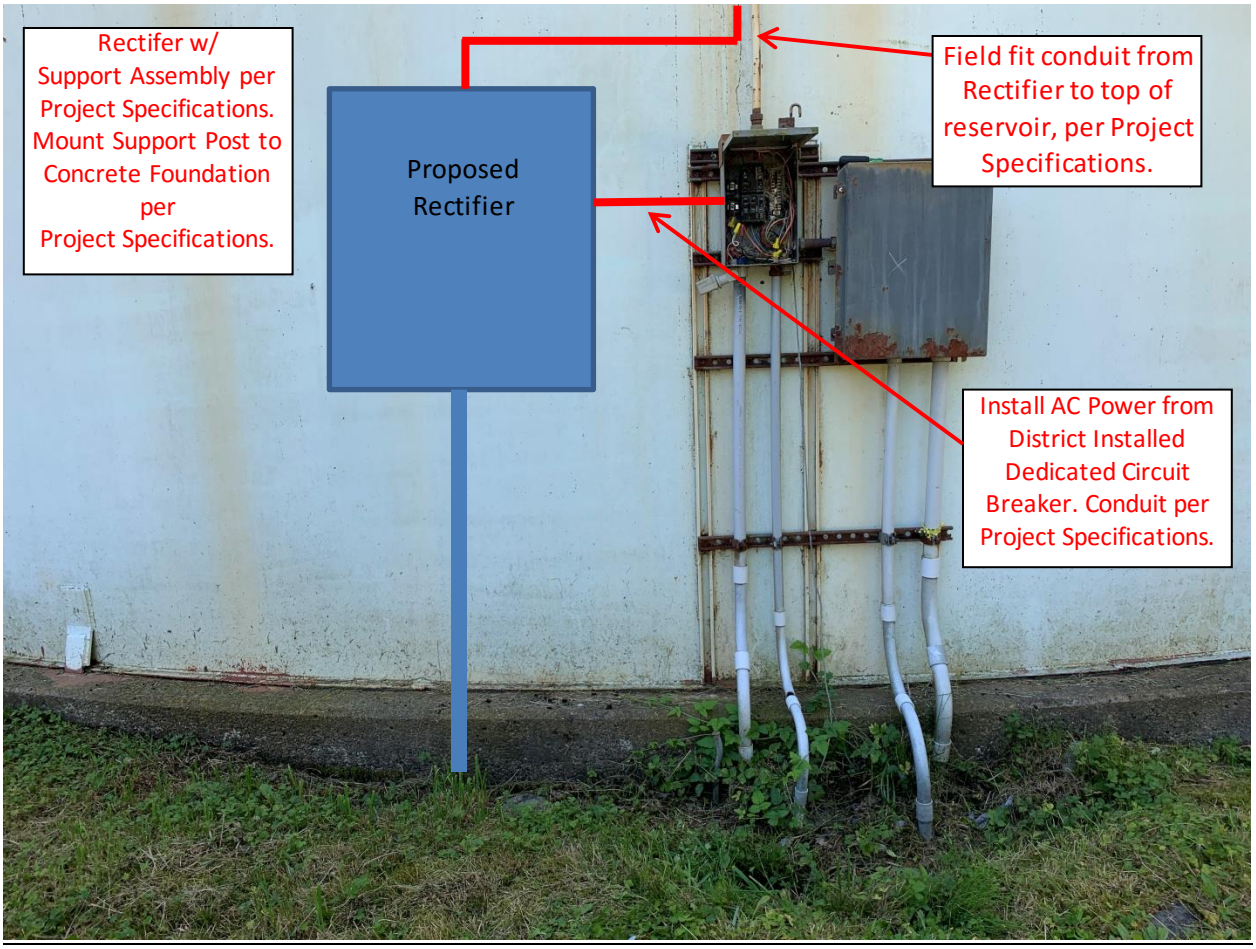

Figure 3: Geneva Reservoir – Proposed Rectifier Location

Diagram is a schematic diagram showing possible location of new equipment and conduit, with the intent to use existing conduit supports. Existing conduits may need to be shifted to allow room for another conduit. The diagram is not to scale and is not inclusive of all work to be done. Locations shown are approximate. Final locations are to be determined by the contractor and field fit.

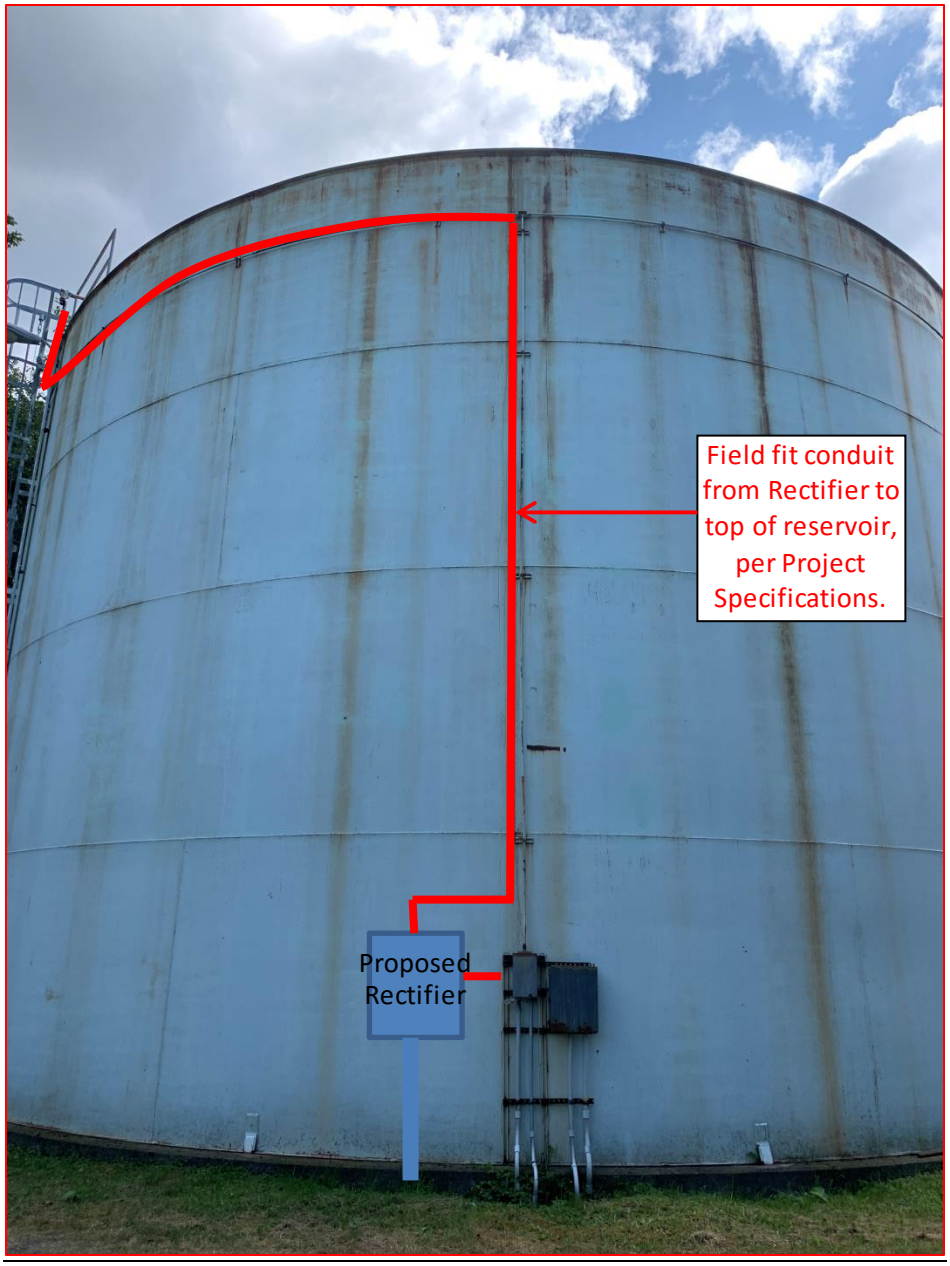

Figure 4: Geneva Reservoir – Proposed Rectifier Conduit Alignment

Diagram is a schematic diagram showing possible location of new equipment and conduit, with the intent to use existing conduit supports. Existing conduits may need to be shifted to allow room for another conduit. The diagram is not to scale and is not inclusive of all work to be done. Locations shown are approximate. Final locations are to be determined by the contractor and field fit.

Reservoir 2: Division 22 Reservoir

Address: 10 Water Tower Court. Bellingham, WA
Year Built: 1971
Diameter: 50'0"
Height of Shell: 35'0"
High Water Level: 31'-6"
Interior Coating Condition: Failing. Assume 50% Failure (for bidding purposes only)
Water Conductivity: To be determined by Contractor
Galvanic Cathodic Protection System: YES
Current Number of Galvanic CP System Handholes: 6
15 Amp Dedicated Breaker Location: Installed by District at panel adjacent to the reservoir.
Proposed Rectifier Location: See photo, Figure 7.
In-ground Conduit Requirements: Not anticipated. Conduit to be installed above ground along and atop the circular foundation.
Other: No known submerged materials within the reservoir, consisting of other materials such as stainless steel, copper or brass. See underwater inspection photos that follow.

Figure 5: Exterior Division 22 Reservoir

Additional control panels exist and are not shown in the above photo.

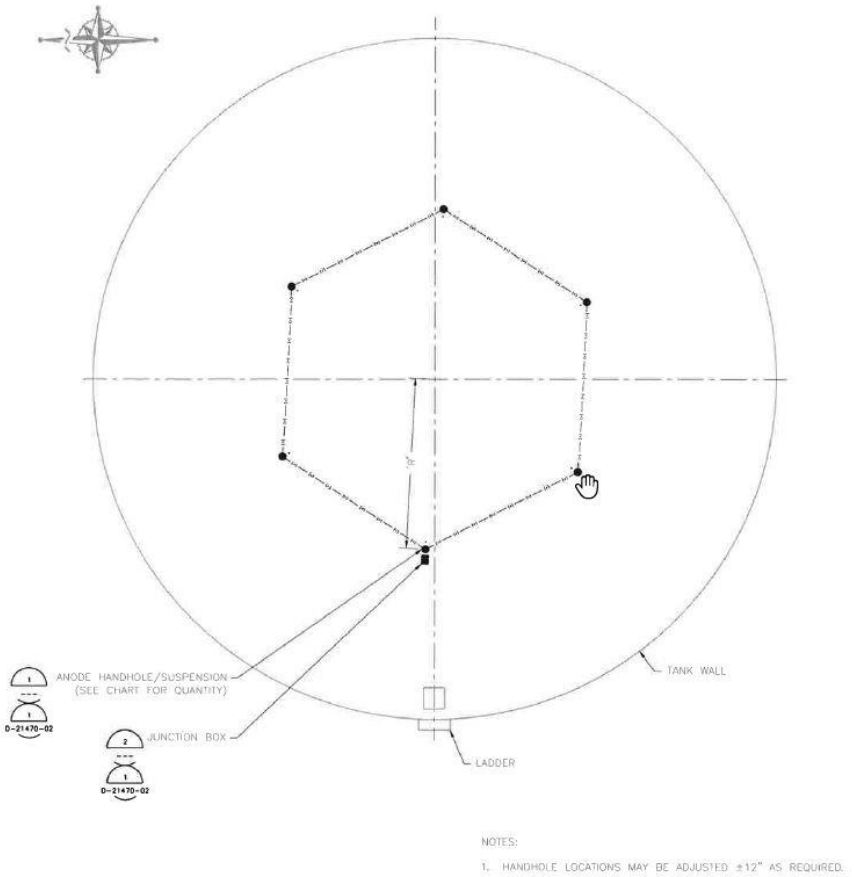

Figure 6: Plan View – Division 22 Galvanic Cathodic Protection System (Installed 2014)

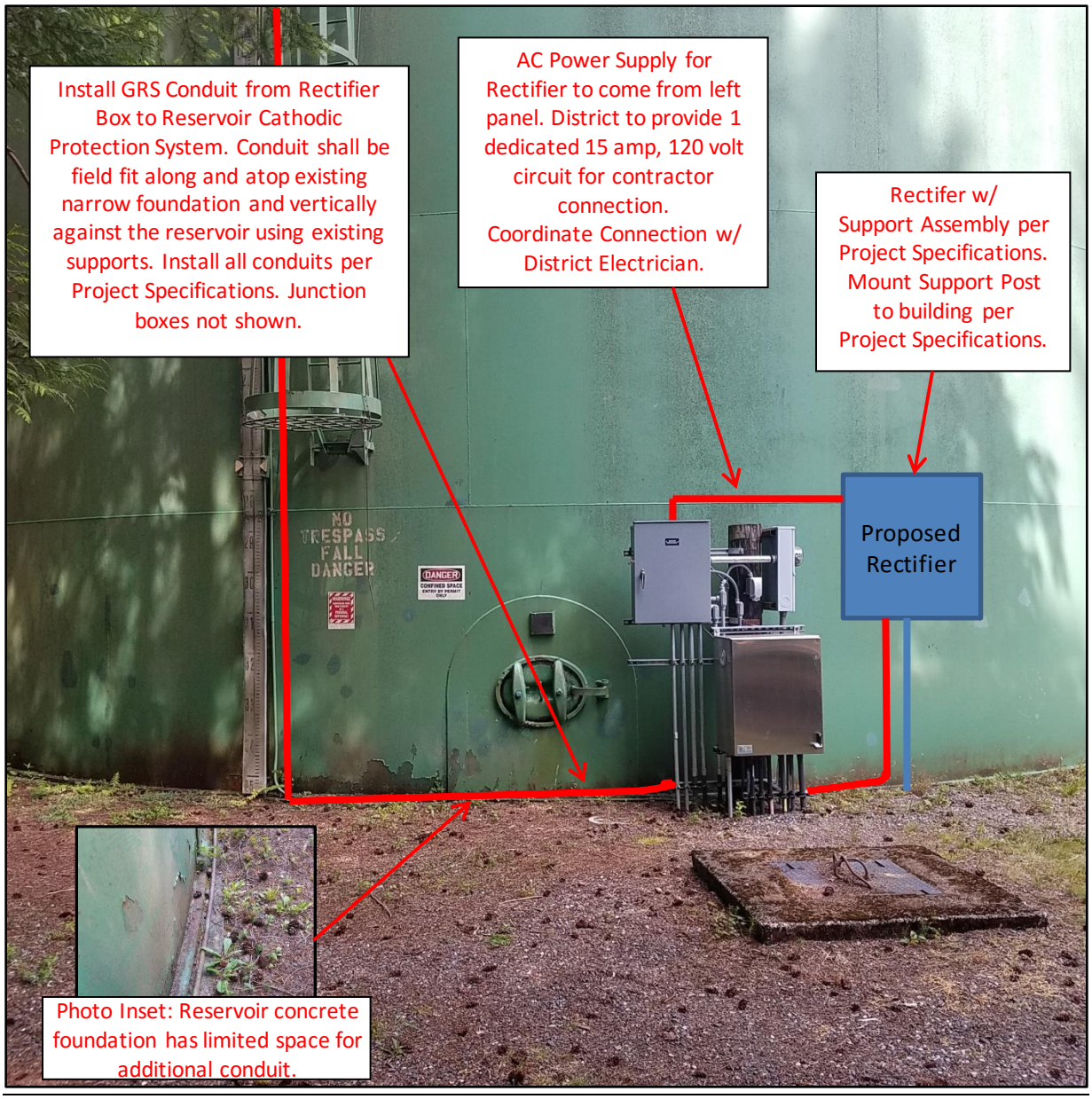

Figure 7: Division 22 Reservoir – Proposed Rectifier and Conduit Locations

Diagram is a schematic diagram showing possible location of new equipment and conduit, with the intent to use existing conduit supports for the vertical connection to the left of the exterior ladder. Existing conduits may need to be shifted to allow room for another conduit. Conduit supports may need to be widened by Contractor. The diagram is not to scale and is not inclusive of all work to be done. Locations shown are approximate. Final locations are to be determined by the contractor and field fit.

Additional reservoir information follows:

- as-built galvanic cathodic protection system information (2014),
- 2018 reservoir inspection notes and photos, and
- 2019 cathodic protection system inspection field report.

NORTON CORROSION LIMITED

8820 222nd Street SE, Woodinville, WA 98077
Phone (425) 483-1616 • Fax (425) 485-1754
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April 8, 2019

Lake Whatcom Water & Sewer District
Attn: Brent Winters
1220 Lakeway Drive
Bellingham, WA. 98229
Brent.Winters@lwwsd.org

Subject: **2019 ANNUAL INSPECTIONS-CATHODIC PROTECTION SYSTEMS**
5 WATER RESERVOIRS
BELLINGHAM, WASHINGTON

Dear Mr. Winters

On March 27, 2019 Norton Corrosion Limited (NCL) personnel completed an inspection of the galvanic type cathodic protection (CP) systems that protects the internal submerged surfaces of the Geneva, SVWTP, Division 7, Division 22, and Division 30 Reservoirs from corrosion. Authorization to perform this work was issued on February 5, 2019.

Work Performed

NCL personnel recorded structure-to-water potential measurements of the installed galvanic systems at each reservoir. In the past, native potentials were recorded at each location to serve as a baseline value. NCL inspected all accessible components of the CP system to ensure it was operating properly. Electrical measurements were recorded using a Fluke Model 28II multi-meter. Structure-to-water potential measurements were recorded at representative test locations for the purpose of evaluating the level of CP being received. Potential measurements were obtained with a saturated copper/copper sulfate (CSE) half-cell. Both on and instant-off potentials were measured by utilizing a toggle switch to temporarily disconnect the anodes.

Criteria

NACE International has established criteria that indicate, when used separately or in combination, whether adequate CP has been achieved The applicable criteria are listed in NACE standard SP0196, "Galvanic Anode Cathodic Protection of Internal Submerged Surfaces of Steel Water Storage Tanks." NCL has evaluated your CP system based on the following criteria:

- Adequate CP is indicated by a potential difference of -0.850 volt or more negative between a steel structure and a saturated copper/copper sulfate (CSE) reference half-cell. These criteria require all voltage drops, other than those across the structure-to-electrolyte boundary, be considered for a valid interpretation of the potential data. These measurements account for any voltage drops (IR drop) and have been used to evaluate the level of protection achieved.

- Adequate protection is also indicated by a cathodic polarization shift of not less than 100 millivolts. This is equivalent to the difference between the instant-off (polarized) and native (depolarized) potential measurements.

Results and Conclusions

Testing indicates three of the five water reservoirs are receiving adequate protection based on the 100mV criterion of polarization. While Division 7, 22, and 30 are adequately protected, the recorded measurements were close to not satisfying the criteria for adequate protection. Measurements at the Geneva and SVWTP reservoirs indicate these reservoirs **are not adequately protected** per NACE standards. The following table summarizes the results of the testing. Please see the attached data sheets for more details of the values recorded at each reservoir location.

Reservoir	**Status**
Geneva	**Inadequate Protection**
SVWTP	**Inadequate Protection**
Division 7	Adequate Protection
Division 22	Adequate Protection
Division 30	Adequate Protection

Recommendations

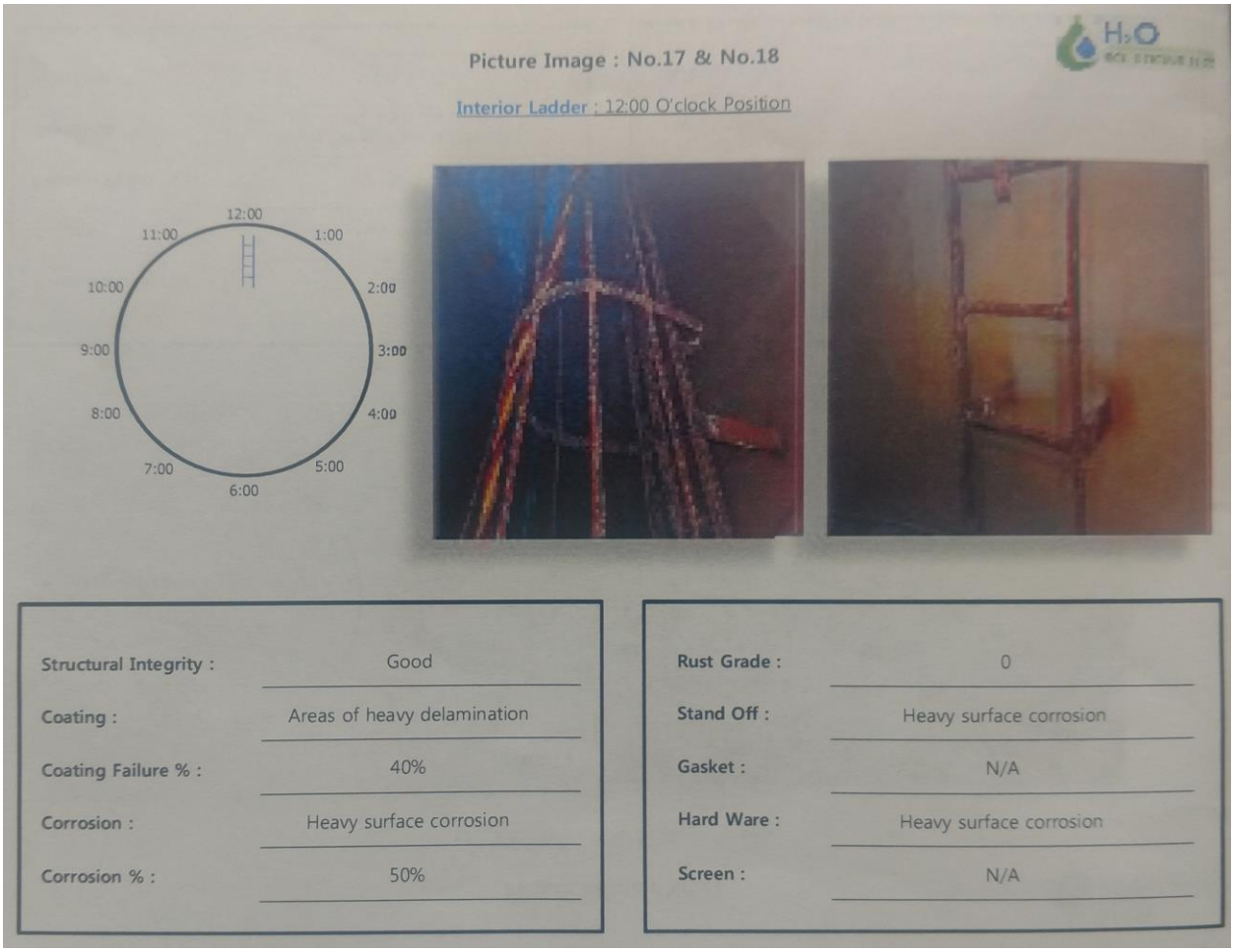
After reviewing the results of this survey, NCL investigated as to why the CP systems installed in 2015 are failing to protect the water reservoir at two locations. In 2012, H20 Solutions LLC provided Lake Whatcom Water and Sewer District with a report describing the condition of the coatings of the reservoirs. Key points from this report can be summarized as follows:

-60-75% coating failure of the interior floors and walls at the Geneva reservoir,
-Photos taken at the SVWTP show heavy corrosion of the ladder and surrounding cage within the tank at this location.

The CP systems were originally designed based on a specification that indicated to account for 2% total bare surface area. Because the coating loss at the Geneva reservoir far exceeds what the system was designed to protect explains why the CP system at this location is unable to protect the subject structure. NCL recommends recoating the interior of the Geneva tank before attempting to protect this structure galvanically. Alternatively, if recoating the tank is not viable an impressed current cathodic protection system could be designed capable of protecting the Geneva reservoir in its current condition.

NCL has an estimated budget for design, supply and installation for an impressed current CP system to be $16,500-19,000. NCL would be happy to give an exact quote when you are ready to proceed with a system upgrade.

In the photos from the 2012 H20 Solutions LLC report it can be seen the interior coating of the SVWTP reservoir as mostly good with exception of the ladder. Please see the excerpt from the H20 Solutions LLC report below.



As can be seen in the photos above the ladder and safety cage located inside the SVWTP is heavily rusted, and poorly coated. When performing the 2019 inspection, NCL personnel lowered a reference electrode into the reservoir within the confines of this heavily rusted steel ladder. The proximity of the reference electrode to this corroded steel explains why potentials measured at the SVWTP were so low. NCL recommends recoating the bare metal on this steel ladder or replacing it with a non-metallic style. Future testing should be performed by lowering the reference electrode through one of the anode hand holes farthest from the ladder to better assess the overall condition of the SVWTP reservoir.

NCL appreciates the opportunity to provide this service to Lake Whatcom Water & Sewer District. If you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,

S. Bercik

Stephen J. Bercik
NACE CP Technician #70786

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LAKE WHATCOM WATER & SEWER DISTRICT
5 RESERVOIRS
CATHODIC PROTECTION SYSTEMS

DATA SHEET: 1 OF 2
NCL JOB NO.: O-22832
DATE: 3/27/19
BY: S. BERCIK

Potential Measurements (Volts DC, Reference CSE)

Geneva	**Native**	**On**	**Instant-Off**
Bottom	-0.494	-0.595	**-0.535**
5’	-0.471	-0.614	**-0.533**
10’	-0.450	-0.620	**-0.537**
15’	-0.450	-0.615	**-0.535**
20’	-0.443	-0.599	**-0.530**
25’	-0.441	-0.577	-0.541
30.5’- surface	N/A	-0.563	-0.511
Shunt Measurement (5A/50mV)	1.75 mV DC	.	
Calculated Current	0.175 Amps		

SVWTP	**Native**	**On**	**Instant-Off**
Bottom	-0.536	-0.537	**-0.523**
5’	-0.539	-0.527	**-0.518**
10’	-0.544	-0.509	**-0.506**
15’	-0.560	-0.509	**-0.502**
18’- Surface	-0.535	-0.510	**-0.504**
Shunt Measurement (5A/50mV)	0.3 mV DC		
Calculated Current	.03 Amps		

Division 7	**Native**	**On**	**Instant-Off**
Bottom	-0.413	-0.849	-0.716
5’	-0.415	-0.872	-0.786
10’	-0.413	-0.898	-0.885
15’	-0.407	-0.921	-0.738
20’	-0.408	-0.930	-0.739
25’	-0.411	0.935	-0.755
29’ -surface	-0.410	-0.925	-0.738
Shunt Measurement (5A/50mV)	1.0 mV		
Calculated Current	0.1 Amps		

LAKE WHATCOM WATER & SEWER DISTRICT
5 RESERVOIRS
CATHODIC PROTECTION SYSTEMS

DATA SHEET: 2 OF 2
NCL JOB NO.: O-22832
DATE: 3/27/19
BY: S. BERCIK

Potential Measurements (Volts DC, Reference CSE)

Division 22	**Native**	**On**	**Instant-Off**
Bottom	-0.424	-0.743	-0.610
5’	-0.423	-0.811	-0.646
10’	-0.423	-0.873	-0.672
15’	-0.422	-0.934	-0.710
20’	-0.423	-0.988	-0.726
28’ surface	-0.425	-0.995	0.728
Shunt Measurement (5A/50mV)	0.73 mV DC		
Calculated Current	0.073 Amps		

Division 30	**Native**	**On**	**Instant-Off**
Bottom	-0.466	-0.878	-0.645
5’	-0.441	-0.902	-0.652
10’	-0.429	-0.879	-0.676
15’	-0.430	-0.794	-0.585
20’	-0.444	-0.687	-0.571
25’	-0.445	-0.680	-0.558
30’	-0.445	-0.627	-0.556
35’	N/A	0.609	-0.552
38’-surface	N/A	0.608	0.549
*notes: Bring hammer to tap off latch on tank access door.			
Shunt Measurement (5A/50mV)	0.7 mV DC		
Calculated Current	0.07 Amps		

NORTON CORROSION LIMITED

OPERATION & MAINTENANCE MANUAL

CATHODIC PROTECTION SYSTEMS
5 EACH WATER RESERVOIRS
LAKE WHATCOM WATER & SEWER DISTRICT
BELLINGHAM, WASHINGTON

Prepared for: Lake Whatcom Water & Sewer District
Attn: Krisin Hemenway
kristin.hemenway@lwwsd.org

December 2014
NCL File No. C-21470

CORROSION CONTROL SPECIALISTS SINCE 1959

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Woodinville, WA 98072

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Fax: 425-485-1754

OPERATION & MAINTENANCE MANUAL
CATHODIC PROTECTION SYSTEMS
5 EACH WATER RESERVOIRS
LAKE WHATCOM WATER & SEWER DISTRICT
BELLINGHAM, WASHINGTON

TABLE OF CONTENTS

Item	Manufacturer	Part No.
Anode	Galvotec Alloy, Inc.	GA-MG-R1.315
Wire Splice	Raychem	GHFC-1-90
CP Cable	Kris Tech Wire Co., Inc.	#8 HMW/PE

The above materials are readily available from:

Norton Corrosion Limited
8820 222nd Street SE
Woodinville, WA 98077
Phone: 425-483-1616
Fax: 425-485-1754
sales@nortoncorrosion.com
www.nortoncorrosion.com

OPERATION & MAINTENANCE MANUAL
CATHODIC PROTECTION SYSTEMS
5 EACH WATER RESERVOIRS
LAKE WHATCOM WATER & SEWER DISTRICT
BELLINGHAM, WASHINGTON

APPENDIX A

CONSTRUCTION RECORDS

NORTON CORROSION LIMITED

8820 222nd Street SE, Woodinville, WA 98077
Phone (425) 483-1616 • Fax (425) 485-1754
E-mail: sales@nortoncorrosion.com
www.nortoncorrosion.com

December 23, 2014

Lake Whatcom Water & Sewer District
Attn: Kristin Hemenway, P.E.
1220 Lakeway Drive
Bellingham, WA. 98229
kristin.hemenway@lwwsd.org

Subject: **CATHODIC PROTECTION SYSTEMS**
POST-INSTALLATION INSPECTION
5 WATER RESERVOIRS
LAKE WHATCOM WATER & SEWER DISTRICT

Dear Ms. Hemenway:

On December 13, 2014 Norton Corrosion Limited (NCL) personnel completed the cathodic protection (CP) system installation and testing on the subject reservoirs. The CP systems were installed to protect the internal submerged surfaces of the tanks from corrosion.

Summary

The following table summarizes the results of the testing.

Reservoir	Status
Geneva	Meets NACE Criteria
SVWTP	Meets NACE Criteria
Division 7	Meets NACE Criteria
Division 22	Meets NACE Criteria
Division 30	Meets NACE Criteria

Work Performed

NCL personnel installed galvanic systems on each reservoir and recorded structure-to-electrolyte potential measurements at representative test locations. Prior to activating the CP systems, native potentials and the fill levels of each reservoir were recorded. NCL energized each CP system to verify proper installation and function. Energized structure-to-electrolyte potentials were repeated in the same locations as the native potentials. Once testing was complete, the systems were left connected.

Criteria

Structure-to-water potentials were measured to determine the level of protection being achieved by the CP systems. Adequate CP is indicated by achieving a potential difference of –850 millivolts or more negative in reference to a saturated copper/copper sulfate (CSE) reference electrode, or by obtaining 100 millivolts of polarization as measured by the difference between the native and polarized potentials. The results of the testing are detailed on the attached data sheet and are discussed below.

Results/Recommendations

Results of the testing indicate the CP systems are functioning properly and each reservoir is receiving adequate protection per NACE International standards. See attached data sheet for details of the testing.

NCL appreciates the opportunity to provide this service to Lake Whatcom Water & Sewer District. If you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,

Ryan Hurd

Ryan Hurd
NACE CP Technician

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NORTON CORROSION LIMITED

LAKE WHATCOM WATER & SEWER DISTRICT
5 RESERVOIRS
CATHODIC PROTECTION SYSTEMS

DATA SHEET: 1 OF 1
NCL JOB NO.: C-21470
DATE: 12/13/14
BY: R. HURD

Potential Measurements Volts DC Reference CSE

Geneva	**Native**	**On**
Bottom	-0.494	-0.916
5'	-0.471	-1.102
10'	-0.450	-1.085
15'	-0.450	-1.035
20'	-0.443	-0.804
24'- Surface	-0.441	-0.783

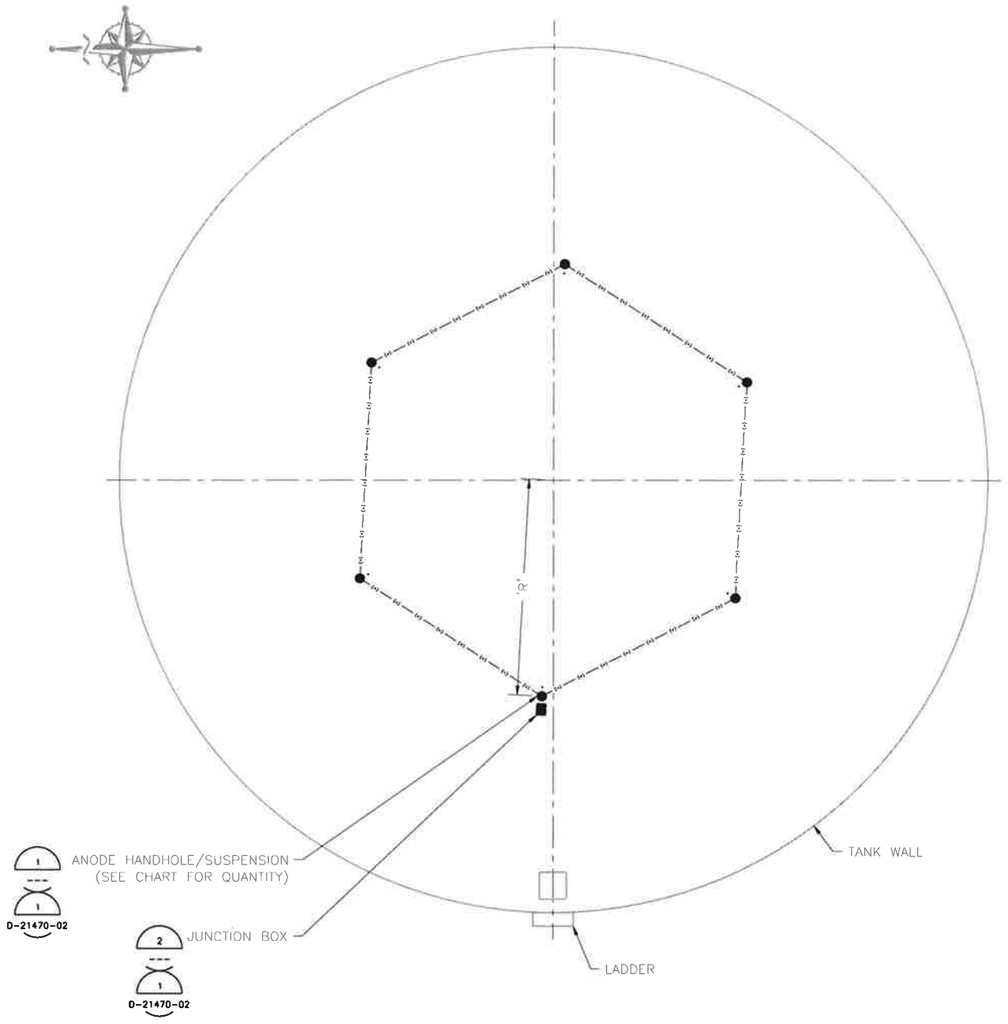
SVWTP	**Native**	**On**
Bottom	-0.536	-1.418
5'	-0.539	-1.500
10'	-0.544	-1.519
15'	-0.560	-1.531
18'- Surface	-0.535	-1.506

Division 7	**Native**	**On**
Bottom	-0.413	-1.159
5'	-0.415	-1.230
10'	-0.413	-1.236
15'	-0.407	-1.214
20'	-0.408	-1.114
25'	-0.411	-1.099
26' - Surface	-0.410	-1.100

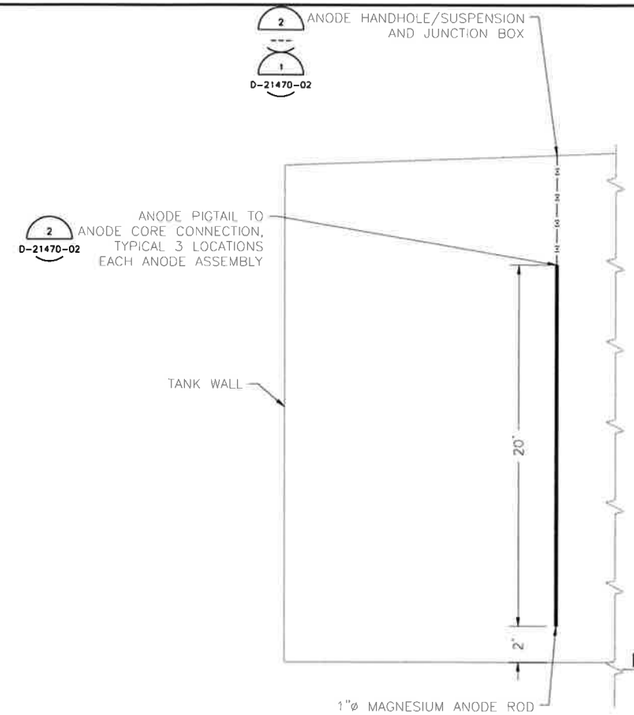
Division 22	**Native**	**On**
Bottom	-0.424	-0.973
5'	-0.423	-1.136
10'	-0.423	-1.158
15'	-0.422	-1.152
20'	-0.423	-1.058
21' - Surface	-0.425	-1.046

Division 30	**Native**	**On**
Bottom	-0.466	-1.006
5'	-0.441	-1.186
10'	-0.429	-1.174
15'	-0.430	-1.128
20'	-0.444	-1.010
25'	-0.445	-0.801
30' - Surface	-0.445	-0.744

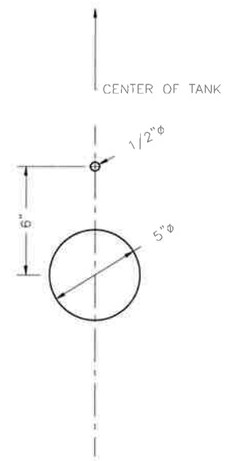
CATHODIC PROTECTION SYSTEM				
RESERVOIR	DIA. (FT)	HEIGHT (FT)	# ANODES	RADIUS 'R'
DIVISION 22	50	30	6	13'-0"

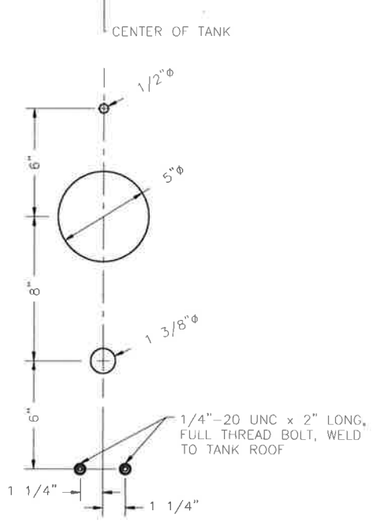


TYPICAL PARTIAL ELEVATION



HANDHOLE & ANODE/REFERENCE SUSPENSION 1





NOTES:

1. HANDHOLE LOCATIONS MAY BE ADJUSTED ±12" AS REQUIRED.

HANDHOLE, ANODE SUSPENSION, & JUNCTION BOX LOCATIONS

HANDHOLE, ANODE SUSPENSION, JUNCTION BOX 2

Date	Revision	Approved	Date	Revision	Approved

RANDALL G. CORTEZ — STATE OF WASHINGTON — 37994 — REGISTERED PROFESSIONAL ENGINEER

Norton Corrosion Limited
Woodinville, WA.
(800) 426-3111
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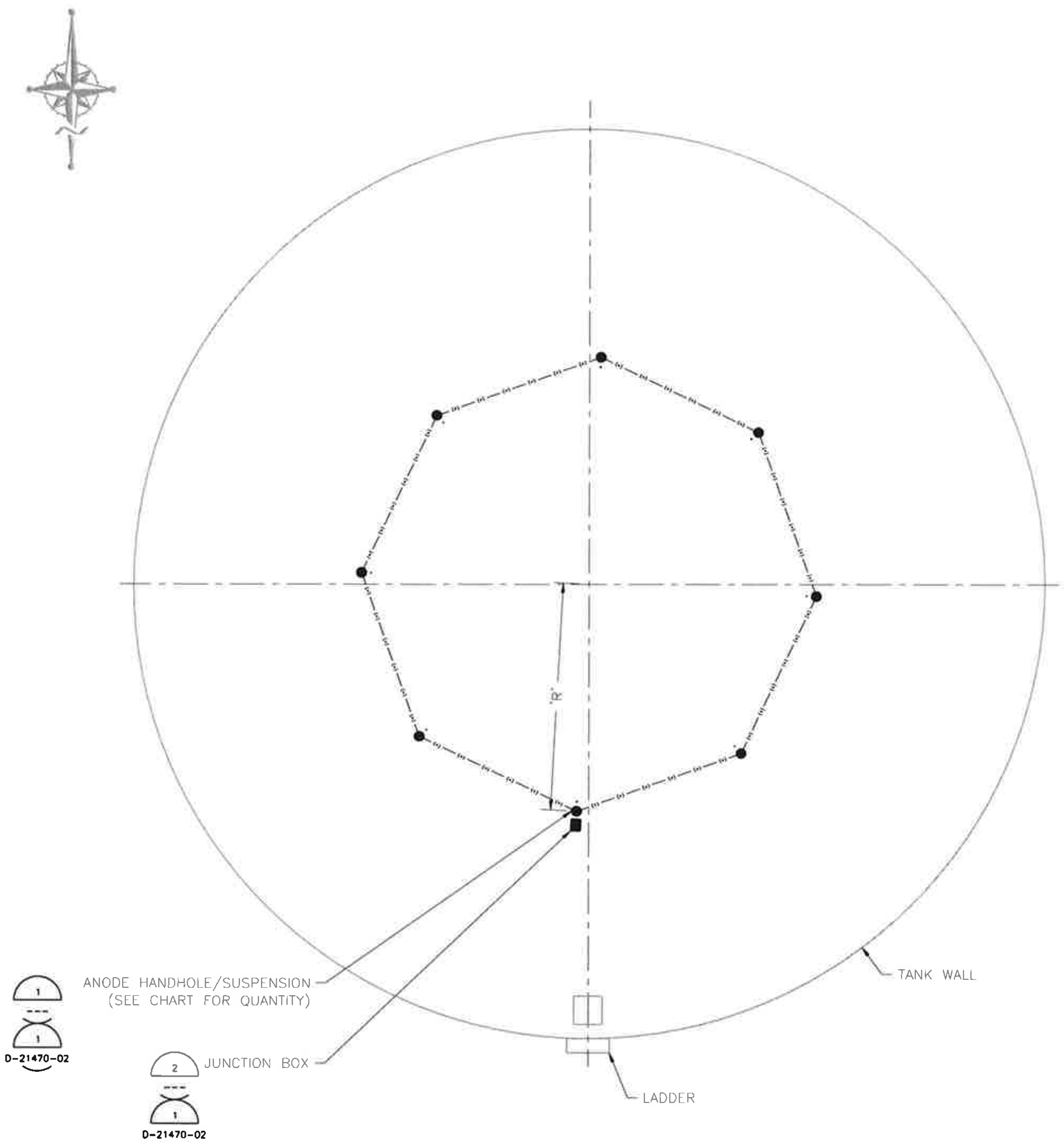
GALVANIC CATHODIC PROTECTION SYSTEM
WATER RESERVOIR
LWWSD
BELLINGHAM WA
AS-BUILT
REF. N.C.L. JOB#: C-21470

Drawing #:	D-21470-01
Designed By:	R.G.
Drawn By:	R Hunt
Approved By:	R.G
Date Drawn:	22SEP2014
Revision #:	0
Drawing Scale:	None

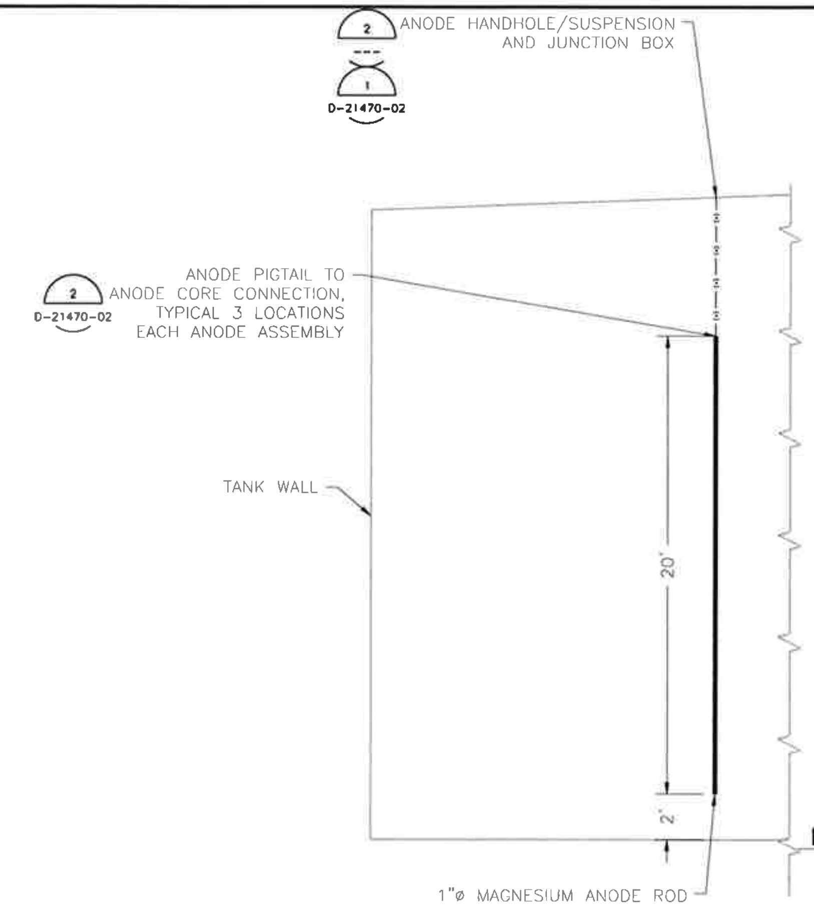
CATHODIC PROTECTION SYSTEM				
RESERVOIR	DIA. (FT)	HEIGHT (FT)	# ANODES	RADIUS 'R'
GENEVA	52	33	8	13'-0"



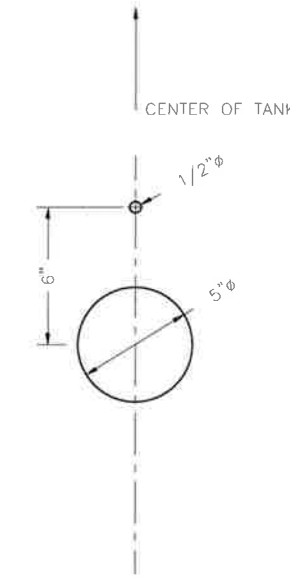
NOTES:

1. HANDHOLE LOCATIONS MAY BE ADJUSTED ±12" AS REQUIRED.

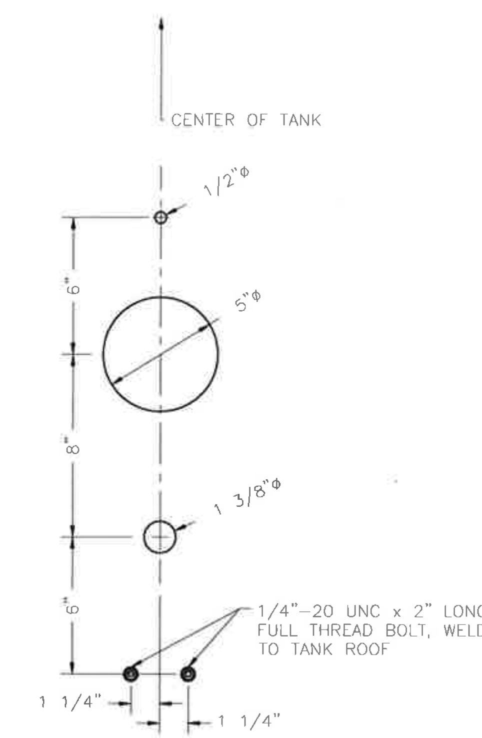
HANDHOLE, ANODE SUSPENSION, & JUNCTION BOX LOCATIONS



TYPICAL PARTIAL ELEVATION



HANDHOLE & ANODE/REFERENCE SUSPENSION 1



HANDHOLE, ANODE SUSPENSION, JUNCTION BOX 2

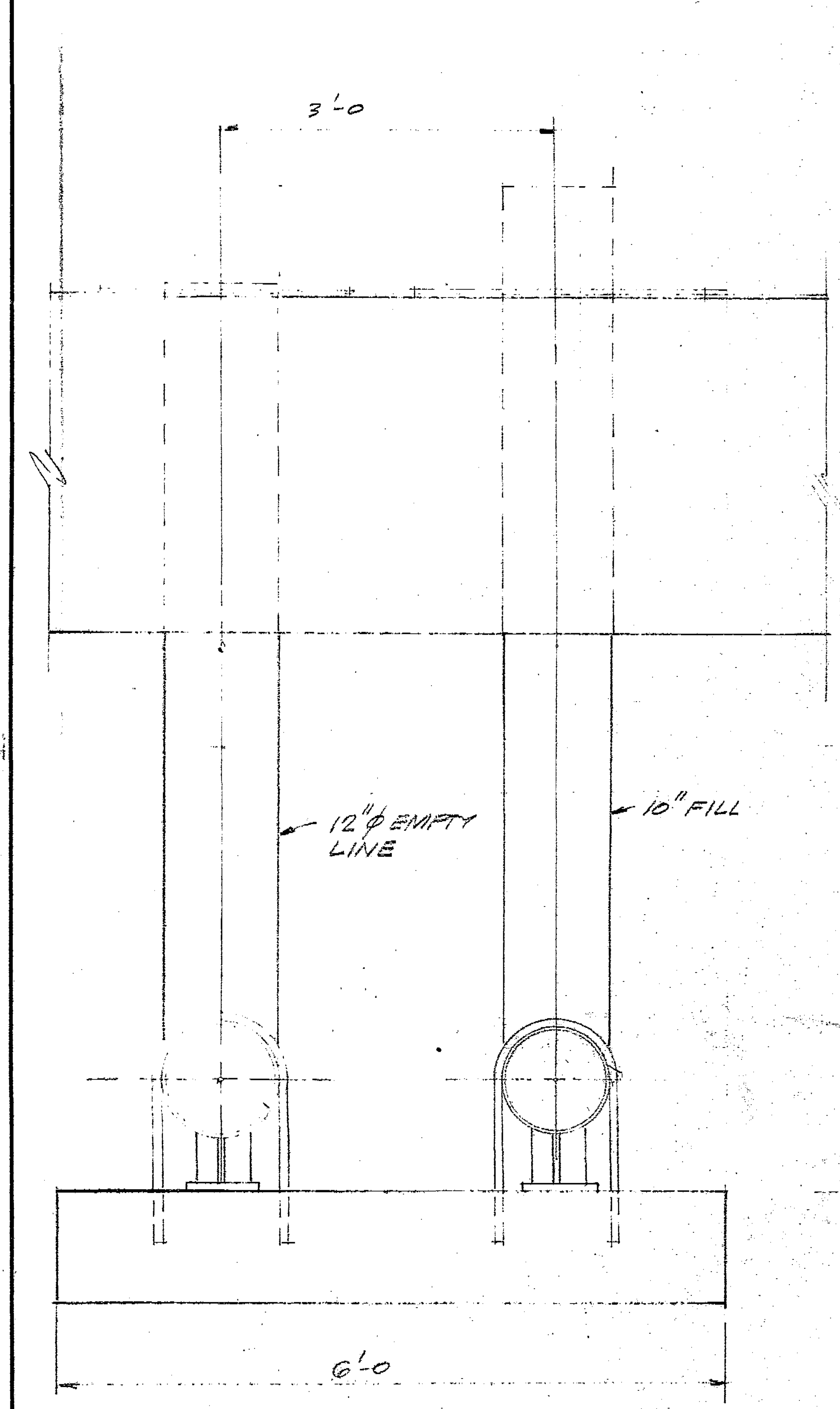
Date	Revision	Approved	Date	Revision	Approved

Norton Corrosion Limited
Woodinville, WA.
(800) 426-3111
www.nortoncorrosion.com

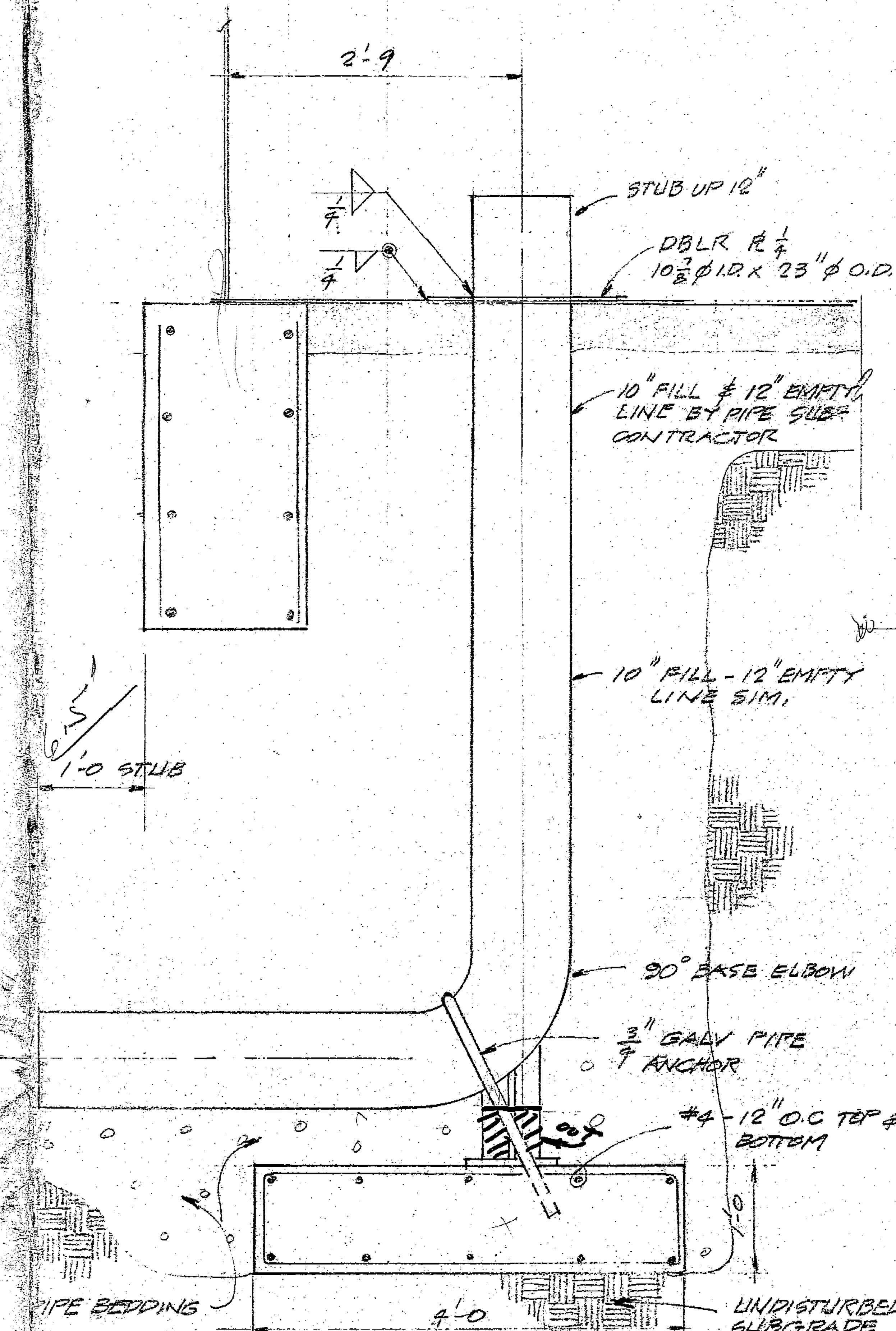
GALVANIC CATHODIC PROTECTION SYSTEM
WATER RESERVOIR
LWWSD
BELLINGHAM WA
AS-BUILT
REF. N.C.L. JOB#: C-21470

Drawing #:	D-21470-01
Designed By:	R.G.
Drawn By:	R. Hunt
Approved By:	R.G
Date Drawn:	22SEP2014
Revision #:	0
Drawing Scale:	None

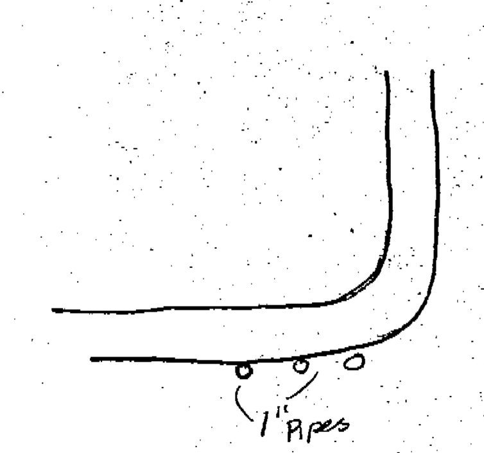
Geneva Reservoir Information

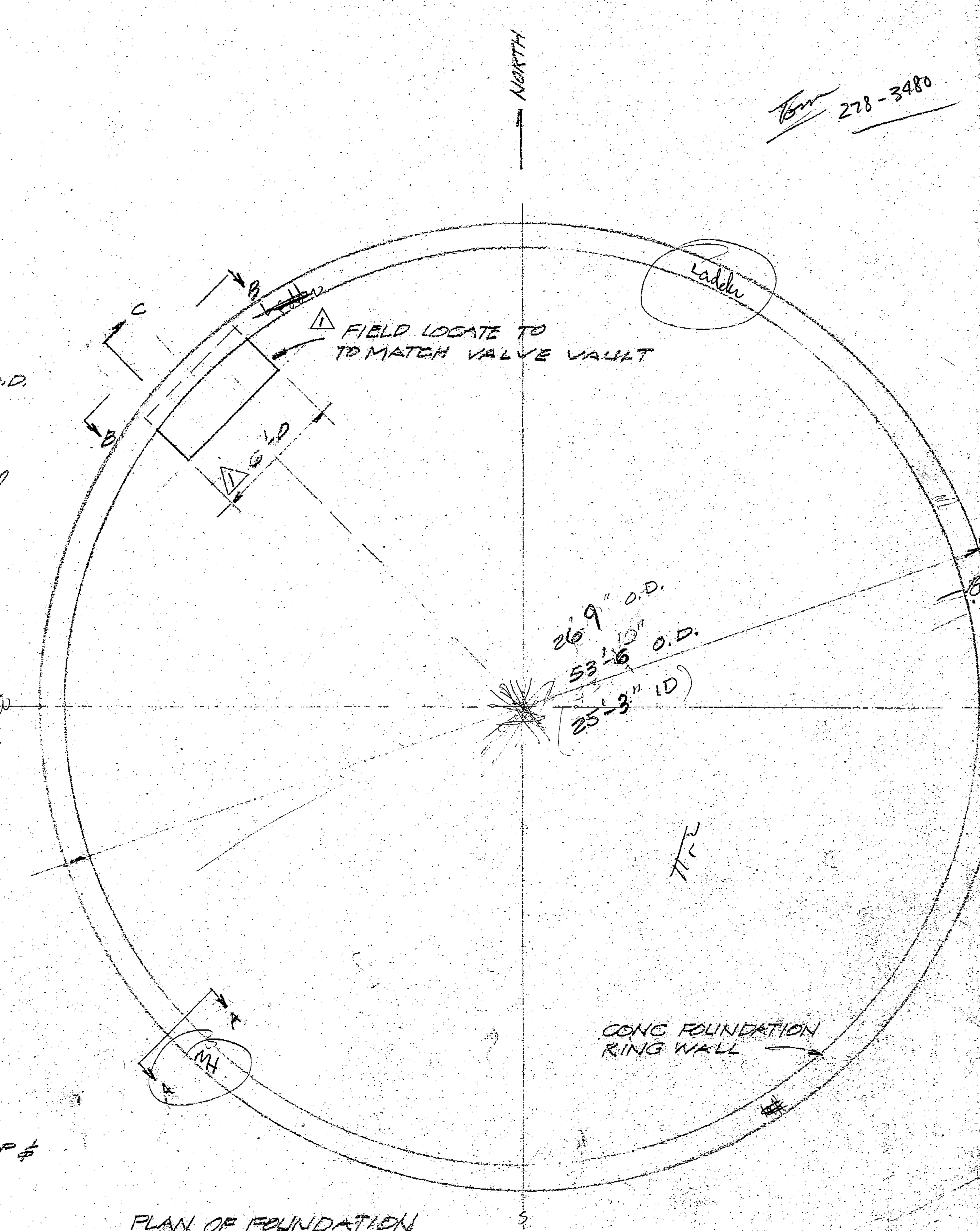


SECTION B-B.
10" FILL & 12" EMPTY LINE BY PIPING SUB-CONTRACTOR



SECTION C





PLAN OF FOUNDATION

DESIGN CALCULATIONS

TANK	52' φ x 33	12 x 33 = 396
ROOF		13 x 15 = 195
WT OF WATER		.5 x 33 x 625 = 1031
WT OF FOOTING		2 x 150 = 300
		1922

$\frac{h}{d} = \frac{33}{26}$ 1.27

$\frac{m'}{m} = .164 \quad \frac{\bar{z}}{h} = .39$

$((26)^2 \pi \times 62.5 + 12 \times 52 \times \pi) \times .135 = 18184$ #/ft

$18184 \times (33)^2 \times .37 \times .64 = 4942673$ #'

$S = (26)^2 \pi = 2123.7 \quad \frac{4942673}{2123.7} = 2327.4$

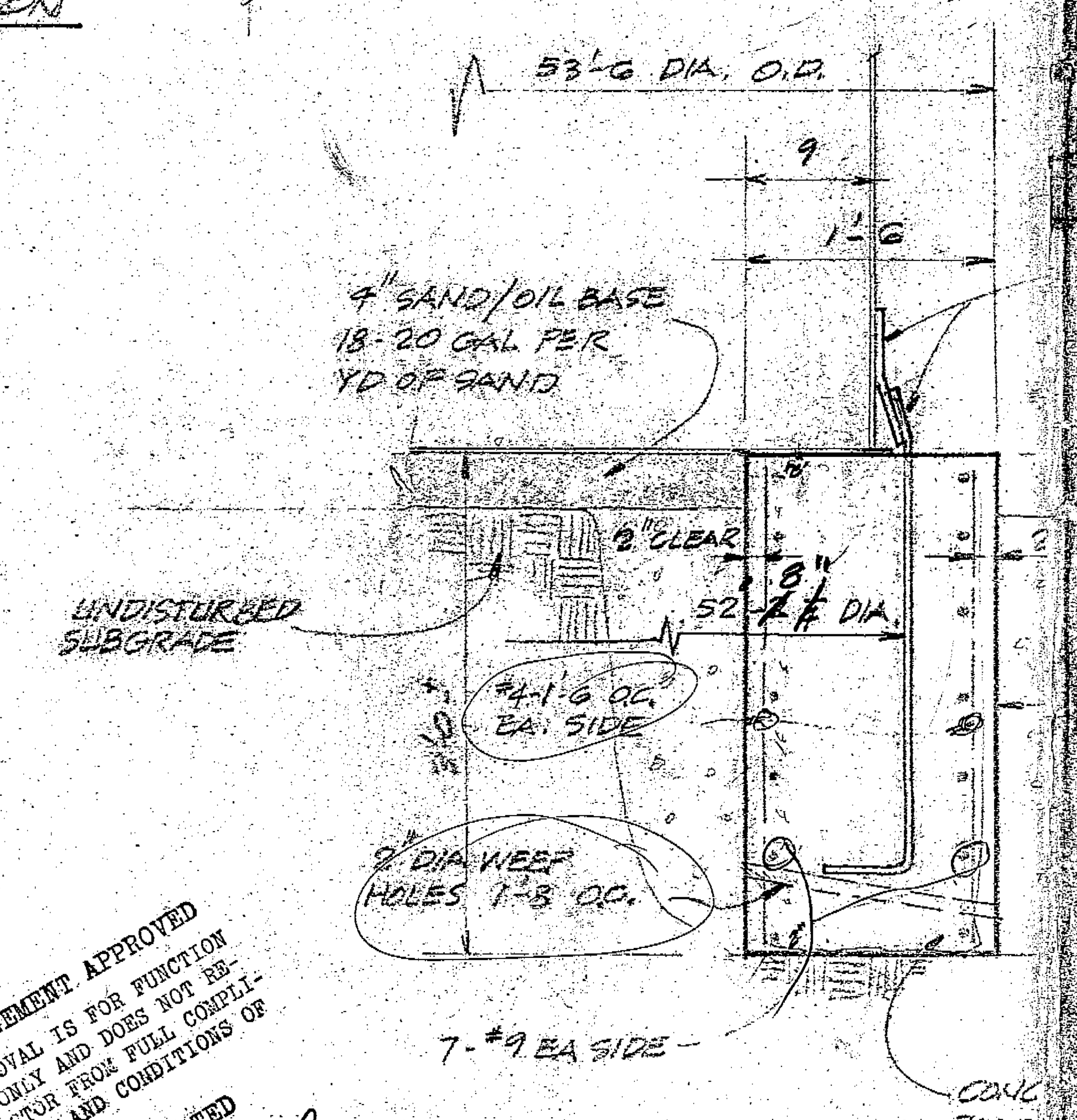
FOOTING 1'-6" WIDE

$\frac{1922 + 515 + 150}{1.5} = \frac{2587}{1.5} = 1725$ #/□'

$2327.4 - 591.0 = 1736.4$ USE FB $3 \times \frac{3}{8}$

$\frac{1.125 \times 22.000}{1736.4} = 14.25' \quad \frac{52\pi}{14.25} = 11.46$

USE 12 - FB $3 \times \frac{3}{8}$ ANCHORS



SECTION A-A TYPICAL @ FOUNDATION

GENERAL ARRANGEMENT APPROVED
THIS GENERAL APPROVAL IS FOR FUNCTION AND ARRANGEMENT ONLY AND DOES NOT RELEASE THE CONTRACTOR FROM FULL COMPLIANCE WITH THE TERMS AND CONDITIONS OF HIS CONTRACT.
YOSHIDA INCORPORATED
6123 MAYNARD AVE. SO.
SEATTLE, WASH. 98108
Job No. 1120 Date 6/4/79

All Sheets 5/5

Tom 228-3980

BILL OF MATERIAL

SHEET REF.	SHIP MARK	NO. PCS	PC MK	SECTION	LENGTH	WT	REMARKS

Aug 2 Called Mr. Dick Louis about Foundation size he said Ring is 53'-6 OD, 50'-6 ID the only change is Tiedown steel Moved to 52-8" Told Tom McKeever at Tank site

Aug 20 Moved MH opening to the westerly for better all around use.
Moved Ladder to the northerly for better road clearance

Aug 21 Bert will [illegible]
No Crown center Rail will be off. (11:10)

Aug 79 Mr. Dick Louis

OPEN HOLES ________ EXCEPT AS NOTED
END & EDGE DIST. ________ EXCEPT AS NOTED
PAINT SEE NOTES SHT 2
SHIP TO JOB SITE
ERECTION BY RELIABLE STEEL FABRICATORS

RELIABLE STEEL FABRICATORS, INC.
PHONE 352-7575
1218 WEST BAY DRIVE P.O. BOX 8 OLYMPIA, WASH. 98501

500,000 GAL STEEL RESERVOIR
WHATCOM CO. WATER DIST. #10

FOUNDATION

CONTRACTOR

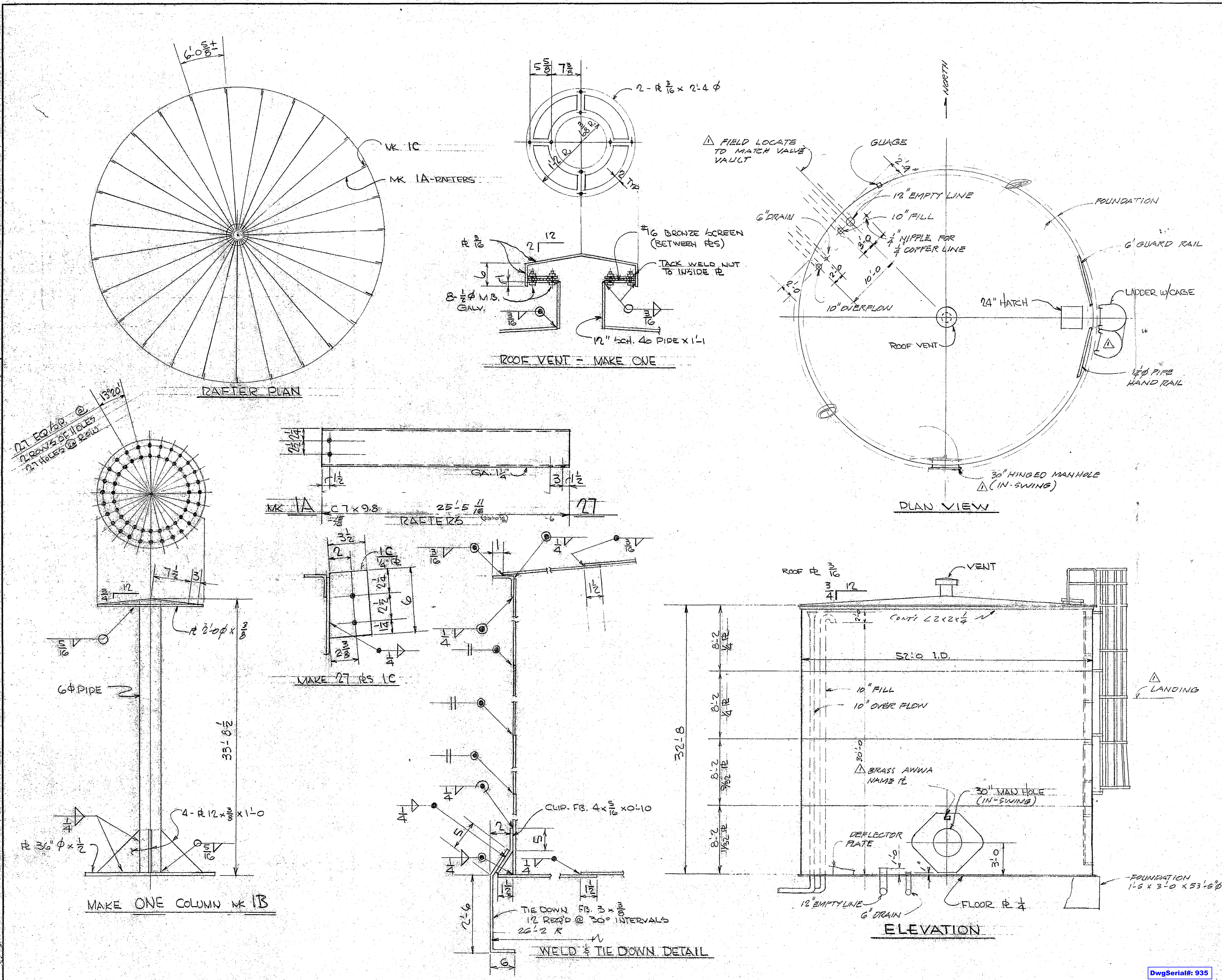
JOB NO.	DRAWING NO.	REV.	DRAWN	CHKD.
9-5-45	1 OF 5			
			DATE 5	

0934

REVISION

DwgSerial#: 934

BRUNING 40-594 34421



BILL OF MATERIAL

SHEET REF.	SHIP MARK	NO. PC'S	PC. MK.	SECTION	LENGTH FT.	LENGTH IN.	REMARKS

PAINT NOTES

1. PAINT TO BE APPLIED AS SPECIFIED BY MFGR. AND TO MIL THICKNESS SPECIFIED BELOW
2. PAINT SHALL NOT BE APPLIED WHEN SURROUNDING AIR TEMPERATURE IS BELOW 40°F. PAINT SHALL NOT BE APPLIED WHEN RELATIVE HUMIDITY EXCEEDS 85%.
3. ALLOW PROPER VENTILATION TO REMOVE SOLVENTS FROM INTERIOR OF TANK. ALLOW SEVEN DAYS FOR PAINT TO DRY BEFORE TESTING OR USE

PAINT SCHEDULE

INTERIOR - ALL INTERIOR SURFACES & APPURTENANCES SHALL BE PREPARED IN ACCORDANCE WITH SSPC SURFACE PREP SPEC #10 NEAR WHITE SANDBLAST. INTERIOR SURFACES SHALL BE PAINTED IN ACCORDANCE WITH AWWA D102-78 INSIDE PAINT SYSTEM NO. 4 1-4S 4 COAT SINGLE SOLUTION VINYL PAINT. SHOP PRIME W/ 1 COAT VINYL ENGARD #101 1.5 MILS D.F.T. THE SECOND & THIRD FINISH COATS SHALL BE OF CONTRASTING COLORS VINYL RESIN PAINT 3.0 MILS DFT, 6.0 MIL TOTAL DFT. FORTH FINAL COAT SHALL BE THE SAME AS PREVIOUS 1.5 MILS D.F.T. COLOR SPECIFIED BY OWNER.

EXTERIOR - ALL EXTERIOR SURFACES & APPURTENANCES SHALL BE PREPARED IN ACCORDANCE WITH SSPC SURFACE PREP SPEC #6 COMMERCIAL BLAST. EXTERIOR SURFACE SHALL BE PAINTED IN ACCORDANCE WITH AWWA D102-78 OUTSIDE PAINT SYSTEM NO. 1 O-1-S SHOP PRIME SHALL BE ENGARD #101 1.5 MILS DFT FOLLOWED BY FINISH COATS OF ALKYD ENAMEL 3.0 MILS D.F.T. TOTAL 6.0 MIL DFT COLOR AS SPECIFIED BY OWNER

OPEN HOLES 9/16 φ EXCEPT AS NOTED
END & EDGE DIST. VARIES EXCEPT AS NOTED
PAINT SEE NOTES ABOVE
SHIP TO JOB SITE
ERECTION BY RELIABLE STEEL FABRICATORS

RELIABLE STEEL FABRICATORS, INC.
PHONE 352-7575
1218 WEST BAY DRIVE P.O. BOX 9 OLYMPIA, WASH. 98501

500,000 GAL STEEL RESERVOIR AWWA
WHATCOM CO. WATER DIST. #10

LAYOUT & STRUCTURAL

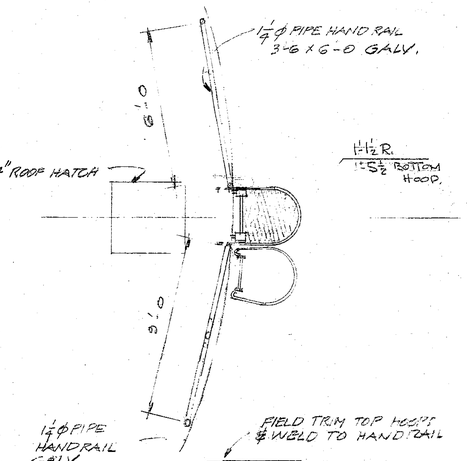
CONTRACTOR

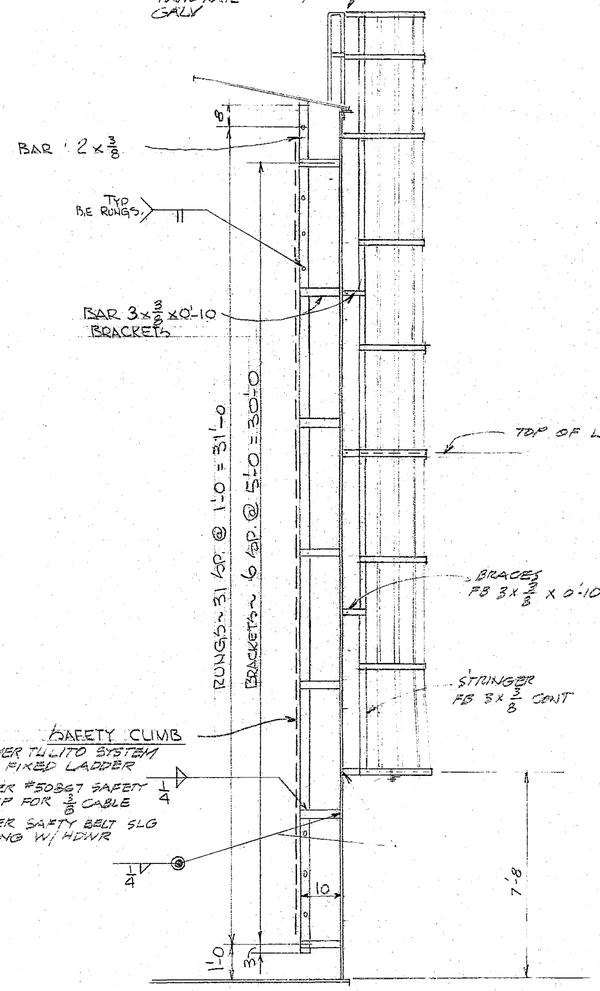
JOB NO.	DRAWING NO.	REV.	DRAWN	CHKD.
7545	2 of 5	1	LR, DATE 5-24-79	

0935

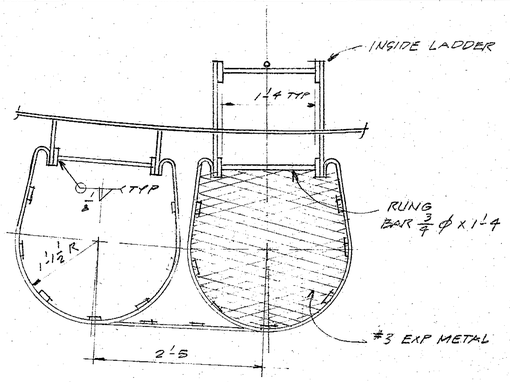
REVISIONS

DwgSerial#: 935

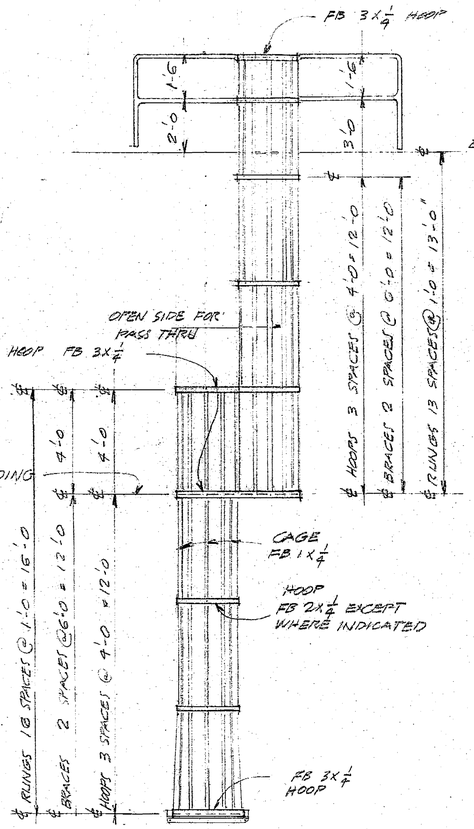


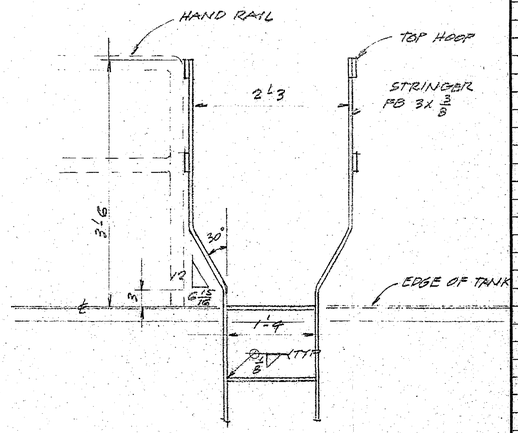


LADDERS ~ MAKE ONE EACH AS SHOWN
GALVANIZE LADDERS

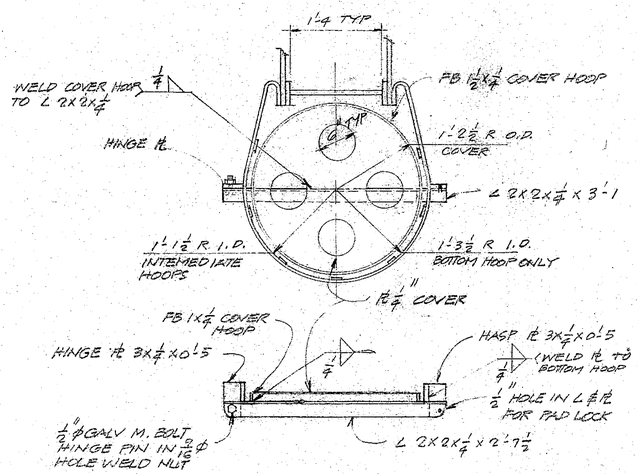


SECTION @ LANDING





ELEVATION @ TOP OF LADDER



LADDER ENTRANCE COVER
GALVANIZE

BILL OF MATERIAL

SHEET REF.	SHIP MARK	NO. PC'S	PC. MK.	SECTION	LENGTH FT.	LENGTH IN.	REMARKS

OPEN HOLES VARIES EXCEPT AS NOTED
END & EDGE DIST VARIES EXCEPT AS NOTED
PAINT SEE NOTES SHT 2 OF 2
SHIP TO 408 SITE
ERECTION BY RELIABLE STEEL FABRICATORS

RELIABLE STEEL FABRICATORS, INC.
1216 WEST BAY DRIVE PHONE 352-7575 P.O. BOX 9 OLYMPIA, WASH. 98501

500,000 GAL STEEL RESERVOIR AWWA
WHATCOM CO. WATER DIST #10

APPURTENANCE
CONTRACTOR

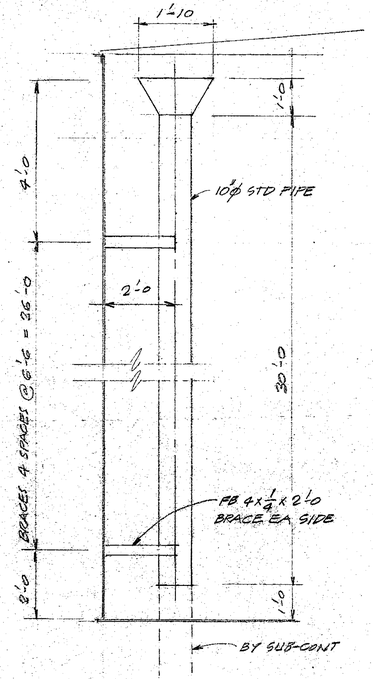
JOB NO.	DRAWING NO.	REV.	DRAWN	CHKD.
9 5 45	3 OF 5	1	LR	
			DATE 5 24 79	

1 ADDED OFF SET IN EXT LADDER DELETED MAN HOLES AS PER APPROVAL DWGS @ 12 79 GW

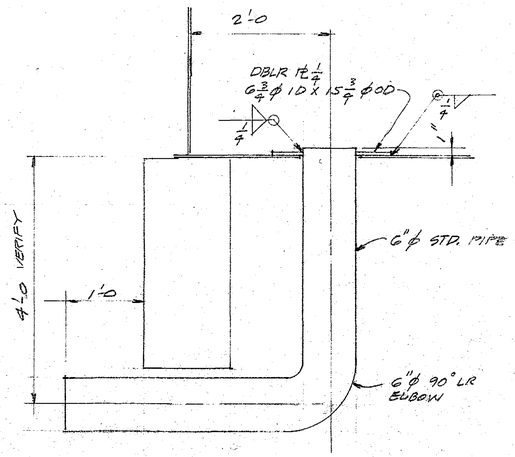
0936 REVISIONS

DwgSerial#: 936

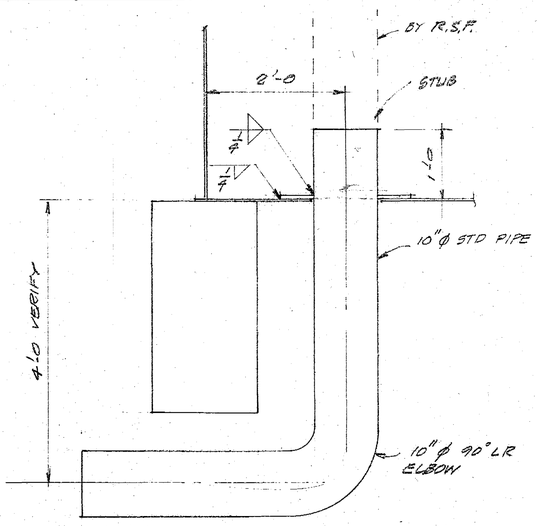
BRUNING 40-534 3-4471



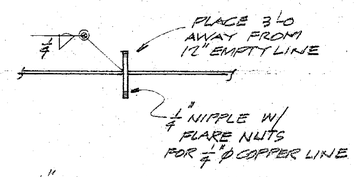
10"ϕ OVER FLOW RISER 1 REQ



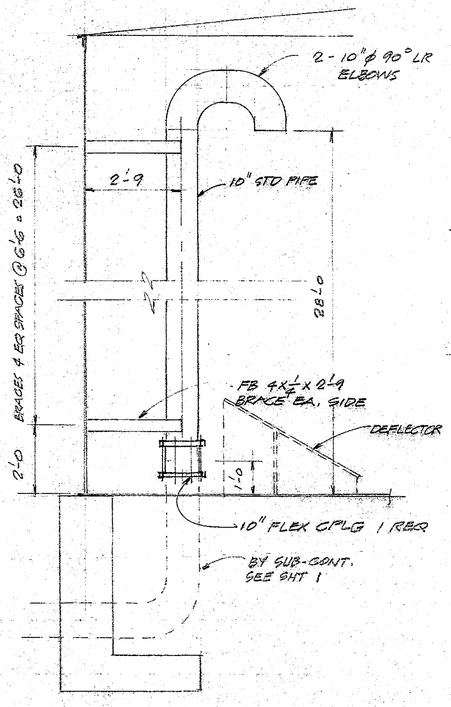
6" DRAIN 1 REQ BY SUB-CONTR



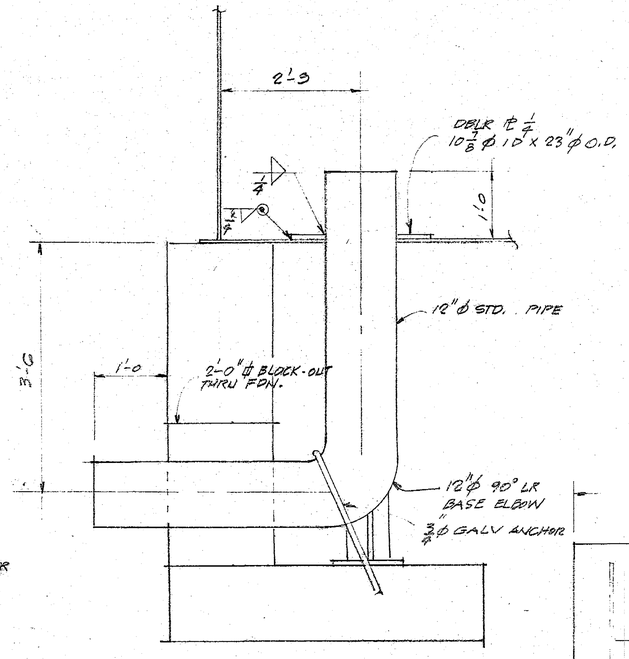
10" OVERFLOW 1 REQ BY SUB-CONTR



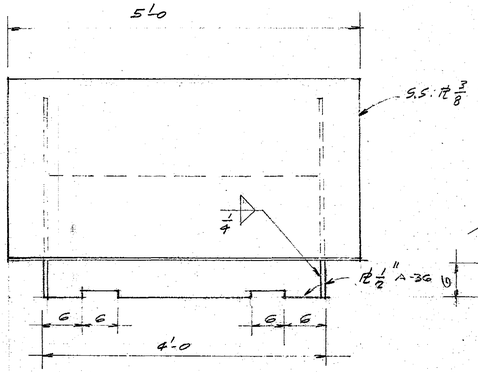
1/4" NIPPLE FOR COPPER LINE 1 REQ BY SUB-CONTR



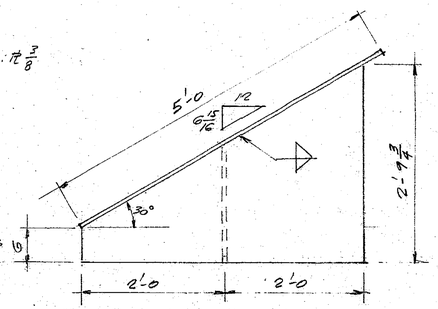
10" FILL RISER 1 REQ



12"ϕ EMPTY LINE SEE FOUNDATION PLAN SHT 1



DEFLECTOR PLATE 1 REQ



BILL OF MATERIAL

SHEET REF.	SHIP MARK	NO. PC'S	PC. MK.	SECTION	LENGTH FT.	LENGTH IN.	REMARKS

a b c d f h k m n p s t v w aa ab ac ad af ah ak am an ap as at av aw ba bb bc bd bf

OPEN HOLES _____ EXCEPT AS NOTED
END & EDGE DIST. _____ EXCEPT AS NOTED
PAINT SEE NOTES SHT 2 OF 2
SHIP TO JOB SITE
ERECTION BY RELIABLE STEEL FABRICATORS

RELIABLE STEEL FABRICATORS, INC.
PHONE 352-7575
1218 WEST BAY DRIVE P.O. BOX 9 OLYMPIA, WASH. 98501

500,000 GAL STEEL RESERVOIR AWWA
WHATCOM CO. WATER DIST. #10

APPURTENANCES
CONTRACTOR

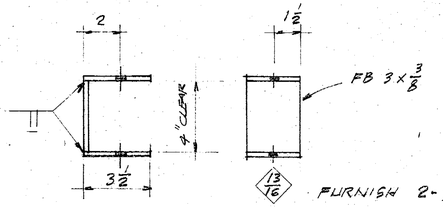
JOB NO.	DRAWING NO.	REV.	DRAWN	CHKD.
9 5 45	4 OF 5	1	EW	
			DATE 5 29 79	

REVISED 12" EMPTY LINS AS PER APPROVAL DWGS 6 15 79 EW

DwgSerial#: 937

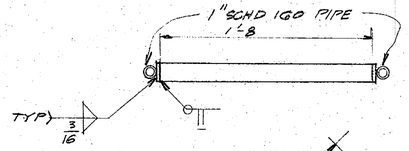
0937 REVISIONS

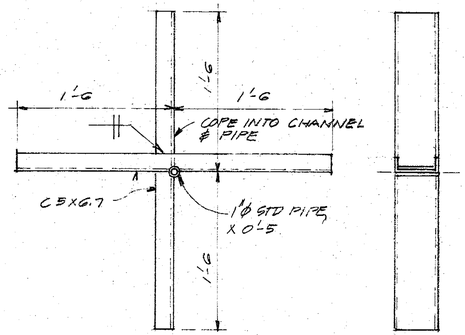
BRUNING 40-9343-9471



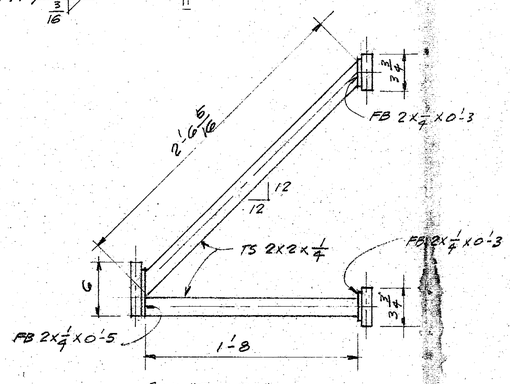
HANGER 2 REQ

FURNISH 2-¾" ø x 6" SS. BOLTS W/NUTS

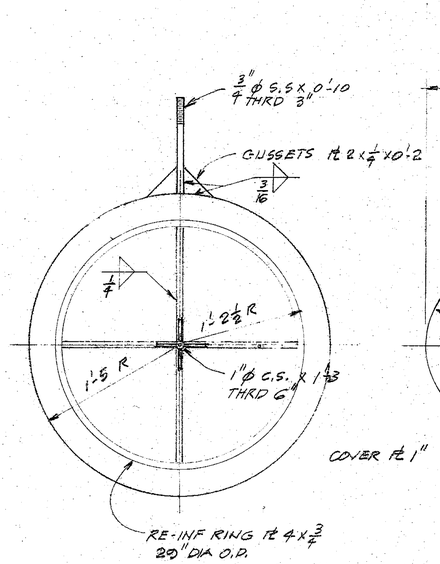




PRESSURE BAR 1 REQ'D



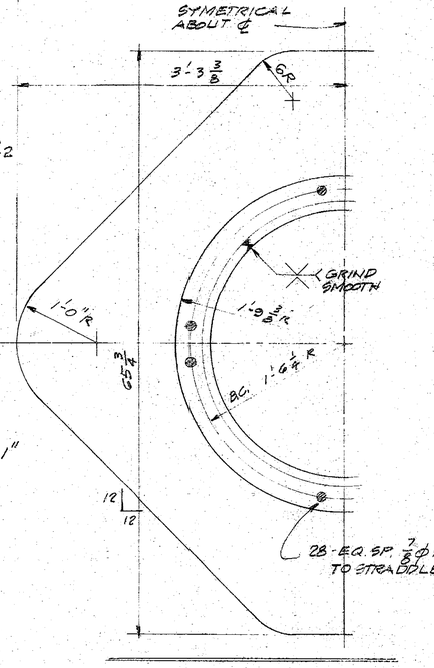
SWING ARM

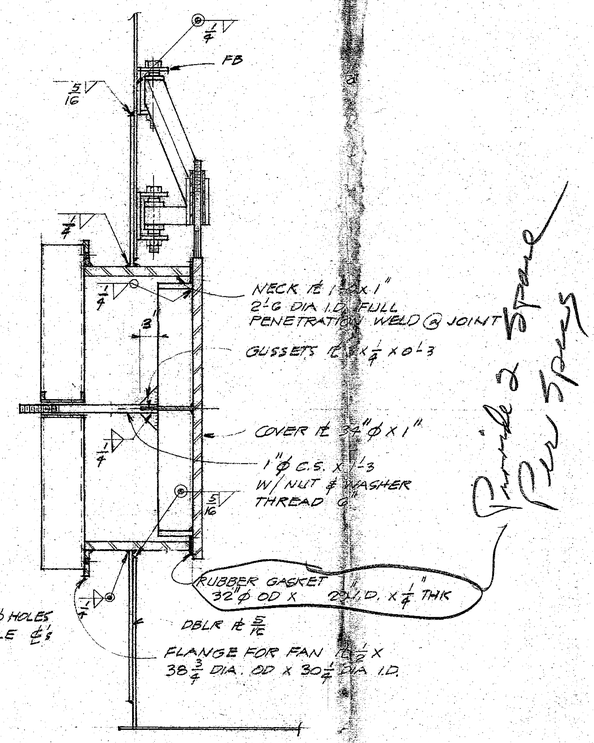


COVER PL 1"

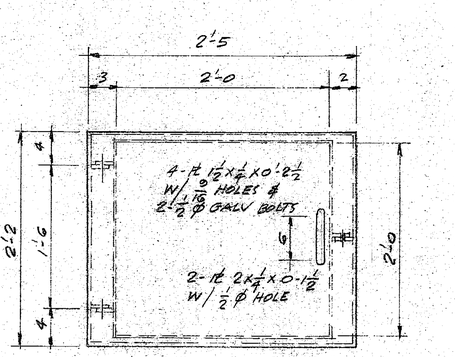
RE-INF RING PL 4 x ¾ 20" DIA O.D.

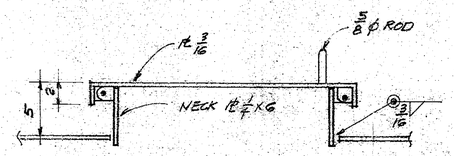
COVER PLATE DETAIL





30" SHELL MANHOLE 1 REQ'D





24" ø ROOF HATCH 1 REQ'D

BILL OF MATERIAL

SHEET REF.	SHIP MARK	NO. PC'S	PC. WK.	SECTION	LENGTH FT.	LENGTH IN.	REMARKS

OPEN HOLES VARIES EXCEPT AS NOTED

END & EDGE DIST VARIES EXCEPT AS NOTED

PAINT SEE NOTES SHT 2

SHIP TO JOB SITE

ERECTION BY RELIABLE STEEL FABRICATORS

RELIABLE STEEL FABRICATORS, INC.

PHONE 352-7575

1218 WEST BAY DRIVE P.O. BOX 9 OLYMPIA, WASH. 98501

500,000 GAL STEEL WATER RESERVOIR

WHATCOM CO. WATER DIST #10

CONTRACTOR

JOB NO.	DRAWING NO.	REV.	DRAWN	CHKD.
9545	5 OF 5	1	DATE 6 13 79	

REVISIONS

a NEW SHELL MAN HOLE DET AS PER APPROVAL DWGS. 6 12 79 SW

b c d e f g h j k m n p s t v w aa ab ac ad af ah ak am an ap as at av aw ba bb bc bd bf

DwgSerial#: 938

0938

BRUNING 40-634-34471

LAKE WHATCOM WATER & SEWER DISTRICT

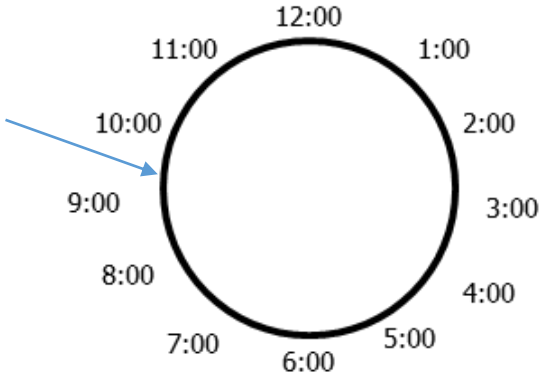
Geneva Reservoir

April 10, 2018

H2O SOLUTIONS, LLC

Date of Cleaning & Inspection :	April 10, 2018	Tank Name :	Geneva
Water Loss from Cleaning:	18,000 Gallons	Height :	53’
Construction Type:	Steel	Diameter or L x W :	32’
Capacity(gal):	519,000	Year Built :	1979

Exterior Wall



Description

Appeared to be in good condition with areas of minor surface corrosion. Overall 10% corrosion present.

Rust Grade

3

Coating System

Appeared to be in poor condition with chalking, delamination and fading. Overall 50% coating failure.

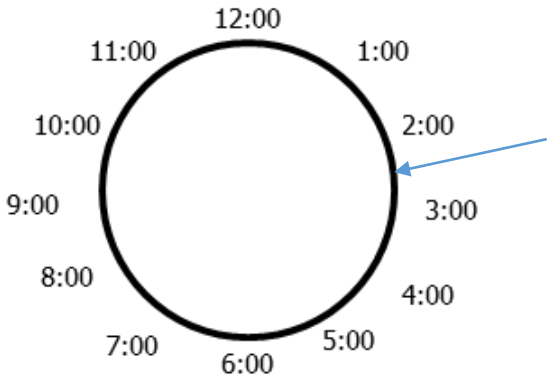
Recommendations

Coating replacement

Exterior Wall

Description

Appeared to be in good condition with areas of minor surface corrosion. Overall 10% corrosion present.



Rust Grade

3

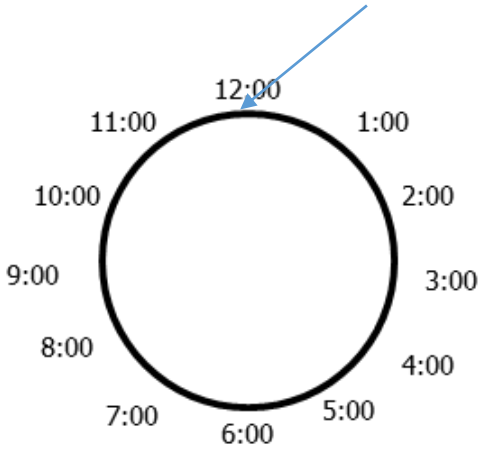
Coating System

Appeared to be in poor condition with chalking, delamination and fading. Overall 50% coating failure.

Recommendations

Coating replacement

Exterior Ladder



Description

Structurally sound and in good condition. A few isolated spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

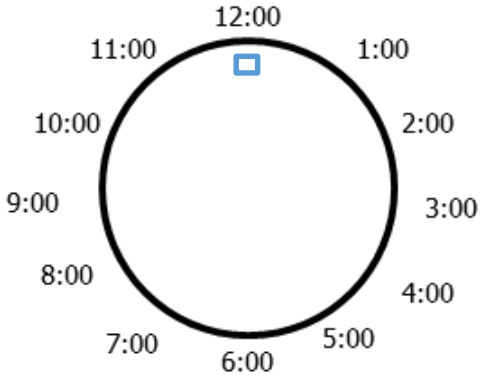
Coating System

Appeared to be in good condition with minor chalking. Overall less than 5% coating failure.

Recommendations

None at this time.

Exterior Hatch Lid



Description

Appeared to be in good working condition with areas of surface corrosion. Overall 20% corrosion present.

Rust Grade

3

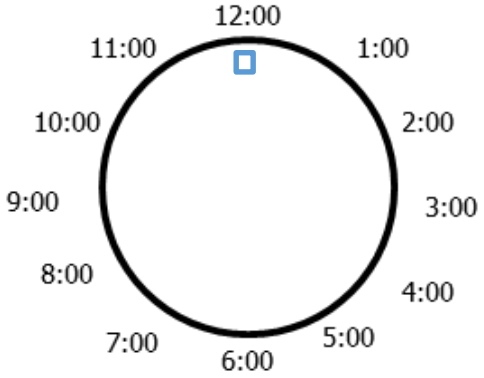
Coating System

Appeared to be in poor condition with chalking, delamination and fading. Overall 50% coating failure.

Recommendations

Coating replacement

Exterior Hatch



Description

Appeared to be in good condition with areas of surface corrosion. Overall 50% corrosion present.

Rust Grade

1

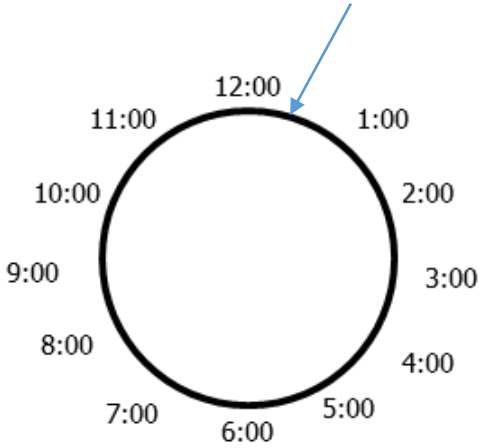
Coating System

Appeared to be in poor condition with chalking, delamination and fading. Overall 75% coating failure.

Recommendations

Coating replacement

Exterior Railing



Description

Appeared to be in good working condition with areas of minor surface corrosion. Overall 10% corrosion present.

Rust Grade

3

Coating System

Appeared to be in good condition with minor chalking and fading . Overall 10% coating failure.

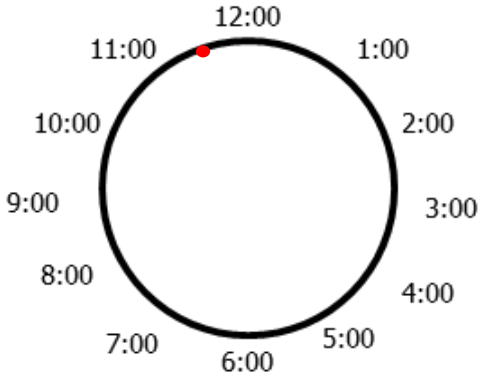
Recommendations

None at this time

Exterior MLI

Description

Appeared to be in good working condition.



Rust Grade

N/A

Coating System - Box

N/A

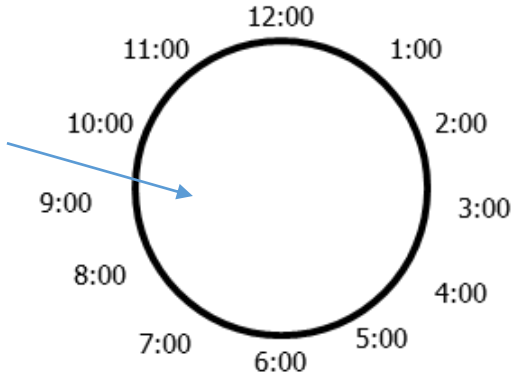
Recommendations

None at this time

Exterior Roof

Description

Appeared to be in good condition with areas of minor surface corrosion. Overall 20% corrosion present.



Rust Grade

2

Coating System

Appeared to be in poor condition with chalking, delamination and fading. Overall 50% coating failure.

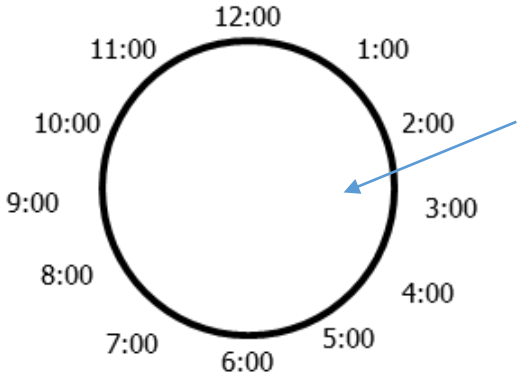
Recommendations

Coating replacement

Exterior Roof

Description

Appeared to be in good condition with areas of minor surface corrosion. Overall 20% corrosion present.



Rust Grade

2

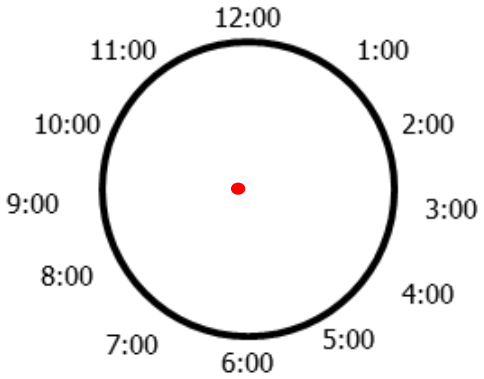
Coating System

Appeared to be in poor condition with chalking, delamination and fading. Overall 50% coating failure.

Recommendations

Coating replacement

Exterior Vent



Description

Appeared to be in good condition with areas of minor surface corrosion. Overall 10% corrosion present.

Rust Grade

3

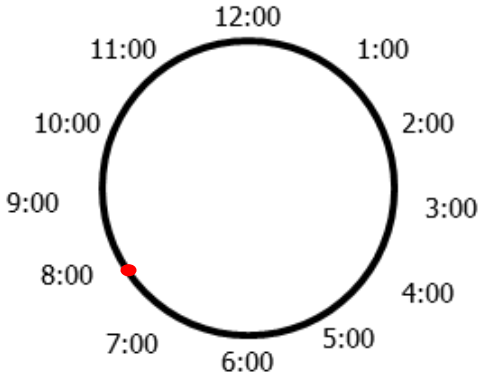
Coating System

Appeared to be in poor condition with chalking, delamination and fading. Overall 50% coating failure.

Recommendations

Coating replacement

Exterior Manway



Description

Appeared to be in good condition with areas of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

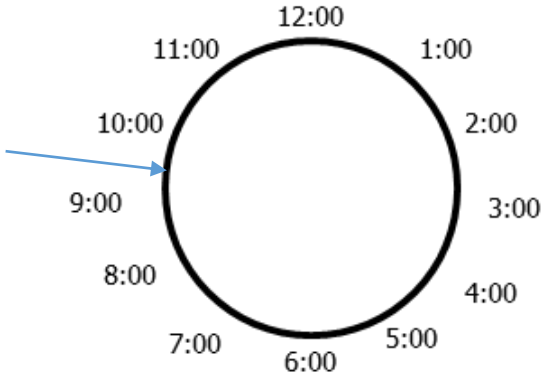
Coating System

Appeared to be in good condition with minor chalking. Overall 10% coating failure.

Recommendations

None at this time

Interior Wall



Description

Appeared to be in good condition with areas of minor to moderate surface corrosion. Overall 20% corrosion present.

Rust Grade

3

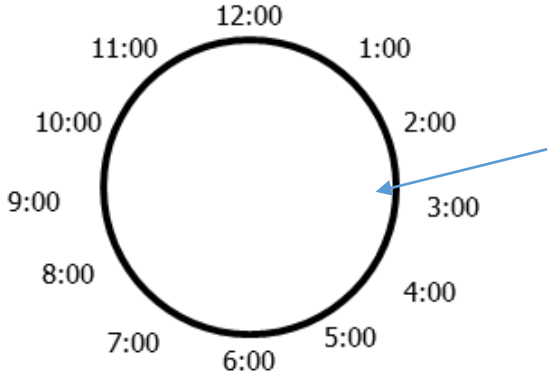
Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 25% coating failure.

Recommendations

Coating replacement

Interior Wall



Description

Appeared to be in good working condition with a few isolated spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

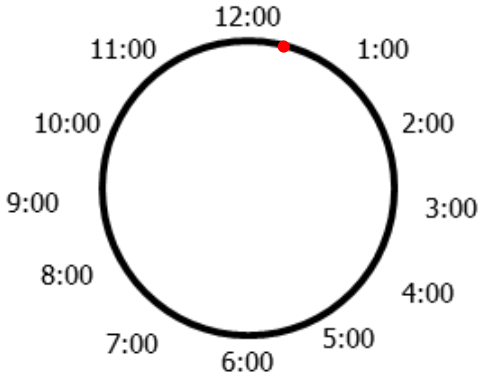
Coating System

Appeared to be in fair condition with chalking blistering and staining. Overall 10% coating failure.

Recommendations

Coating replacement

Interior Telemetry



Description

Appeared to be in good working condition.

Rust Grade

N/A

Coating System

N/A

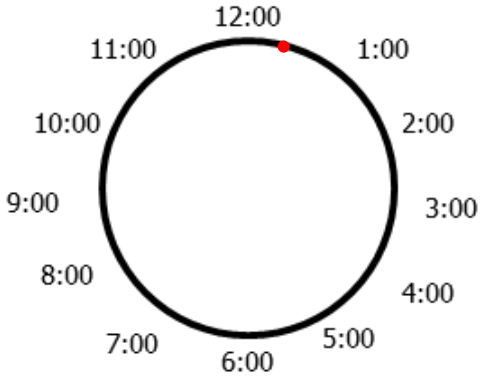
Recommendations

None at this time

Interior MLI Base

Description

Appeared to be in good working condition.



Rust Grade

N/A

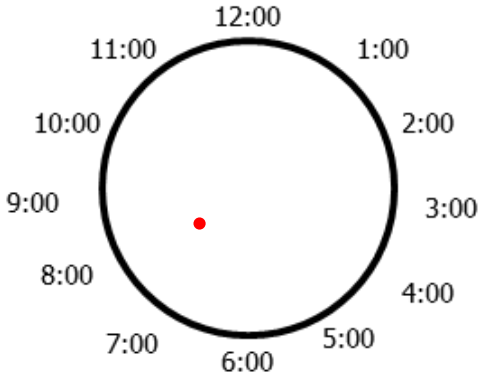
Coating System

N/A

Recommendations

None at this time

Interior Sacrificial Anode



Description

Appeared to be in good working condition. Sacrificed 5%.

Rust Grade

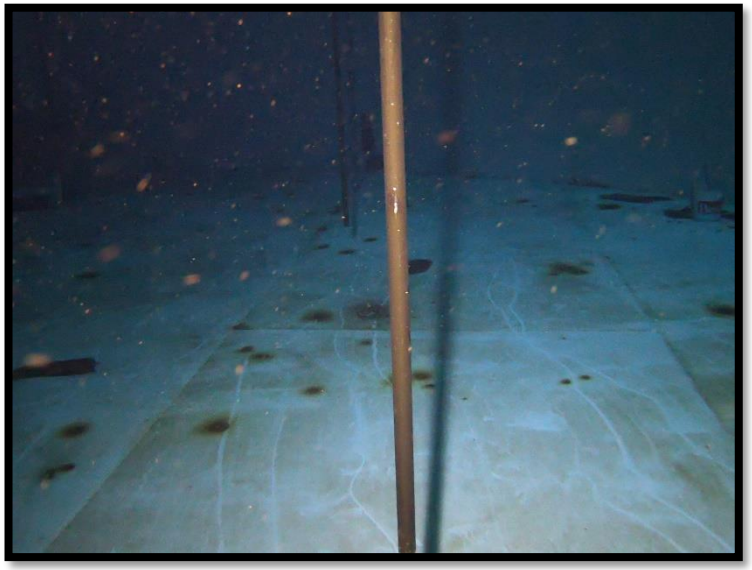
N/A

Coating System

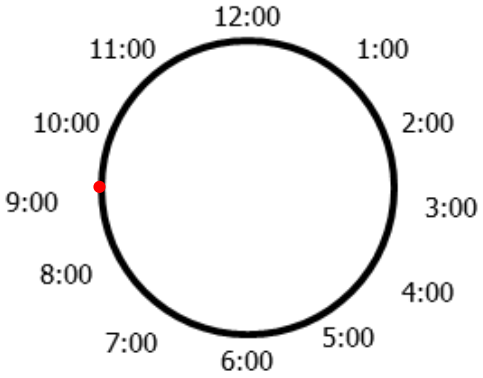
N/A

Recommendations

None at this time



Interior Overflow



Description

Appeared to be in good working condition with areas of surface corrosion. Overall 25% corrosion present.

Rust Grade

2

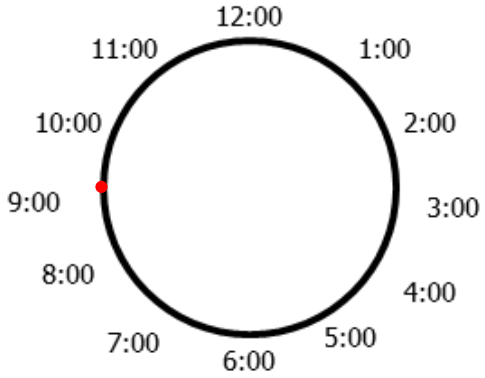
Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 25% coating failure.

Recommendations

Coating replacement

Interior Overflow



Description

Appeared to be in good working condition with areas of surface corrosion. Overall 25% corrosion present.

Rust Grade

2

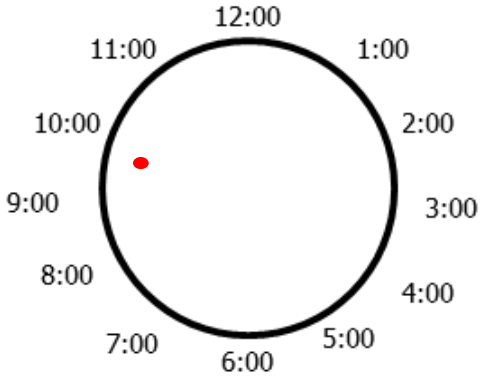
Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 25% coating failure.

Recommendations

Coating replacement

Interior Inlet



Description

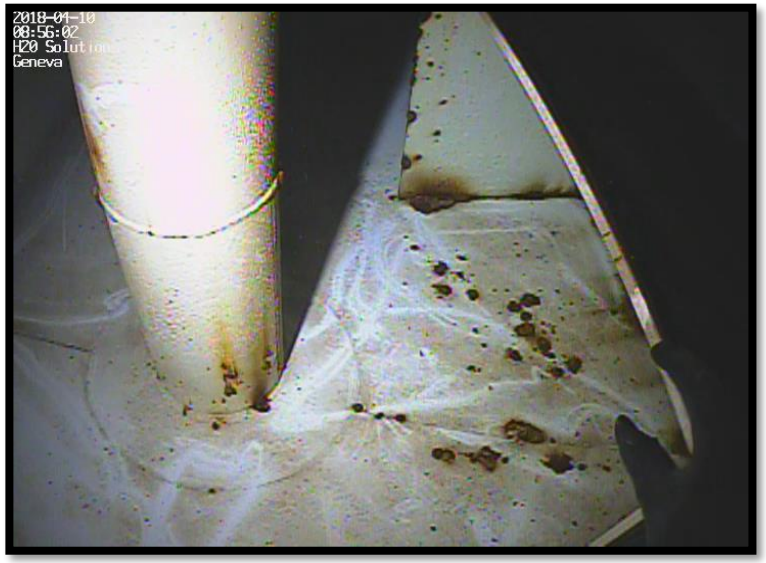
Appeared to be in good working condition with areas of surface corrosion. Overall 25% corrosion present.

Rust Grade

2

Coating System

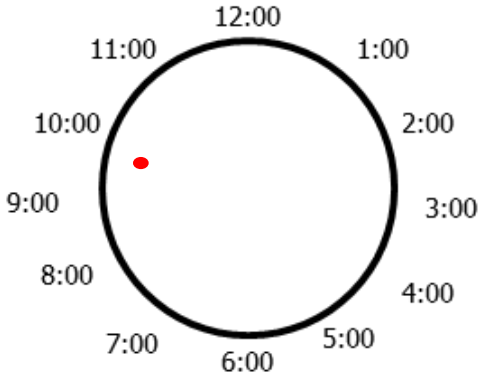
Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 25% coating failure.



Recommendations

Coating replacement

Interior Inlet



Description

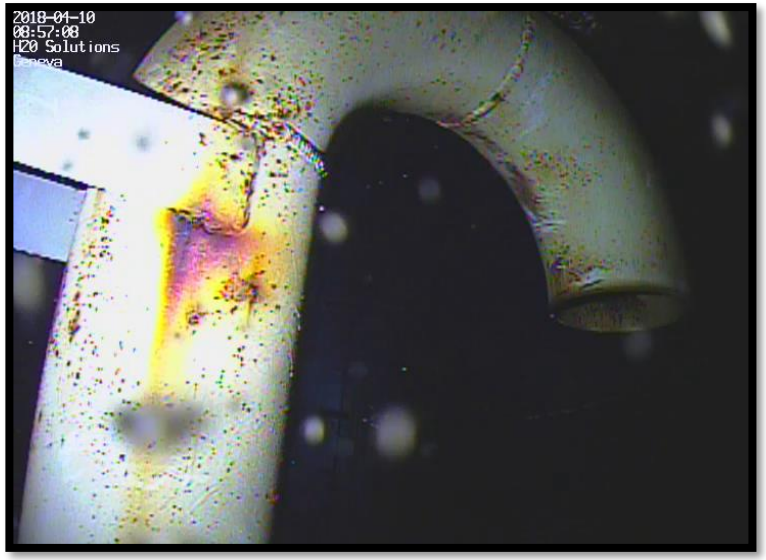
Appeared to be in good working condition with areas of surface corrosion. Overall 25% corrosion present.

Rust Grade

2

Coating System

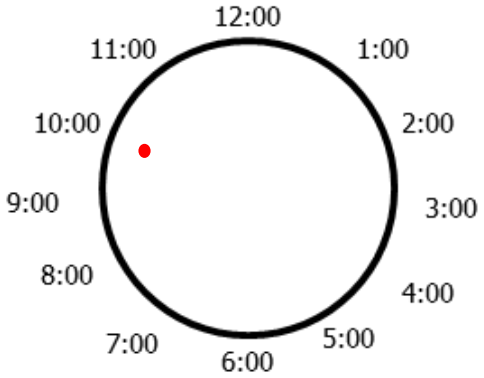
Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 25% coating failure.



Recommendations

Coating replacement

Interior Outlet



Description

Appeared to be in good working condition with areas of surface corrosion. Overall 25% corrosion present.

Rust Grade

2

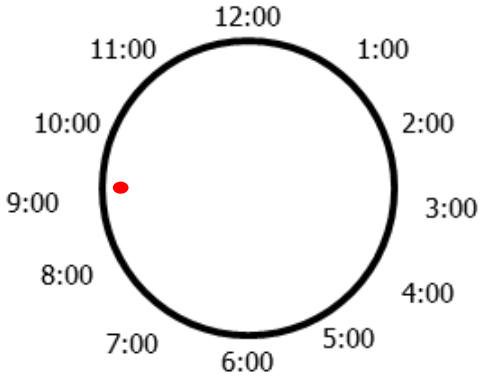
Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 25% coating failure.

Recommendations

Coating replacement

Interior Drain



Description

Appeared to be in good working condition with areas of minor surface corrosion. Overall 10% corrosion present.

Rust Grade

3

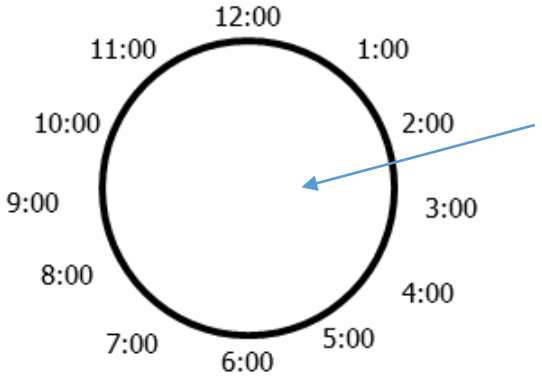
Coating System

Appeared to be in good condition with minor chalking. Overall 5% coating failure.

Recommendations

None at this time

Interior Ceiling



Description

Appeared to be in fair condition with areas of moderate to heavy surface corrosion. Overall 50% corrosion present.

Rust Grade

1

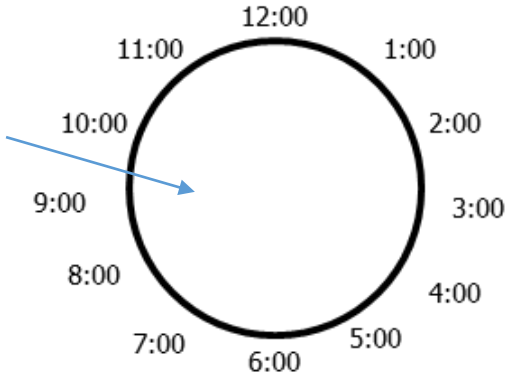
Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 75% coating failure.

Recommendations

Coating replacement

Interior Ceiling



Description

Appeared to be in fair condition with areas of moderate to heavy surface corrosion. Overall 50% corrosion present.

Rust Grade

1

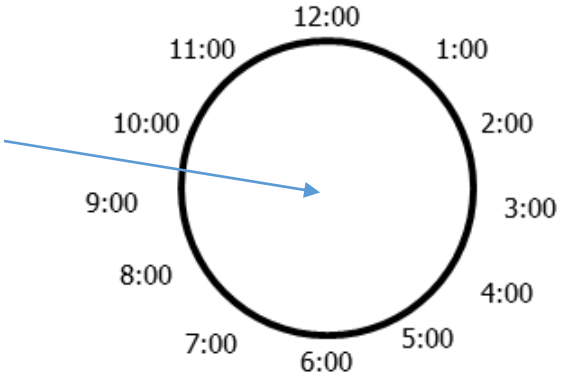
Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 75% coating failure.

Recommendations

Coating replacement

Interior Ceiling



Description

Appeared to be in fair condition with areas of moderate to heavy surface corrosion. Overall 50% corrosion present.

Rust Grade

1

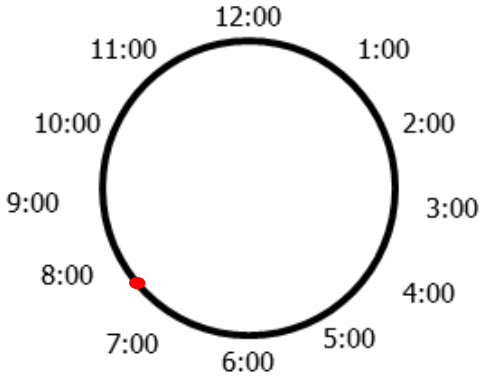
Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 75% coating failure.

Recommendations

Coating replacement

Interior Manway



Description

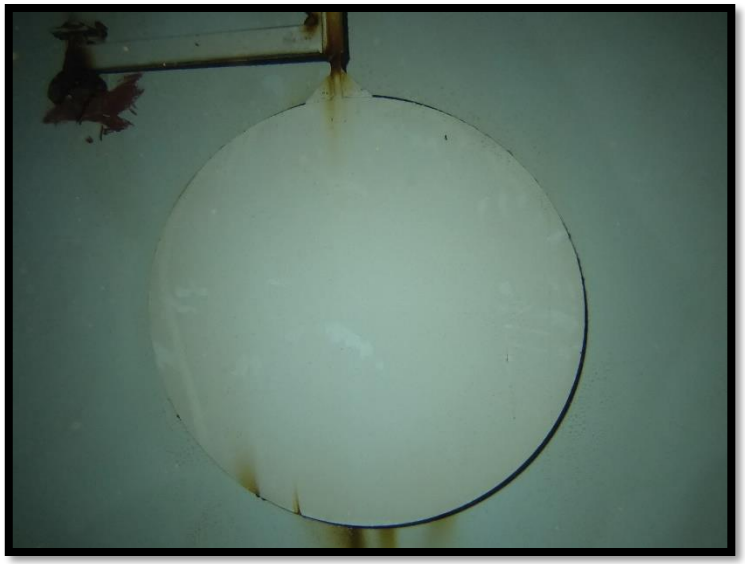
Appeared to be in good condition with areas of surface corrosion. Overall 5% corrosion present. Gasket is in good condition.

Rust Grade:

4

Coating System

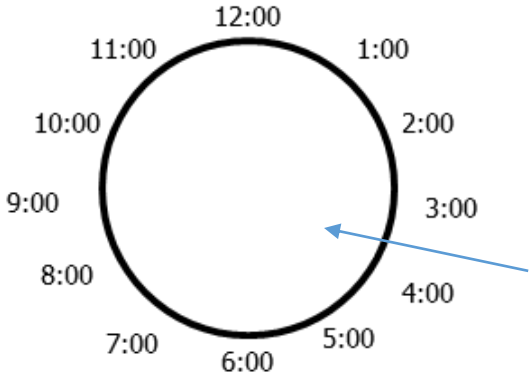
Appeared to be in good condition with chalking and staining. Overall 5% coating failure.



Recommendations

None at this time

Interior Floor



Description

Appeared to be in good condition with areas of minor to moderate surface corrosion. Overall 30% corrosion present.

Rust Grade

2

Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 50% coating failure.

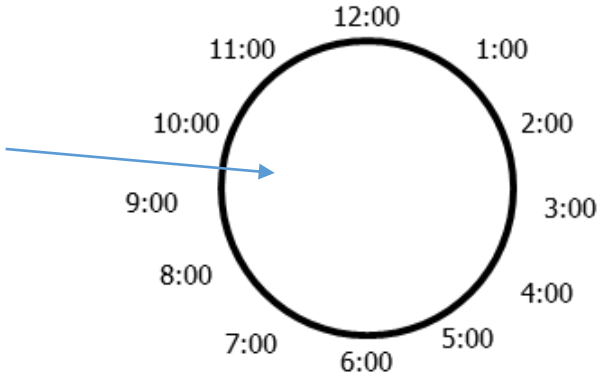
Recommendations

Coating replacement

Interior Floor

Description

Appeared to be in good condition with areas of minor to moderate surface corrosion. Overall 30% corrosion present.



Rust Grade

2

Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 50% coating failure.

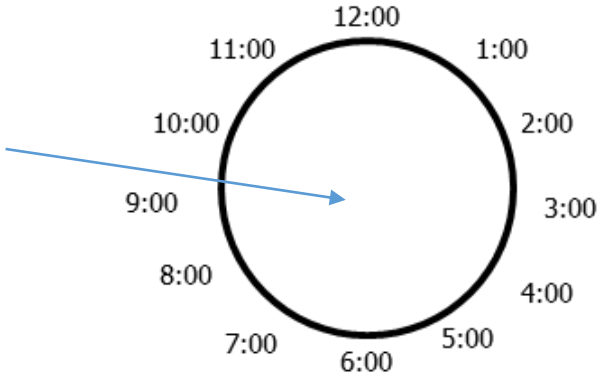
Recommendations

Coating replacement

Interior Floor

Description

Appeared to be in good condition with areas of minor to moderate surface corrosion. Overall 30% corrosion present.

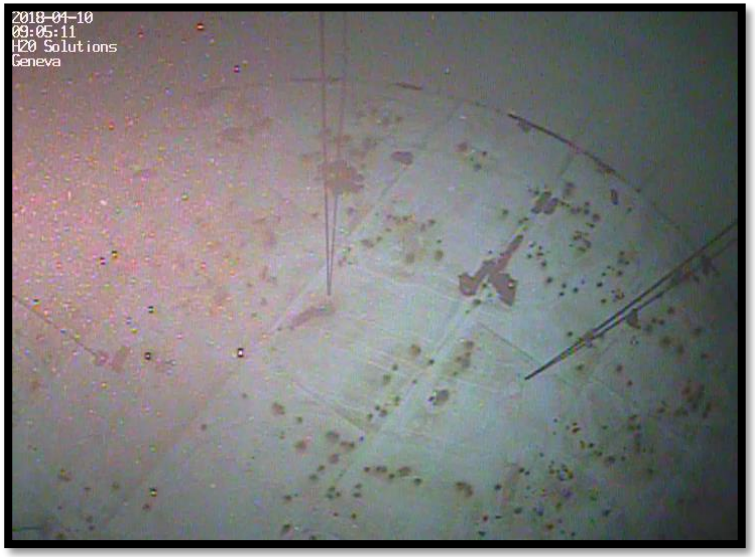


Rust Grade

2

Coating System

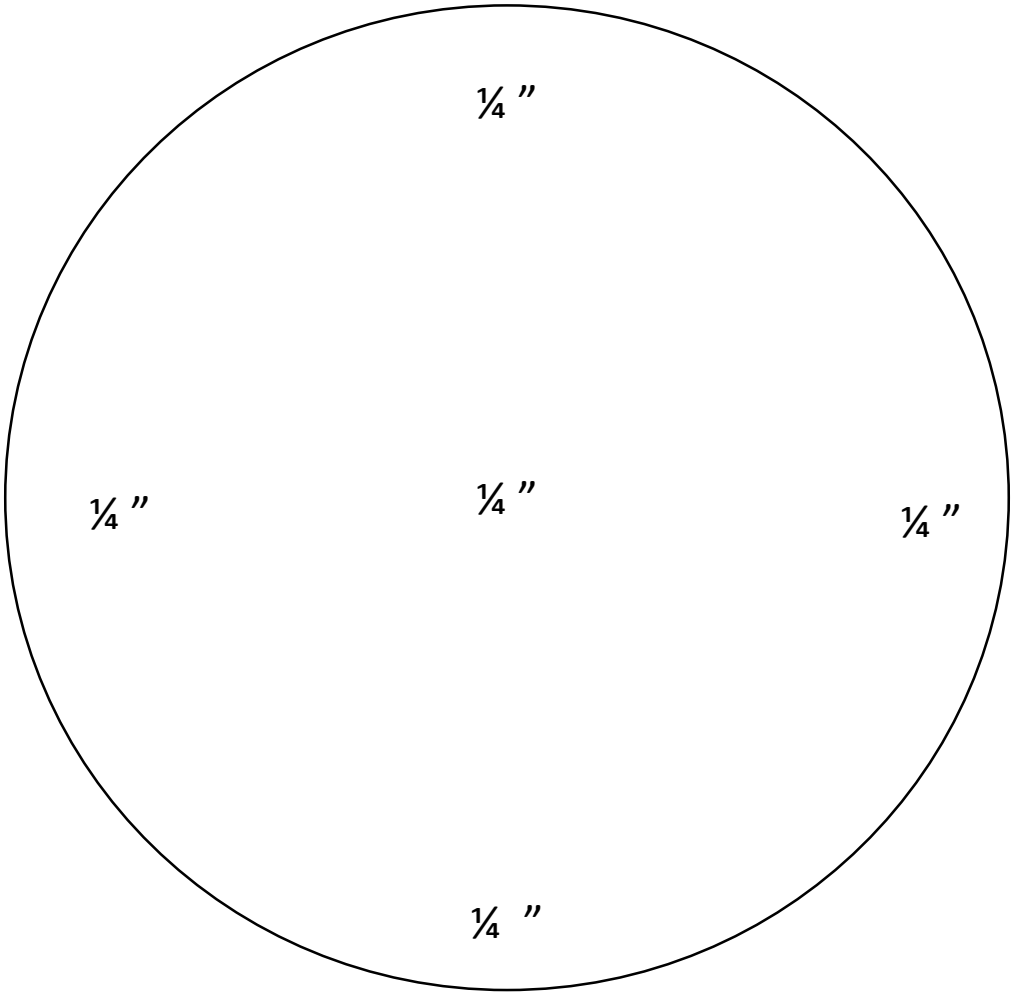
Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 50% coating failure.



Recommendations

Coating replacement

Sediment Depth



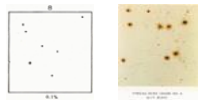
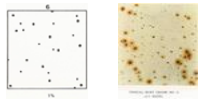
References

Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces – SSPC-Vis 2-82 & ASTM D 610-85 (1989)

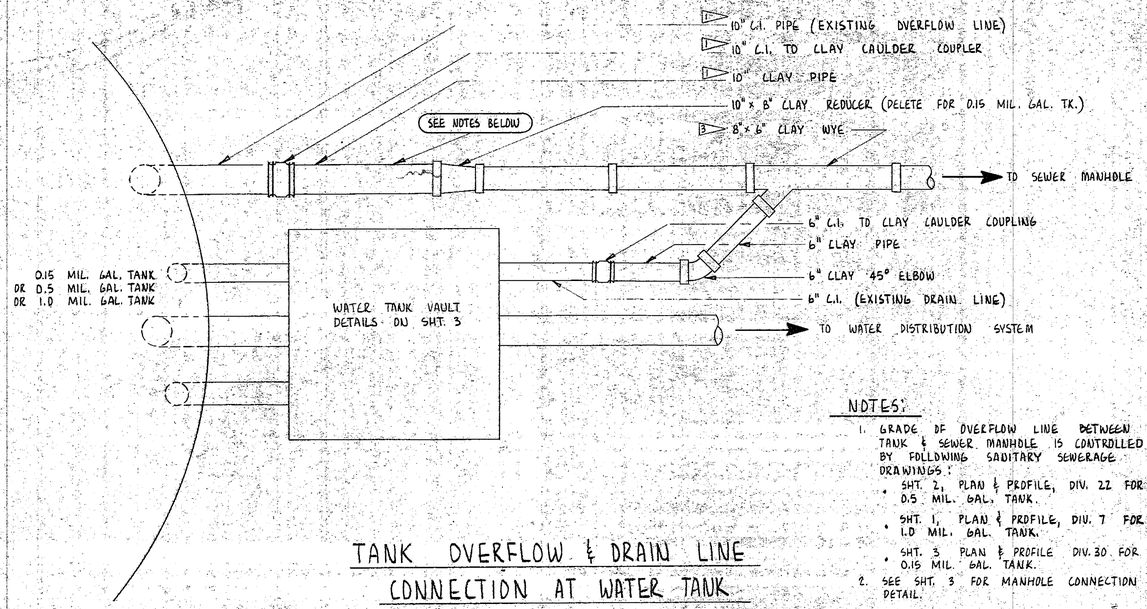
The graphical representations show examples of area percentages, which may be helpful in rust grading. The use of photographical reference standards requires the following precautions:

- Some finishes are stained by rust. This staining must not be confused with the actual rusting involved.
- Accumulated dirt or other material may make accurate determination of the degree of rusting difficult.
- Certain types of deposited dirt that contain iron or iron compounds may cause surface discoloration that should not be mistaken for corrosion.
- It must be realized that failure may vary over a given area and discretion must therefore be used in applying these reference standards.
- In evaluating surfaces, consideration shall be given to the color of the finish coating, since failures will be more apparent on a finish that shows color contrast with rust, such as white, than on a similar color, such as iron oxide finish.
- The photographic reference standards are not required for use of the rust-grade scale since the scale is based upon the percent of the area rusted and any method of assessing area rusted may be used to determine the rust grade.

A	Similar to European Scale of Degree of rusting for Anti-Corrosive Paints (1961) (Black & White)
B	Corresponds to SSPC Initial Surface Conditions E (0 - 0.1%) and BISRA (British Iron and Steel Research Association) 0.1%
C	Corresponds to SSPC Initial Surface Conditions F (0.1%-1%) and BISRA 1%
D	Corresponds to SSPC Initial Surface Conditions G (1 - 10%)
E	Rust grades below 4 are of no practical importance in grading performance of paints
F	Corresponds to SSPC Initial Surface Condition H (50 - 100%)

Rust Grades [A]	Description	Graphical Representation
10	No rusting or less than 0.01% of surface rusted	Unnecessary
9	Minute rusting less than 0.03% of surface rusted	
8[B]	Few isolated rust spots less than 0.1% of surface rusted	
7	Less than 0.3% of surface rusted	
6[C]	Extensive rust spots but less than 1% of surface rusted	
5	Rusting to the extent of 3% of surface rusted	
4[D]	Rusting to the extent of 10% of surface rusted	
3[E]	Approximately on sixth of the surface rusted 16%	
2	Approximately one third of the surface rusted 33%	
1	Approximately one half of the surface rusted 50%	

Division 22 Reservoir Information

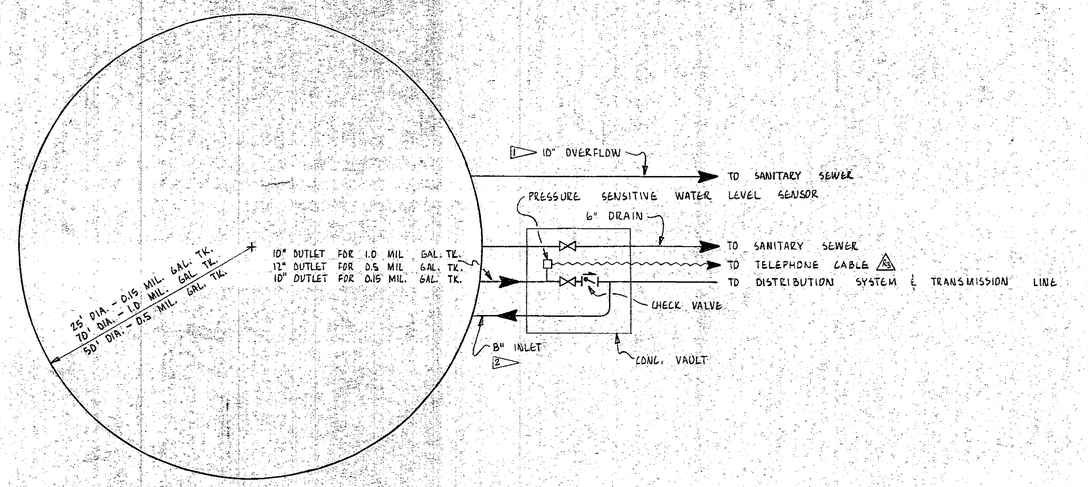


TANK OVERFLOW & DRAIN LINE CONNECTION AT WATER TANK DETAIL

NO SCALE

NOTES:

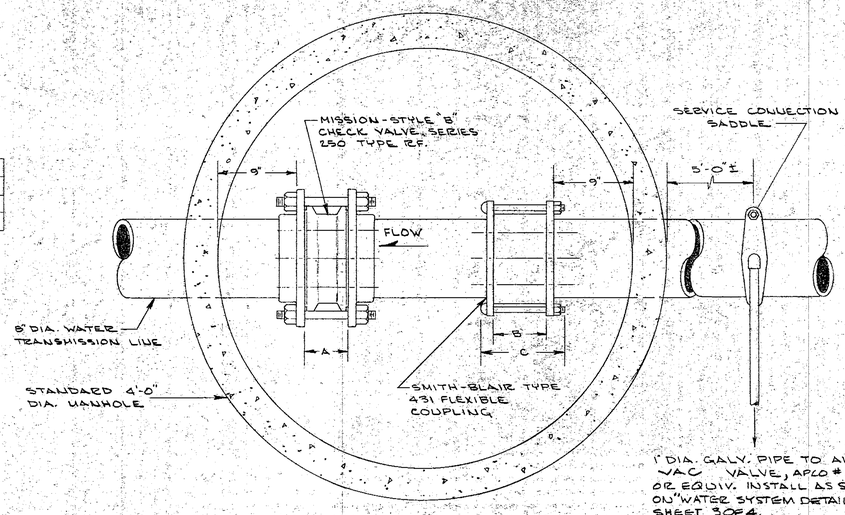
1. GRADE OF OVERFLOW LINE BETWEEN TANK & SEWER MANHOLE IS CONTROLLED BY FOLLOWING SANITARY SEWERAGE DRAWINGS:
   - SHT. 2, PLAN & PROFILE, DIV. 22 FOR 0.5 MIL. GAL. TANK.
   - SHT. 1, PLAN & PROFILE, DIV. 7 FOR 1.0 MIL. GAL. TANK.
   - SHT. 3 PLAN & PROFILE DIV. 30 FOR 0.15 MIL. GAL. TANK.
2. SEE SHT. 3 FOR MANHOLE CONNECTION DETAIL.



PLAN VIEW

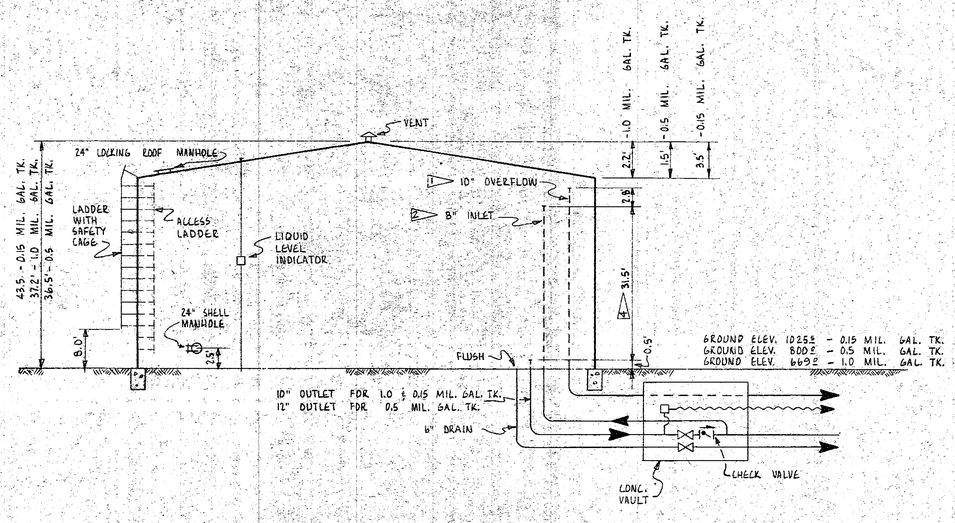
NO SCALE

MK.	6" LINE	8" LINE
A	3 3/4"	5"
B	6"	9 1/2"
C	6"	9 1/2"



WATER TRANSMISSION LINE CHECK VALVE VAULT DETAIL

SCALE: 1 1/2" = 1'-0"



ELEVATION VIEW

NO SCALE

WATER TANK SCHEMATIC

1.0, 0.5, & 0.15 MILLION GALLON TANKS ARE IDENTICAL EXCEPT AS NOTED AND AS SHOWN BY FLAGGED ITEMS.

THE FLAGGED ITEMS APPLY TO THE 0.15 MIL. GAL. TK. ONLY:

1. 6"
2. 6" INLET
3. 6" x 6"
4. 41'-6"

SYMBOL	REVISION	BY	APPROVED	DATE
3	CHANGE DIRECT BURIED CABLE TO TELE. CABLE &			
2	ADD 0.15 MILLION GALLON TANK SPECIFICATIONS	SAW	MLP	2-1-74
1	ADD APCO #143C VALVE	RIA	RIA	8-20-73
0	ADD TANK OVERFLOW CONNECTION DETAIL	SAW	RVM	12-13-71

DESIGNED R.I.A.
DRAWN S.A.W.
CHECKED M.L.P.

CONSULTING ENGINEERS
PLANNING CONSULTANTS
GOLF COURSE ARCHITECT
GOLF COURSE ENGINEERING
SOIL MECHANICS ENGINEERS
ARCHITECTS & LANDSCAPE ARCHITECTS

HORTON DENNIS & ASSOCIATES, INC.
DAVID JENSEN ASSOCIATES
THEODORE G. ROBINSON
D. A. HOGAN & ASSOCIATES
DAMES & MOORE
MILES TANICK & CO.

Sudden Valley

the undevelopment of the
THE SANWICK CORPORATION
SUITE 1200 DENNY BUILDING SEATTLE, WASHINGTON 98121

APPROVED

DATE 3-71
SCALE NONE
F. B. NO.

SUDDEN VALLEY WATER SYSTEM DETAILS

JOB NO. 2234
SHEET NO. 4 OF 4

0881

DwgSerial#: 881

LAKE WHATCOM WATER & SEWER DISTRICT

Division 22 Reservoir

April 10, 2018

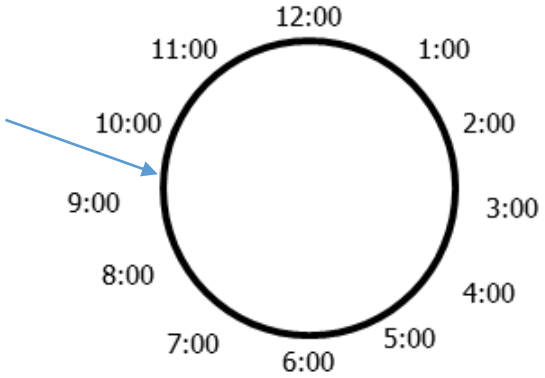
H2O SOLUTIONS, LLC

Date of Cleaning & Inspection :	April 10, 2018	Tank Name :	Division 22
Water Loss from Cleaning:	12,000 Gallons	Height :	35’
Construction Type:	Steel	Diameter or L x W :	50’
Capacity(gal):	520,000	Year Built :	1971

Exterior Wall

Description

Appeared to be in good condition with areas of minor surface corrosion. Overall 5% corrosion present.

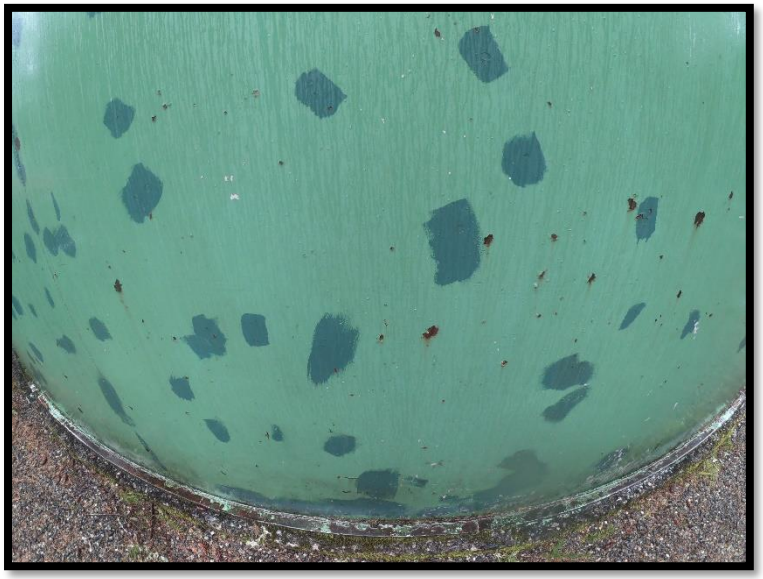


Rust Grade

4

Coating System

Appeared to be in good condition with chalking and delamination. Overall 10% coating failure.



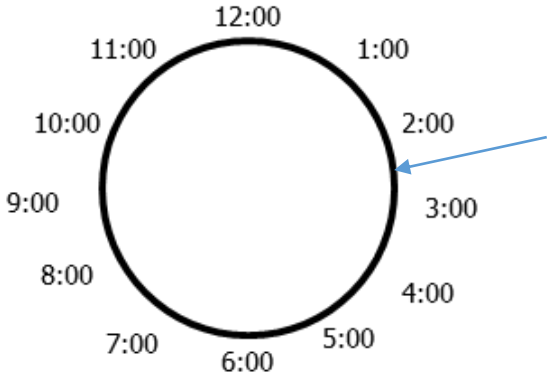
Recommendations

None at this time

Exterior Wall

Description

Appeared to be in good condition with areas of minor surface corrosion. Overall 5% corrosion present.



Rust Grade

4

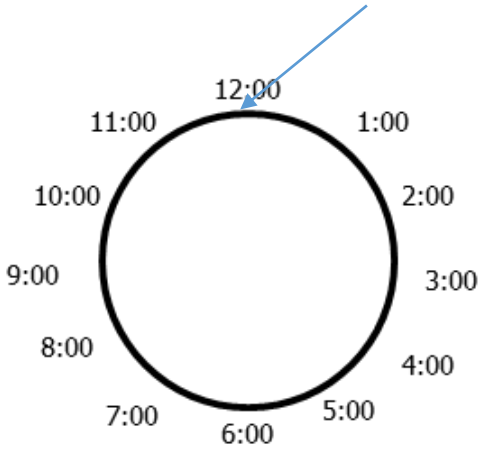
Coating System

Appeared to be in good condition with chalking and delamination. Overall 10% coating failure.

Recommendations

None at this time

Exterior Ladder



Description

Structurally sound and in good condition. A few isolated spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

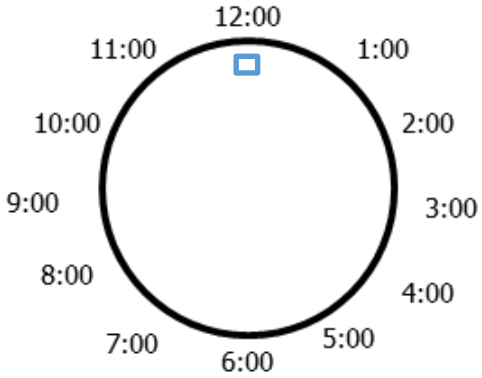
Coating System

Appeared to be in good condition with minor chalking. Overall 5% coating failure.

Recommendations

None at this time.

Exterior Hatch Lid



Description

Appeared to be in good working condition with a few spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

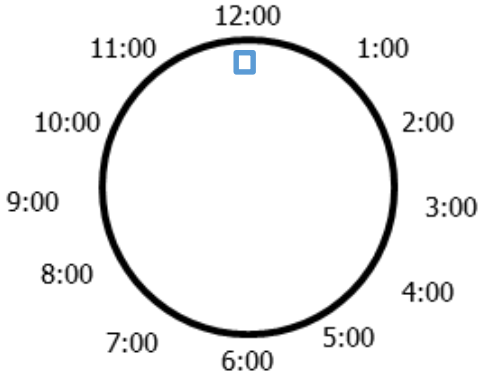
Coating System

Appeared to be in good condition with chalking and delamination. Overall 5% coating failure.

Recommendations

None at this time.

Exterior Hatch



Description

Appeared to be in good working condition with areas of surface corrosion. Overall 10% corrosion present.

Rust Grade

3

Coating System

Appeared to be in good condition with chalking and fading. Overall 25% coating failure.

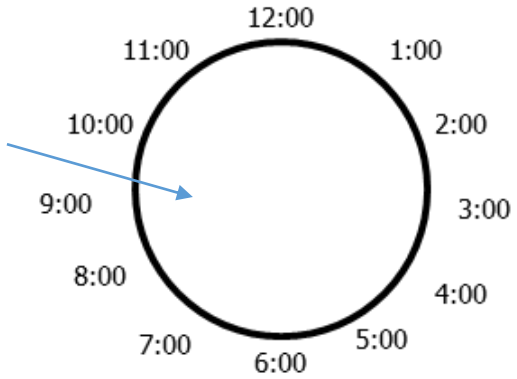
Recommendations

None at this time

Exterior Roof

Description

Appeared to be in good condition with areas of surface corrosion. Overall 10% corrosion present.



Rust Grade

3

Coating System

Appeared to be in good condition with chalking, delamination and organic growth build up. Overall 25% coating failure.

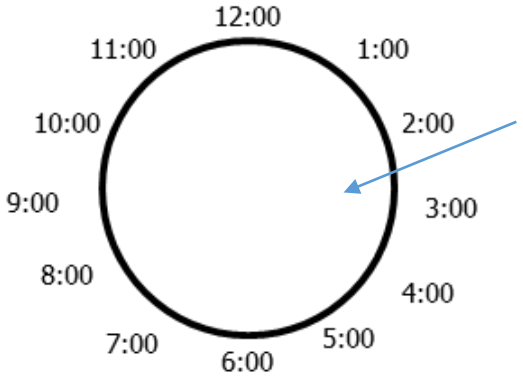
Recommendations

None at this time

Exterior Roof

Description

Appeared to be in good condition with areas of surface corrosion. Overall 10% corrosion present.



Rust Grade

3

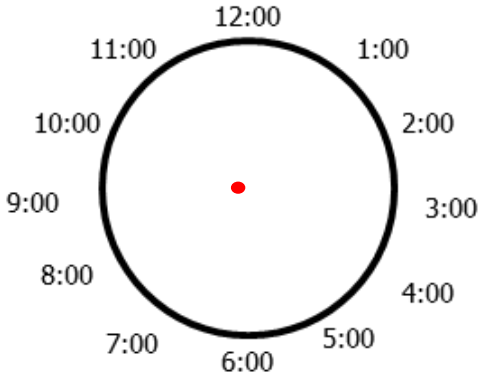
Coating System

Appeared to be in good condition with chalking, delamination and organic growth build up. Overall 25% coating failure.

Recommendations

None at this time

Exterior Vent



Description

Appeared to be in good working condition with a few spots of minor surface corrosion. Overall 5% corrosion present. Fine mesh screen present and in good condition.

Rust Grade

4

Coating System

Appeared to be in good condition with chalking and delamination. Overall 5% coating failure.

Recommendations

None at this time.

Exterior MLI

Description

Appeared to be in good working condition.

Rust Grade

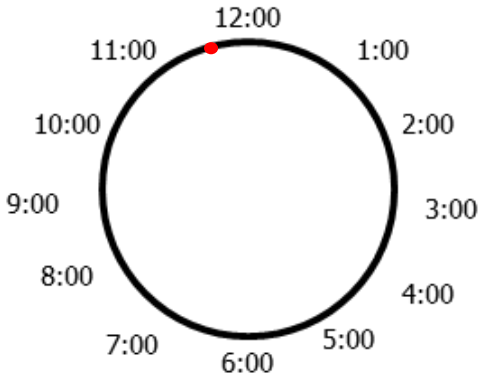
6

Coating System

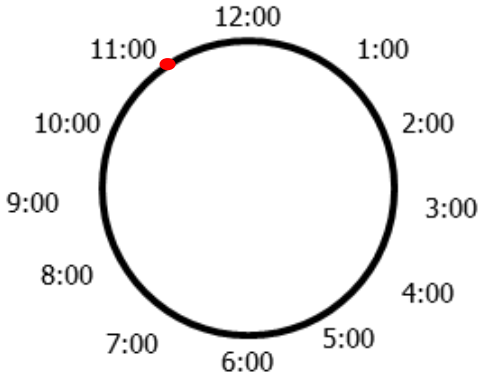
N/A

Recommendations

None at this time



Exterior Manway



Description

Appeared to be in good working condition with a few spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

Coating System

Appeared to be in good condition with chalking and delamination. Overall 5% coating failure.

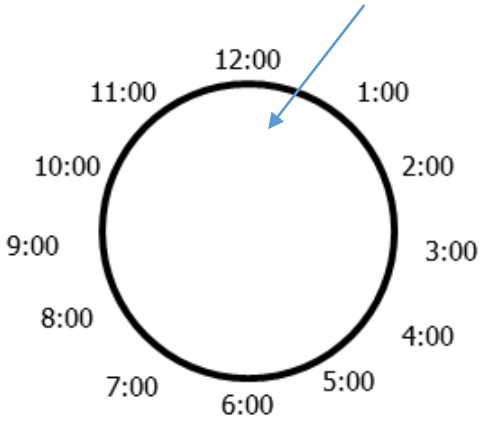
Recommendations

None at this time.

Interior Sediment

Description

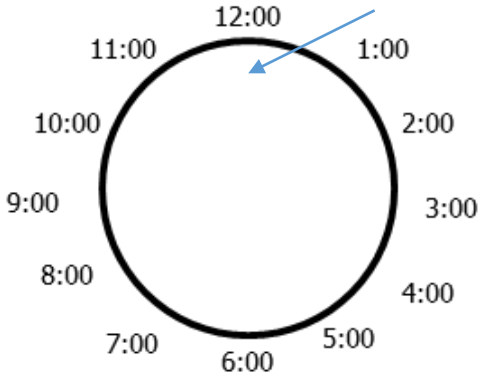
¼ ” of sediment



Recommendations

None at this time

Interior Ladder



Description

Structurally sound and in good condition. A few isolated spots of minor surface corrosion on the rungs. Overall 5% corrosion present.

Rust Grade

4

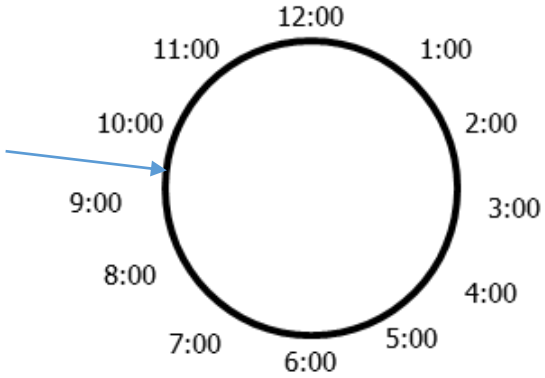
Coating System

Appeared to be in good condition with chalking and delamination. Overall 5% coating failure.

Recommendations

None at this time.

Interior Wall



Description

Appeared to be in good condition with areas of surface corrosion. Overall 5% corrosion present.

Rust Grade

4

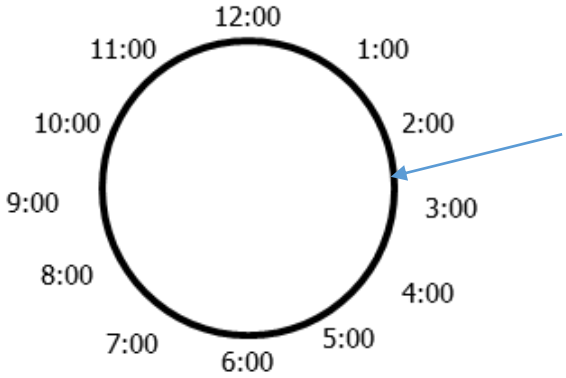
Coating System

Appeared to be in fair condition with chalking, delamination, fading and blistering. Overall 25% coating failure.

Recommendations

None at this time

Interior Wall



Description

Appeared to be in good condition with areas of surface corrosion. Overall 5% corrosion present.

Rust Grade

4

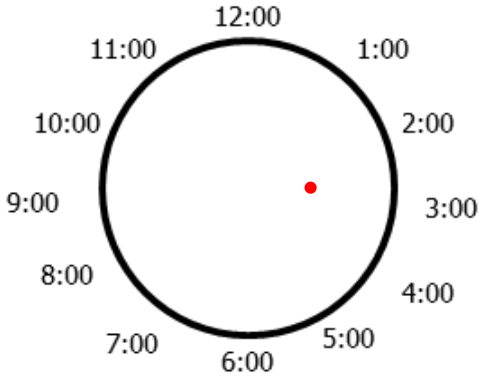
Coating System

Appeared to be in fair condition with chalking, delamination, fading and blistering. Overall 25% coating failure.

Recommendations

None at this time

Interior Sacrificial Anode



Description

Appeared to be in good working condition. Sacrificed 5%.

Rust Grade

N/A

Coating System

N/A

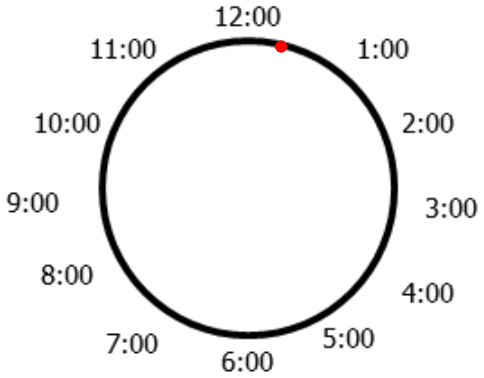
Recommendations

None at this time

Interior MLI

Description

Appeared to be in good working condition.



Rust Grade

N/A

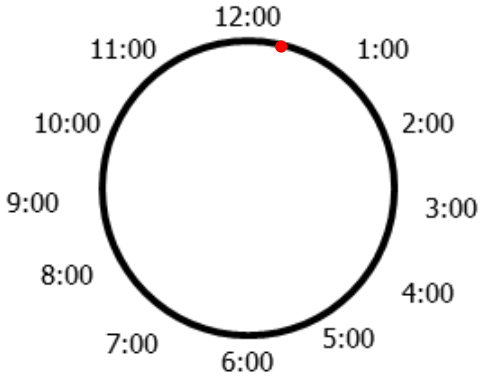
Coating System

N/A

Recommendations

None at this time

Interior MLI Float



Description

Appeared to be in good working condition.

Rust Grade

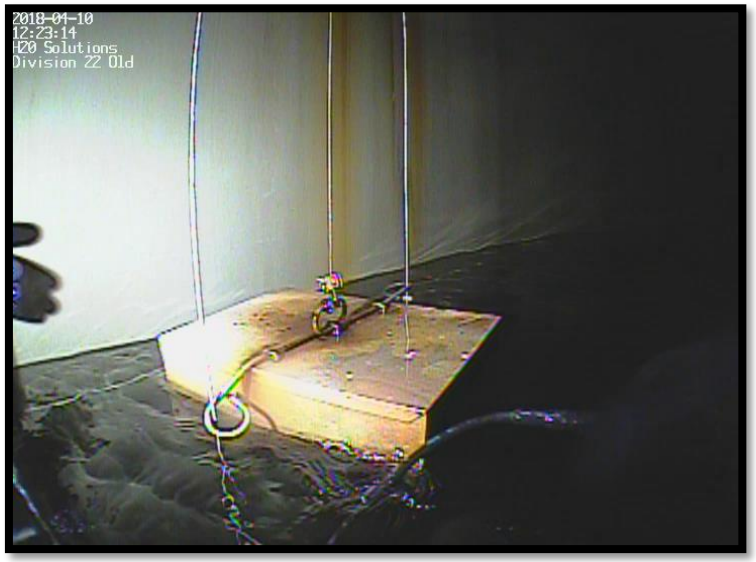
N/A

Coating System

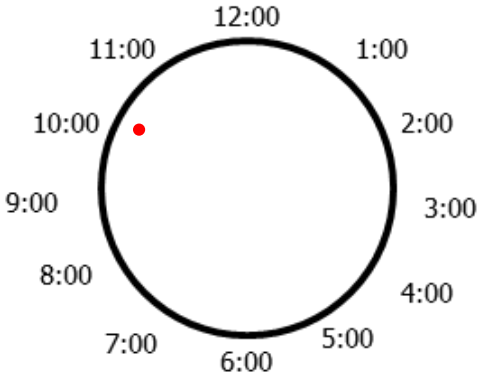
N/A

Recommendations

None at this time



Interior Overflow



Description

Appeared to be in good working condition with a few isolated spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

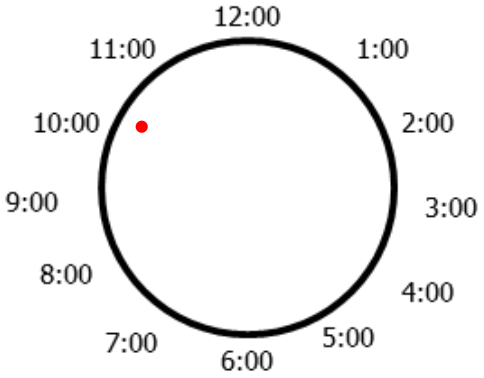
Coating System

Appeared to be in good condition with chalking and blistering. Overall 5% coating failure.

Recommendations

None at this time

Interior Overflow Base



Description

Appeared to be in good working condition with a few isolated spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

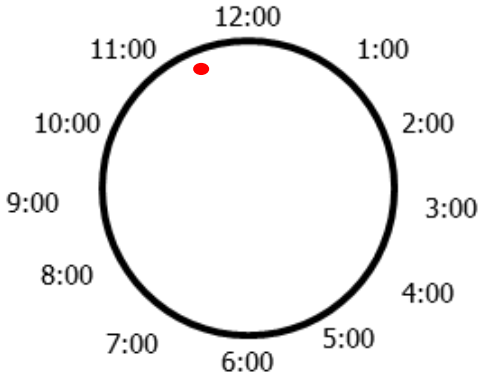
Coating System

Appeared to be in good condition with chalking and blistering. Overall 5% coating failure.

Recommendations

None at this time

Interior Inlet Base



Description

Appeared to be in good working condition with areas of surface corrosion. Overall 10% corrosion present.

Rust Grade

3

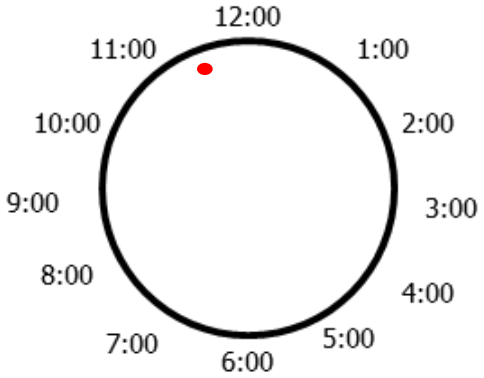
Coating System

Appeared to be in fair condition with chalking, delamination, fading and blistering. Overall 25% coating failure.

Recommendations

None at this time

Interior Inlet



Description

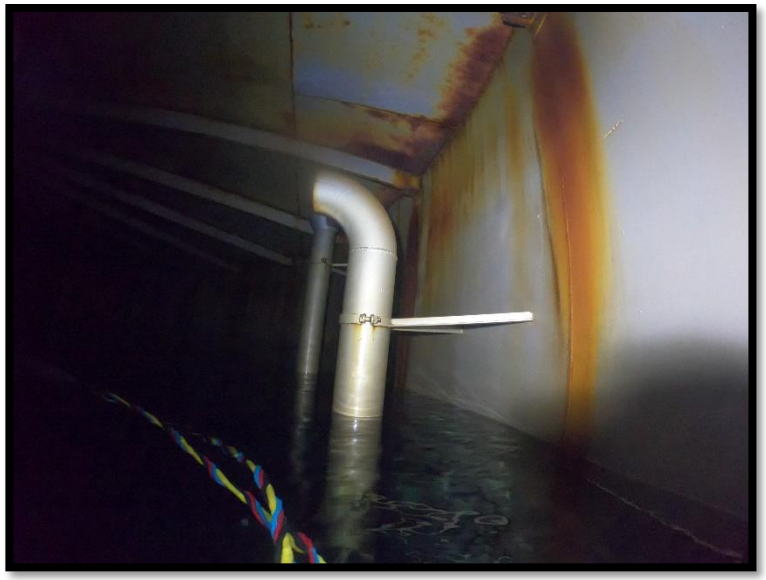
Appeared to be in good working condition with a few isolated spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

Coating System

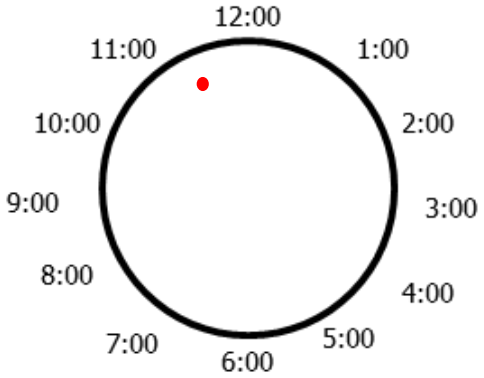
Appeared to be in good condition with chalking and blistering. Overall 5% coating failure.



Recommendations

None at this time

Interior Outlet



Description

Appeared to be in good working condition with a few isolated spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

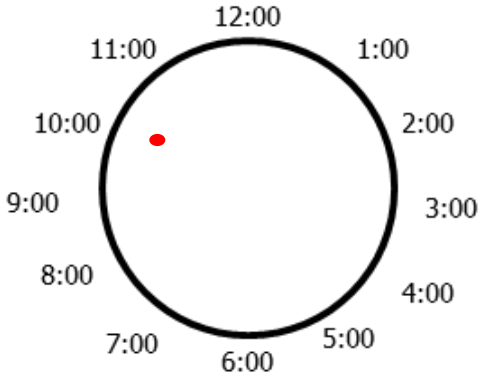
Coating System

Appeared to be in good condition with chalking and blistering. Overall 5% coating failure.

Recommendations

None at this time

Interior Drain



Description

Appeared to be in good working condition with a few isolated spots of minor surface corrosion. Overall less than 5% corrosion present.

Rust Grade

6

Coating System

Appeared to be in good condition with minor chalking. Overall less than 5% coating failure.

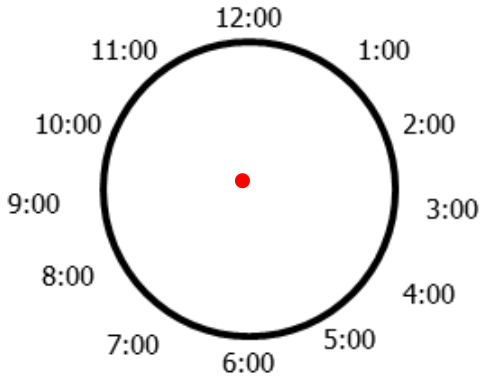
Recommendations

None at this time

Interior Column

Description

Appeared to be in good condition with areas of surface corrosion. Overall 5% corrosion present.



Rust Grade

4

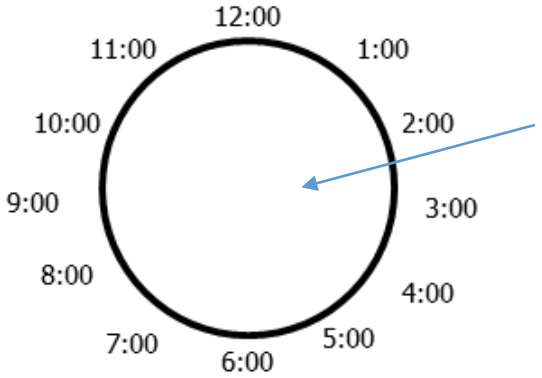
Coating System

Appeared to be in good condition with areas of chalking and staining. Overall 5% coating failure.

Recommendations

None at this time

Interior Ceiling



Description

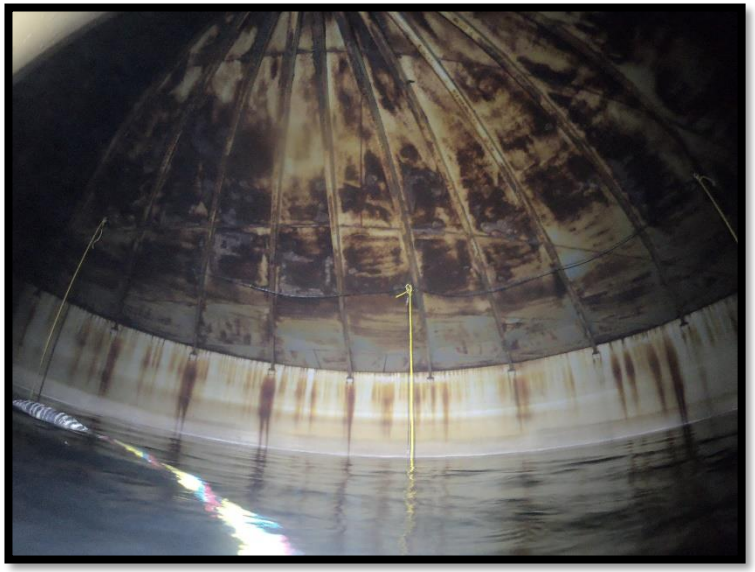
Appeared to be in fair condition with areas of moderate to heavy surface corrosion. Overall 50% corrosion present.

Rust Grade

1

Coating System

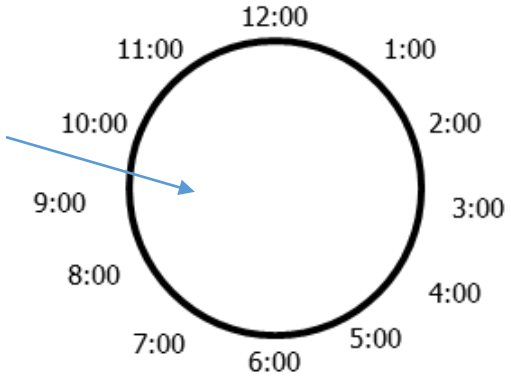
Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 75% coating failure.



Recommendations

Coating replacement

Interior Ceiling



Description

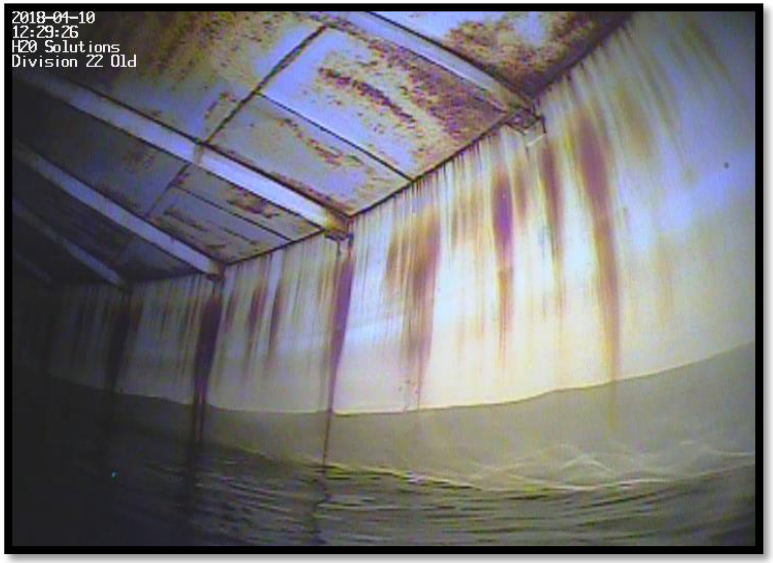
Appeared to be in fair condition with areas of moderate to heavy surface corrosion. Overall 50% corrosion present.

Rust Grade

1

Coating System

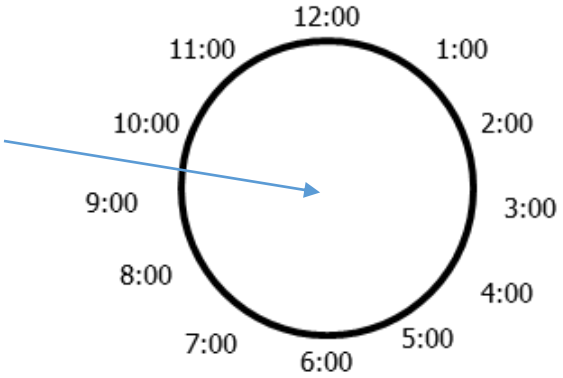
Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 75% coating failure.



Recommendations

Coating replacement

Interior Ceiling



Description

Appeared to be in fair condition with areas of moderate to heavy surface corrosion. Overall 50% corrosion present.

Rust Grade

1

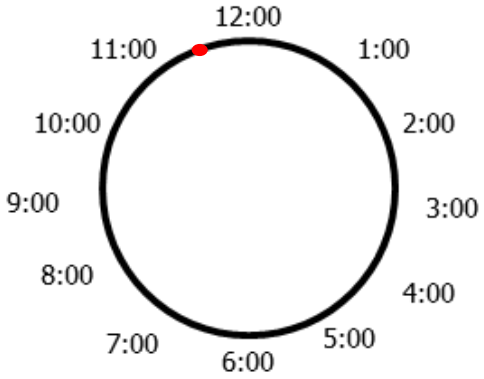
Coating System

Appeared to be in poor condition with chalking, delamination, blistering and staining. Overall 75% coating failure.

Recommendations

Coating replacement

Interior Manway



Description

Appeared to be in good condition with areas of moderate surface corrosion. Overall 30% corrosion present. Gasket is in good condition.

Rust Grade:

2

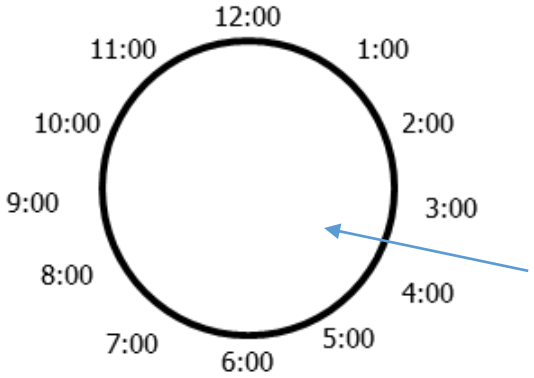
Coating System

Appeared to be in good condition with chalking and blistering. Overall 5% coating failure.

Recommendations

None at this time

Interior Floor



Description

Appeared to be in good condition with a few isolated spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

Coating System

Appeared to be in good condition with chalking and blistering. Overall 5% coating failure.

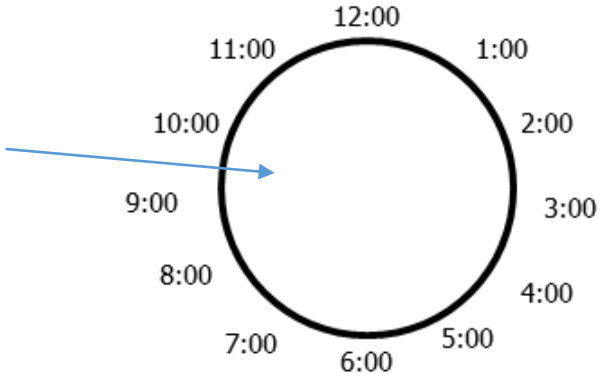
Recommendations

None at this time

Interior Floor

Description

Appeared to be in good working condition with a few isolated spots of minor surface corrosion. Overall 5% corrosion present.

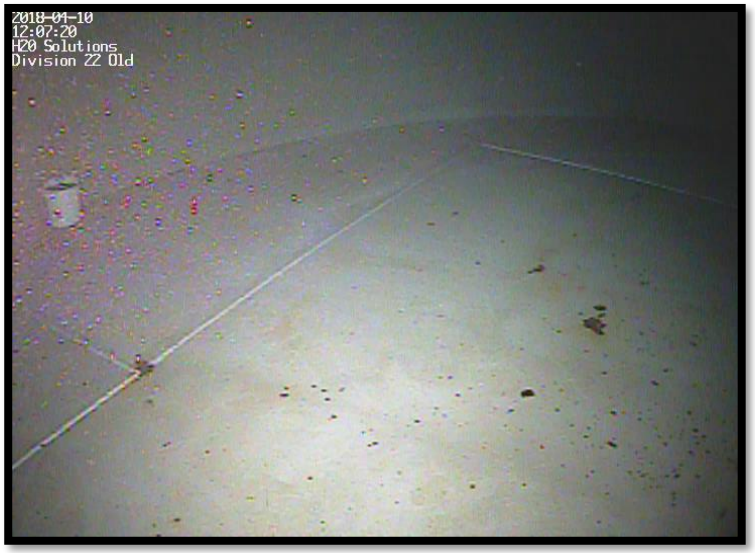


Rust Grade

4

Coating System

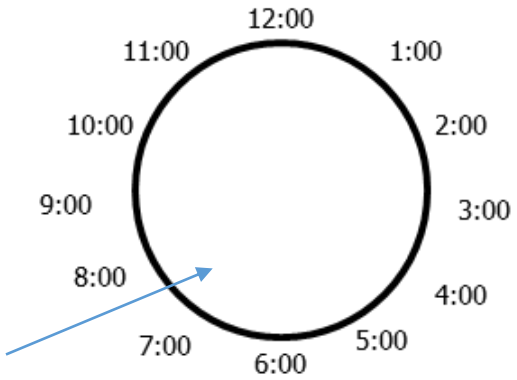
Appeared to be in good condition with chalking and blistering. Overall 5% coating failure.



Recommendations

None at this time

Interior Floor



Description

Appeared to be in good working condition with a few isolated spots of minor surface corrosion. Overall 5% corrosion present.

Rust Grade

4

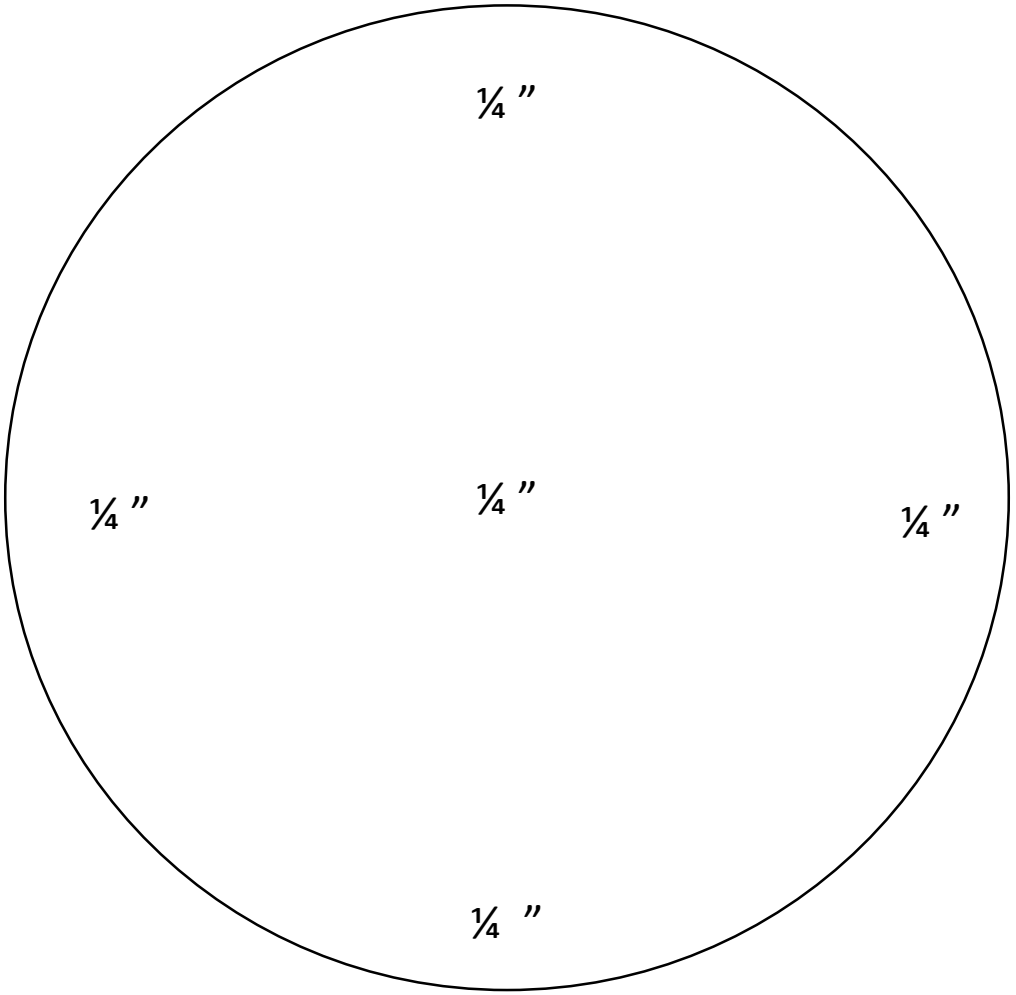
Coating System

Appeared to be in good condition with chalking and blistering. Overall 5% coating failure.

Recommendations

None at this time

Sediment Depth



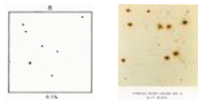
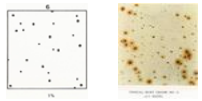
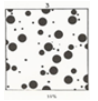
References

Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces – SSPC-Vis 2-82 & ASTM D 610-85 (1989)

The graphical representations show examples of area percentages, which may be helpful in rust grading. The use of photographical reference standards requires the following precautions:

- Some finishes are stained by rust. This staining must not be confused with the actual rusting involved.
- Accumulated dirt or other material may make accurate determination of the degree of rusting difficult.
- Certain types of deposited dirt that contain iron or iron compounds may cause surface discoloration that should not be mistaken for corrosion.
- It must be realized that failure may vary over a given area and discretion must therefore be used in applying these reference standards.
- In evaluating surfaces, consideration shall be given to the color of the finish coating, since failures will be more apparent on a finish that shows color contrast with rust, such as white, than on a similar color, such as iron oxide finish.
- The photographic reference standards are not required for use of the rust-grade scale since the scale is based upon the percent of the area rusted and any method of assessing area rusted may be used to determine the rust grade.

A	Similar to European Scale of Degree of rusting for Anti-Corrosive Paints (1961) (Black & White)
B	Corresponds to SSPC Initial Surface Conditions E (0 - 0.1%) and BISRA (British Iron and Steel Research Association) 0.1%
C	Corresponds to SSPC Initial Surface Conditions F (0.1%-1%) and BISRA 1%
D	Corresponds to SSPC Initial Surface Conditions G (1 - 10%)
E	Rust grades below 4 are of no practical importance in grading performance of paints
F	Corresponds to SSPC Initial Surface Condition H (50 - 100%)

Rust Grades [A]	Description	Graphical Representation
10	No rusting or less than 0.01% of surface rusted	Unnecessary
9	Minute rusting less than 0.03% of surface rusted	
8[B]	Few isolated rust spots less than 0.1% of surface rusted	
7	Less than 0.3% of surface rusted	
6[C]	Extensive rust spots but less than 1% of surface rusted	
5	Rusting to the extent of 3% of surface rusted	
4[D]	Rusting to the extent of 10% of surface rusted	
3[E]	Approximately on sixth of the surface rusted 16%	
2	Approximately one third of the surface rusted 33%	
1	Approximately one half of the surface rusted 50%