

Addendum No. 1

for

“Phase 1b – Contract D – Elevated Water Storage Tank
Illinois Alluvial Regional Water Company
Jersey County, Illinois

September 29, 2026

The contract documents prepared by MECO-Heneghan Engineers for Phase 1a – Contract D – Elevated Water Storage Tank for the Illinois Alluvial Regional Water Company are hereby amended or clarified as follows:

1. BID DATE

The bid opening date has been extended as follows:

Bids for the construction of the Project will be received at the Illinois Alluvial Regional Water Company, Inc. located at 1009 State Highway 16, Jerseyville, IL 62052, until **October 16, 2026**, at 2:00pm local time. At that time the Bids received will be publicly opened and read.

All questions from potential bidders must be submitted by 12:00 p.m. on Friday, October 9, 2026. Questions submitted after that time will not be addressed.

2. FRONT END CONTRACT DOCUMENTS

Changes / additions / clarifications to the project are listed below:

- A. The Bid Form has been revised to add a deduct alternate item related to completion dates. The Bidder may specify a deduct alternate cost to extend the substantial completion date beyond the date indicated in the Agreement. The Bidder **MUST** provide both the deduct alternate amount and the proposed date for the alternate bid to be considered. The attached Bid Form replaces any previous versions and **MUST** be used for all valid bids.
- B. Permits – The IEPA construction permit has been issued, and FAA clearance has been obtained. The Contractor shall obtain the required Jersey County building permit. Contact the Jersey County Code Administrator at codeadmin@jerseycounty-il.gov for permit requirements and cost. The building permit fee will not be waived. No other required licenses or fees are known at this time.

3. SPECIFICATIONS

Changes / additions/ clarifications to the project are listed below:



- A. Specification 331619, shall be replaced with attached updated Section 331619.
- B. References within the Specifications to Section 099000 shall be disregarded.

4. **PLANS**

Changes / additions / clarifications to the project are listed below:

- A. See attached new Plan set. This set shall replace all previous set.
- B. Plan sheet C1 clarifies the distance of piping that Contract D is responsible for.
- C. Plan sheet C2 is revised per the attached Sheet C2 and clarifies valve references and riser ladder and landing geometry.
- D. Plan sheet C3 is revised per the attached Sheet C2 and clarifies valve references and detail 6/C3 – This detail governs the tank logo. Final rendering and letter height and width will be confirmed during the shop drawing review phase. The tank shell exterior color shall be Tnemec Tank White, with blue IARWC lettering and black ILLINOIS ALLUVIAL REGIONAL WATER COMPANY lettering below the logo. The water spigot and drinking glass logo shall be black. The reflection under the IARWC logo letters can be omitted.
- E. Plan sheets C2 and C3: tank roof: the bidder has the option to provide shallow cone roof in lieu of the dome style roof shown on the plans.

5. **GENERAL CLARIFICATIONS**

The questions and comments below are provided for general clarifications from questions presented by Bidders and/or Subcontractors.

- A. Does the Owner have a budget or expected cost for Contract D? **\$7.725M**
- B. Do you anticipate utilizing the entire 120-day bid validity period before issuing contracts? **We hope to award within 90 days.**
- C. Can the contract duration be extended? A tank this size is closer to a two-year project than one-year. Realistically, we would have the tank built by end of 2027, and then on a weather hold until Spring 2028 when temperatures are suitable for coatings. After tank painting, we will have electrical and finish work. Completion likely mid-2028. **We will be revising the Bid Proposal Form by Addendum to add a deduct alternate to extend substantial completion date to a date of the Bidder's Choosing.**
- D. Can you send a site plan showing the area around the tank and work contiguous to the tank? Trying to determine how much room we will have for staging and sub-assembly. The plans provided with Contract D are tank specific. **See attached.**
- E. What is the construction timeline / expected completion for the clearwell (by DN Tanks I believe) right next to the Contract D tank? **We expect their south clearwell to be completed by the end of 2026.**



- F. What building or construction permits will the Contractor need to obtain for this project? **IEPA construction permit has been issued; FAA clearance obtained.** Will a Building Permit and/or Plan Review be required from the city or county? **Yes, Jersey County.** If so, whom do we contact to determine what is the cost? **codeadmin@jerseycounty-il.gov.** Are there any other licenses or fees that the Contractor must pay for? **Not aware of any other.** Will the cost of the Building Permit be waived since it is a municipal project? **No.**
- G. What is the budget for the project? **\$7.725M**
- H. Who is on the plan holders list **IARWC – Phase 1b – Contract D – Heneghan Associates**
- I. Is there any 3rd party inspection (I.e. TIC, KLM, AEC etc.) on engineering construction or painting? If so, who will it be and on what portion of work? **IARWC will hire 3rd party inspection.**
- J. Specification 33 16 19 - 5 Paragraph 2.01 B.2 requires a 43 ft head range. Our standard geometry for this capacity has a 45-ft head range. Can we use a 45 ft head range instead of 43 ft? **Yes; maintain plan overflow elevation.**
- K. Specification 33 16 19 - 9 Paragraph 2.08 G.2 requires a 10' x 12' overhead door. Drawing C2 requires a 10' x 14' overhead door. Which is correct? **10' x 14' is correct.**
- L. Specification 33 16 19 - 10 Paragraph 2.08 L.1 requires an inlet/outlet and Drawing C2 shows the inlet and outlet as separate. Is the inlet and outlet one pipe or are they separate? **Inlet and outlet pipes are separate.**
- M. For construction of the concrete shaft, we do not have crews with workers who are based in the state of Illinois. This is likely true for all bidders. So long as the Illinois unemployment rate stays below 5%, this will not be an issue. However, should the rate rise above 5% for two consecutive months, compliance with the Illinois Works Jobs Program Act will not be possible for this portion of the work. Since shaft construction on composite tanks is specialty work, we believe that the recipient of the IEPA permit will need to apply for and receive a variance. All other portions of the work will not be an issue, but we know of no other option for the concrete shaft. Can we assume that the loan recipient will work with the contractor in this regard. **Yes.**
- N. The alternate logo described on page 344 states the have "Home of the Cardinals" as letter around the cardinal and then refers to a visual rendering which is not provided, can you please provide. The only Logo provided is in the drawings and is the IARWC with the water class next to it. **Specifications 331619/24 Section K., Item 1. Is incorrect. We will issue a deletion of that line by Addendum. The tank logo as designated on Plan Sheet C3, Detail 6/C3 shall govern. We will confirm final rendering and letter height and width during shop drawing review phase. The tank shell exterior color will be Tnemec Tank White, blue IARWC lettering and black ILLINOIS ALLUVIAL REGIONAL WATER COMPANY lettering below logo. Black water spigot and drinking glass logo.**
- O. In the painting area of the spec it lists that the contractor shall maintain a level 1 NACE certified coating inspector on site at all times. So this is an inspector that the contractor is



responsible for getting and paying for? Also this inspector needs to be present during both shop priming and the on-site painting activities? Please provide further clarification on who is providing what inspector? **MHE will employ a third-party NACE inspection company for independent QC/QA. It is encouraged that the contractor document shop and field welding, surface prep, and painting procedures using NACE certified inspection personnel, and surface prep. We will clarify this by Addendum.**

- P. a SCADA telemetry system required as it is mentioned once in the spec, but no details are given. **SCADA will be covered by Contract C1.**
- Q. In regard to the mixing system, there is some information given, but no specific brand is called out. However, on the plans a Tideflex Series 35 check valve is mentioned. Is a Tideflex Mixing System required for this project, or would other passive mixing systems work? **Tideflex mixing system is required for this tank.**
- R. Specification 33 16 19 - 16 paragraph 3.03 4.C specifies that concrete pour height shall be a minimum of 4 ft. and a maximum of 10 ft. Can we use our standard 12 ft forms? **Yes.**
- S. Tank specs call for a 6" Non Freeze Drain with a 6" PVC Pipe to the overflow. Typically this is 3" to 4". Will a 4" Non Freeze Drain work? **6" drain will be required.**
- T. The interior coatings system currently specifies Tnemec Pota-Pox Series 20 which is a discontinued product. The current standard from Tnemec is Epoxoline Series 21. Is this replacement acceptable? **See revised Section 331619 in Addendum #1**
- U. Exterior Coating System 1 specifies Tnemec Hydroflon 700, in order to meet Illinois emission standards we need to use Hydroflon V700. Is this replacement acceptable? **See revised Section 331619 in Addendum #1**
- V. Exterior Coating System 2 specifies Tnemec Series 66 and Tnemec Series 1074U have both been discontinued, The current standard from Tnemec is Pota-Pox N140 and Endurashield 1095. Is this replacement acceptable?
- W. Will the Logo need to appear once or twice on the tank? **One side required.**
- X. Logo and lettering is specified as Endura shield 1074, this product is discontinued. Tnemec recommend using Series V700 for gloss and color retention. Is this change acceptable? **See revised Section 331619 in Addendum #1**
- Y. Will a simplified version of the logo be provided to remove the reflected letters and the photorealistic glass up water? **The Board will make this decision during shop drawing review.**
- Z. What will site conditions be for Contract D? contract C plans on Sheet C2 indicate that we'll need to cut out approximately 4 feet it looks like, from 690' elevation down to 686' elevation? **Contract D will be responsible for grading and excavation. Current grade is close.**



- AA. What will site conditions be for Contract D? Contract C plans on Sheet C2 indicate that we'll need to cut out approximately 4 feet it looks like, from 690' elevation down to 686' elevation? **Contract D will be responsible for grading and excavation. Current grade is close.**
- BB. And as was indicated earlier, we're responsible for final grade (which looks like gravel on C1.1) how far out from tank? **Contract D will have to blend to existing Contract C surface and restore any disturbance.**
- CC. How far away are we going to be connecting to the water main? **Existing tees shown on site piping plans. See Addendum 1 exhibits for clarification.**
- DD. Looking over the documents in Contract C, the site placement is understood. In terms of the tank scope in Contract D, what is the extent of grading/site work that we are responsible for? **Yes, final grading around elevated tank site will be the responsibility of Contract D contractor.**
- EE. Are we only responsible for the footprint of the tank in terms of site work/grading along with the piping and splash pad indicated on C1 plans? **Grading, splash pad, piping to connect to existing finish main tees/valves and site cleanup and seeding will be responsibility of Contract D contractor.**
- FF. From my understanding of Contract D plans, we have no fence scope? **Correct.**
- GG. Is SCADA part of scope? **No.**
- HH. Our closest standard design for this size tank is 45' head range and 92.5' tank diameter, is that acceptable? **Yes. Maintain plan HWL elevation.**
- II. Is SWPPP required. **No; covered under Contract C1**

1. **ADMINISTRATIVE**

- a. EJCDC C-520 Agreement between Owner and Contractor for Construction Contract, Page 1 of 7, Article 4.02: please confirm that the project substantial completion may be extended to November 1, 2028. **See alternate completion dates in Addendum 1 Proposal form.**
- b. EJCDC C-700 Standard General Conditions of the Construction Contract, Page 15 of 75, Article 5.03: please confirm that the Terracon IARWC Proposed Water Treatment Plant Geotechnical Engineering Report dated June 5, 2025, is applicable to this project and if so, provide a copy of the report. **Yes, same report that DN used for Contract C.**

2. **SPECIFICATIONS**



- a. Section 22 12 19, Page 5, Article 1.02.D.3.g: Please confirm that the Tank Contractor may determine the size of the overflow pipe and weir in accordance with the stated 8-mdg design capacity. **Yes.**
- b. Section 22 12 19, Page 7, Article 2.01B: Please confirm that Type 1L cement is acceptable for the proposed tank. **Yes, it is acceptable.**

3. **DRAWINGS**

- a. Sheet C2: The grading plan shows clusters of gradation marks at the north, east and west sides of the proposed tank that are not easily discernable. Please confirm the high and low finish grade elevations around that proposed tank as this may greatly affect the penetrations (manways, overflow pipe, etc.) through the tank wall. With the proposed tank having a relatively short wall height, grouping these penetrations at the same elevation would be advantageous, if possible. Additionally, please confirm that the low finish grade elevation around the proposed tank may be raised above the proposed tank floor elevation to provide the minimum 30-inch embedment required in the Terracon IARWC Proposed Water Treatment Plant Geotechnical Engineering Report dated June 5, 2025. **Please see Sheet C-2 Rev 4 in Addendum #1 to address the revised grades, maintain planned pipe penetrations and alignments.**
- b. Sheet M6.12: Please confirm that the top non-voided detail is a representation of the tank drainpipe as the pipe size does not match Detail 5 on Sheet C4.12, Detail 1 on Sheet T1 nor the Tank Piping Plan on Sheet T6. Additionally, please clarify the elevation of the drainpipe below the proposed tank floor. **This is the surge relief line from pump building, not related to tank piping.**
- c. Sheet T1, Detail 1 (Tank No. 1 Plan): Please confirm the 3-inch sensing line is not applicable to this project and should be removed. **Correct.**
- d. Sheet T1, Detail 1 (Tank No. 1 Plan): The distance shown for the through-floor piping from the inside of the proposed tank wall differs from Sheet T6, Tank Piping Plan. Please clarify the required distances from the inside of the proposed tank wall to the through-floor inlet, outlet and drainpipes. **Use orientations shown on Sheet T6.**
- e. Sheet T1, Detail 3 (Tank Section): Please confirm the stated 1-foot minimum required wall freeboard is accurate for the proposed tank as this differs from Detail 4 (Overflow Pipe) on Sheet T3. **1 foot minimum is correct.**
- f. Sheets C2, T1 and T6 all show different configurations of the piping and appurtenance based on the provided North arrows. Since the height of the proposed tank through-wall piping and appurtenances needs to be confirmed with the final tank backfill elevations, please clarify the plan location of the piping and appurtenances based on a unified North arrow direction. **Use orientations shown on Sheet T6.**
- g. Sheet T5, Detail 2 (Guardrail Elevation): Please confirm that Hollaender SpeedRail joint fittings are acceptable for the proposed tank roof handrail. **Those are acceptable.**
- h. Sheet T5, Detail 2 (Roof Vent): Please confirm that the proposed tank roof vent is required to be an aluminum fail safe type in accordance with the Recommended Standards for Water Works. **Aluminum fail safe is preferred.**

4. **GEOTECHNICAL REPORT**



- a. The Terracon IARWC Proposed Water Treatment Plan Geotechnical Engineering Report dated June 5, 2025, indicates a maximum NET allowable bearing pressure of 2,000-psf for the water storage tank with shallow foundation design. As the existing grade elevations and planned final grad elevations vary across the proposed tank footprint, please confirm the maximum GROSS allowable soil bearing pressure (with tank backfill 9-feet over the tank perimeter footing) is accounted for and that the 2,000-psf net allowable bearing pressure can be used to design the tank foundation excluding backfill pressure on the tank footing. **This is up to tank contractor to verify acceptable soil loadings with Terracon.**
- JJ. Is 50% or more of this project funded by the State Capital Fund? **No, IEPA SRF loan funds.**
- KK. Illinois Works Jobs Program Act – Apprentice Initiative – This act requires 10% goal of Illinois laborers to be apprentices. Composite Elevated Tank construction is considered a specialty work type. It is common for apprenticeships and local labor requirements are waived due to the hazardous and technical nature of this type of construction. All members of the crews are highly trained in both safety and technique for this type of construction. Can you confirm that the 10% local apprentice labor requirement for this job will be waived? **We will confirm with IEPA.**
- LL. Employment of Illinois Workers on Public Works Act – This Act requires 90% of Illinois laborers when unemployment rates exceeds 5%, which is currently the case. Due to the specialized nature of this type of construction, tank providers rely upon their own “inhouse” highly trained out-of-state crews in order to ensure a quality and safe execution of the Work. It will be impossible to comply with these requirements and cannot be met by any tank constructors. Can you confirm that the Owner or Owner’s representatives has a means to reliably obtain an exemption to these requirements such that all bidders may participate in the Work without risk of penalty resulting from said requirements? **Contractor will have to request a waiver from IEPA regarding this requirement if necessary.**
- MM. Section 33 16 19, Item 1.02 does not specify the required number of completed tanks of similar capacity constructed by the Tank Manufacturer to be a qualified Bidder. Industry standard experience requirements for the Tank Manufacturer is 10 completed tanks of similar capacity. Can you confirm that the Tank Manufacturer shall have completed 10 tanks of similar capacity to be an approved Bidder? **See Article9, 8.04**
- NN. Section 33 16 19, Item 3.12F.1d – f. the specified interior wet coatings system does not meet current NSF requirements and has been replaced with Tnemec Series 21. Can you confirm Tnemec Series 21 applied at the same specified DFT will be an acceptable material? **See Addendum 1 for revised Section 331619.**
- OO. Section 33 16 19, Item 3.12 G. 1. D – f. the specified interior dry coatings system does not meet current NSF requirements and has been replaced with Tnemec Series 21. Can you confirm Tnemec Series 21 applied at the same specified DFT will be an acceptable material? **See addendum 1 for revised Section 331619.**
- PP. Section 33 16 19 Item 3.12 H.1 (System 1) & I.1 (System 2) There are two different specified exterior systems. System 1 is a superior system and has high cost compared to system 2. Can you confirm which system we are to quote? **See Addendum 1 for revised Section 331619.**



- QQ. Section 33 16 19 Item 3.12 K. logo and lettering are identified as an alternate bid item. The current bid form does not include logo and lettering as an alternate bid item. Will a logo/lettering be required? **See Addendum 1 for revised Section 331619.**
- RR. If yes, Section 331619 Item 3.12 K talks about a Cardinal logo and “Home of the Cardinals” lettering, which does not match the logo shown on Drawing Showing C3. Can you confirm the alternate for the logo shall be as shown on C3? **See Addendum 1 for revised Section 331619.**
- SS. Section 331619, Item 3.13.5 discusses filling the tank with an “acceptable supply of potable water”. Can you confirm the owner is to provide the acceptable supply of potable water at no cost to the contractor at sufficient pressure to fill the tank? **See Addendum 1 for revised Section 331619.**
- TT. Section 331619 Item 1.08.A discussed a one-year warranty. However, Section 331619 Item 3.16 requires a 3-year warranty. Can you confirm that the warranty is 1 year? **See Addendum 1 for revised Section 331619.**
- UU. Section 331619 Item 2.08.D specifies a drip pan located under the access tube (typically attached to the underside the walkway) to collect any condensate dripping from the access tube. This detail has been improved and is no longer done. We suggest paragraph 2 be replaced with the following which is current industry standard: *‘The access tube shall incorporate a 2” x 2” channel to collect condensation that may form on the interior surface of the access tube. A flexible 3/2” PVC hose complete with backflow preventer shall drain the channel to the overflow pipe’*. Can you confirm the Bidder can replace the drip pan with a 2” x 2” channel to collect the condensation? **Bid per plan; can request alternate during shop drawing review phase.**
- VV. Section 331619 Item 2.08L.1 & 2 allow for the 30” diameter piping to be 10 gauge minimum. However, this is too thin of a wall for this size diameter of pipe, we recommend this pipe be 304L-10s rather than 10 gauge. Can you confirm the 30” piping is to be 304L-10s? **304L-10S is required.**
- WW. Section 33 16 19, Item 3.14A. requires the contractor to maintain a level 1 NACE Coatings Inspector on-site at all times during surface preparation and painting activities. It is industry standard practice for the Owner/Engineer to hire a coatings inspector. Can you confirm that the Owner/Engineer will be responsible for hiring a NACE level 1 coatings inspector? **See Addendum 1 for revised Section 331619.**
- XX. Can you confirm we follow Section 331619, AWWA D107 and industry standards for the composite tank support wall relating to mixes, curing, form removal times, etc. in lieu of Section 03300 as Division 3 relates more to concrete operations such as concrete paving and sidewalks, etc.? **See Addendum 1 for revised Section 331619 which shall govern in cases of conflict with 033000.**
- YY. Drawing Sheet C-2 shows insulation on the overflow pipe. However, this pipe will never be full of static water and therefore insulation is unnecessary. Can you confirm that insulation is not required for the overflow pipe? **Correct.**



- ZZ. Section 050800 – Item 2.04 – The Miscellaneous Metal specifications have ladder requirements that greatly differ from the Section 331619 Item 2.08.B.3, can you confirm we are to follow Section 331619 with respect to ladder materials? **331619 shall govern.**
- AAA. Drawing Sheet C2 shows a domed roof. This is one specific manufacturer's standard detail. Our standard roof construction is conical in shape, not domed. Either option will minimize snow accumulation and water ponding, and both are acceptable per AWWA D107 standards. Can you confirm that individual manufacturers' standard details will be acceptable? **Dome shape is preferred. Owner will consider a deduct alternative during shop drawing phase for alternate roof style. This has now been revised to include shallow cone roof as an approved roof style.**
- BBB. Drawing Sheet C2 illustrates a ladder system that offsets at each landing. This type of ladder system is not recommended due to the increased safety hazard of unhooking from the safety climb device at each rest platform. Section 331619 Item 2.08.E.1 states that the platforms shall be arranged for a straight run ladder and operable without removing fall protection equipment, which is industry standard and recommended. Can you confirm the vertical ladder inside the concrete pedestal shall be a continuous straight ladder from the slab on grade to the upper platforms? **Offset landings are preferred. See Addendum 1 for revised Section 331619. Revised plan detail clarifies straight ladder configuration and set-off landings.**
- CCC. Drawing Sheet C2 Note #2 states that a galvanized ladder safety device is to be provided. Our standard design utilizes an aluminum rigid rail ladder safety device that meets OSHA standards. Can you confirm both galvanized or aluminum ladder safety devices are acceptable? **Safety climb must be compliant with OSHA and AWWA standard. We will consider aluminum if it conforms to all applicable safety criteria.**
- DDD. Drawing Sheet C2 Detail #24 calls for a 10' x 14' overhead door. Section 331619 Item 2.08.G.2 calls for a 10' x 12' overhead door. Can you confirm that a 10' x 12' overhead door is required? **10' x 14' is required. See Addendum 1 for revised Section 331619.**
- EEE. Drawing Sheet C3 Detail #1 shows an RTU panel for a pressure transducer, and temperature and control valve status. However, there are no specifications given for this scope of work. Can you confirm that this instrumentation is by Others and not included in this contract? **SCADA will be covered by Contract C1.**
- FFF. If this scope of work is to be included, can you provide specifications for this scope of work? **Will need to coordinate with SCADA integrator for Contract C1.**
- GGG. Can you confirm that the Contractor is not responsible for SCADA Integration for this project and will be performed by Others? **Correct.**
- HHH. If the Contractor is responsible for SCADA Integration, who is the preferred SCADA integrator for this project? **See above.**
- III. Can you confirm that the Contract C Contractor will connect to the water lines installed by the Contract D Contractor? **Contract D will have to connect to the stubbed pipes.**
- JJJ. What is the anticipated schedule for Contract C? **Anticipated substantial completion for C-1 is 12/2027.**



- KKK. The drawings and specifications do not provide information regarding adequate space for laydown and crane construction. Can you confirm an 80' radius from the center of the tank will be unobstructed for tank contractor use and 150' x 150' laydown area for tank assembly, storage, and materials directly adjacent to the tank construction area will be provided? **See site plan for available working area. Contract D will have to coordinate site access with Contract C-1 and subs.**
- LLL. Drawing Sheet C3 identifies the mixing system duckbill valve as a 30" Tideflex Series 35 or equal. Our standard mixing system utilizes Onyx duckbill valves. Only duckbill valves meet the requirements of Section 331619 Item 2.08T and are considered to be an equal to Tideflex throughout the industry. Can you confirm that Onyx DBF will be considered an equal for the duckbill valves for the mixing system? **Yes, provided they are equivalent and meet BABA procurement requirements.**
- MMM. Can you confirm funding is in place for this project? **Yes.**
- NNN. Can you confirm the budget amount for this project? **\$7.725,000**
- OOO. What is the planned Notice of Award date for the project? **1/10/2027**
- PPP. What is the planned Notice to Proceed date for the project? **3/1/2027**
- QQQ. Can you describe the process or events (i.e. approval by council, board of directors, etc.) that must occur and anticipated dates and durations that must occur in order to award this project? **IEPA approval of contract documents and IARWC Board recommendation to award.**
- RRR. Is a Building Permit required for the project or for just the elevated tank? **Yes.**
- SSS. If a Building Permit is required will the associated permit and review fees be waived? **No.**
- TTT. If a Building Permit is required and the Contractor is to pay all associated fees, can a fee schedule be provided so Bidders can include the appropriate costs within the bid pricing? **Please contact Jersey County.**
- UUU. Once a building application has been submitted, typically how long is the review process? **Please contact Jersey County.**
- VVV. Can you confirm that the Owner has obtained the necessary approvals and permits required to start construction? **FAA clearance and IEPA permits have been issued.**
- WWW. Are there any governing agencies (federal/state/local agencies other than the building permit department) that must review and approve the project drawings prior to the start of construction? If so, who are these agencies and what is the anticipated duration for their review period? **No, just Jersey County.**
- XXX. Can you confirm that the Owner currently owns the property (or properties) where work is to be performed? If not, can you provide information on the timing in which ownership will be obtained? **IARWC owns the property.**



- YYY. Can you confirm that the Owner currently owns and/or otherwise possess all required easements or permissions to work on or access the property (or properties) where the work is to be performed? If not, can you provide information on the timing in which these easements or permissions will be obtained? **Yes.**
- ZZZ. Due to the nature of tank erection work and the travel distance for our field personnel, working weekends is advantageous for the project from both a cost and schedule perspective. This is even true if the work allowed on the weekends is restricted to non-inspected work. If weekend work is not approved during the bidding phase, it will negatively affect the bid by adding significant costs and duration to the project. Can you confirm that **Saturday** work will not be restricted? **Saturday work allowed.**
- AAAA. Due to the nature of tank erection work and the travel distance for our field personnel, working weekends is advantageous for the project from both a cost and schedule perspective. This is even true if the work allowed on the weekends is restricted to non-inspected work. If weekend work is not approved during the bidding phase, it will negatively affect the bid by adding significant costs and duration to the project. Can you confirm that **Sunday** work will not be restricted? **Sunday work allowed.**
- BBBB. Due to the nature of tank erection work and the travel distance for our field personnel, working nights is advantageous for the project from both a cost and schedule perspective. This is even true if the work allowed at night is restricted to non-inspected work. If night work is not approved during the bidding phase, it will negatively affect the bid by adding significant costs and duration to the project. Can you confirm that night work will not be restricted? **This will be reviewed by the Board; answer can't be given at this time.**
- CCCC. Can you confirm the Owner will pay all Electrical Utility Company costs and fees required to establish permanent power to the Project Site? **Yes.**
- DDDD. If no, can a cash allowance be established to ensure all Bidders include the same Scope of Work and the Owner pays only the cost of the Work? **See above.**
- EEEE. Can you confirm the Owner will provide a location for the Contractor to access temporary water at, or near the Project site, at no cost to the Contractor? **Yes.**

END OF ADDENDUM NO. 1


Max F. Middendorf, P.E. #062-049419 ILL.



ADDENDUM NO. 1 RECEIVED AND ACCEPTED BY:

Signature

Date

MFM:bpg



BID FORM FOR CONSTRUCTION CONTRACT

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, [and](#) the General Conditions, ~~and the Supplementary Conditions~~.

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to:

**Allen Davenport, Board President
Illinois Alluvial Regional Water Company, Inc.
1009 State Highway 16, Jerseyville, IL, 62052**

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

ARTICLE 2—ATTACHMENTS TO THIS BID

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

- A. Required Bid security;
- B. List of Proposed Subcontractors;
- C. List of Proposed Suppliers;
- D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
- E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
- F. Required Bidder Qualification Statement with supporting data; and
- G. **Non-Collusion and Certification Statements**
- H. **Certification of Nonsegregated Facilities**
- I. **Certificate Regarding Bid Rigging & Rotating (Criminal Code 33E)**
- J. **Certificate Regarding Debarment, Suspension, and Other Responsibility Matters**
- K. **Certification that all iron, steel manufactured products and construction materials used for this project must be produced in the United States. [Build America, Buy America Act]**
- L. **Disadvantaged Business Utilization and Affirmative Efforts**

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 *Unit Price Bids*

- A. Bidder will perform the following Work at the indicated unit prices:

Base Bid A – Contract D					
Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Amount
1	2 MILLION GALLON COMPOSITE ELEVATED TANK	1	LS	\$	\$
2	SITE WORK / PIPING / FENCING	1	LS	\$	\$
3	TANK MIXING SYSTEM	1	LS	\$	\$
4	ANTENNA CORRAL	1	LS	\$	\$
Total of All Unit Price Bid Items					\$

Dollars

(In Words)

Alternate A – Contract D					
Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Amount
1.	DEDUCTION TO EXTEND COMPLETION DATE TO: _____	EA	1	\$	\$
Total of All Unit Price Bid Items					\$

Dollars

(In Words)

B. Bidder acknowledges that:

- each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and
- estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

3.02 *Total Bid Price (Lump Sum and Unit Prices)*

Total Bid Price (Total of all Lump Sum and Unit Price Bids)	\$
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ARTICLE 4—TIME OF COMPLETION

4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

4.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

EJCDC® C-410, Bid Form for Construction Contract.

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ARTICLE 5—BIDDER’S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

- A. This Bid will remain subject to acceptance for 120 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 *Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder’s Representations*

- A. In submitting this Bid, Bidder represents the following:
1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
 2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the [SupplementaryGeneral](#) Conditions, with respect to the Technical Data in such reports and drawings.
 5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the [SupplementaryGeneral](#) Conditions, with respect to Technical Data in such reports and drawings.
 6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the [SupplementaryGeneral](#) Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and

procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
 - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
 - d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

Bidder is currently certified as an MBE or WBE under EPA's DBE Program? Yes ☐ No ☐

BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

Address for giving notices:

Bidder's Contact:

Name:

(typed or printed)

Title:

(typed or printed)

Phone:

Email:

Address:

Bidder's Contractor License No.: (if applicable)

DIVISION 33 – UTILITIES**SECTION 331619 - COMPOSITE ELEVATED WATER STORAGE TANK****1.00 GENERAL****1.01 DESCRIPTION AND QUALITY ASSURANCE**

- A. This section includes the design, construction, testing and commissioning of a Composite elevated tank and related work including foundations, (painting, electrical), mechanical and appurtenances.
- B. Related Documents
1. Drawings and the general provisions of this document, including General Conditions, Special Conditions and other Sections apply to work in this section.
 2. If there are any conflicts between Section 033000 and this Section, this Section takes precedence.
- C. All material used on this project shall be new and workmanship shall be of the best quality. Qualified and skilled workmen shall be employed for all phases of this project.
- D. The elevated tank shall be designed and constructed in compliance with applicable federal, state and local regulations.
- E. Personnel safety equipment shall be provided in accordance with OSHA requirements and manufacturers documentation.
- F. All work on the elevated storage tank shall fully conform to the requirements of the latest published editions of the following Standard Specifications.

American Concrete Institute (ACI)

- | | |
|-----------|---|
| 117-10 | Standard Tolerances for Concrete Construction and Materials |
| 228.1R-03 | In-Place Methods to Estimate Concrete Strength |
| 301-05 | Specification for Structural Concrete |
| 304-00 | Guide for Measuring, Mixing, Transporting and Placing Concrete |
| 305-10 | Hot Weather Concreting |
| 306-10 | Cold Weather Concreting |
| 318-08 | Building Code Requirements for Structural Concrete |
| 347-04 | Guide to Formwork for Concrete |
| 371R-08 | Guide for the Analysis, Design and Construction of Elevated Concrete and Composite Steel-Concrete Water Storage Tanks |

American Institute of Steel Construction (AISC)

- | | |
|------|--|
| S335 | Specification for Structural Steel Buildings |
|------|--|

American National Standards Institute (ANSI)

- | | |
|-------|-----------------------------------|
| B16.5 | Pipe Flanges and Flanged Fittings |
|-------|-----------------------------------|

American Society of Civil Engineers (ASCE)

- | | |
|--------|---|
| ASCE 7 | Minimum Design Loads for Buildings and Other Structures |
|--------|---|

American Society for Testing Materials (ASTM)

- | | |
|-------|---|
| A 123 | Zinc Coatings on Iron and Steel Products |
| A 240 | Stainless Steel Plate, Sheet and Strip for Pressure Vessels |
| A 285 | Pressure Vessel Plates, Carbon Steel |
| A 774 | Welded Stainless Steel Fittings |

COMPOSITE - ELEVATED WATER STORAGE TANK**331619/1**

A 778 Welded Stainless Steel Tubular Products

American Water Works Association (AWWA)

- C652-11 Disinfection of Water-Storage Facilities
- D100-11 Welded Steel Tanks for Water Storage
- D102-11 Coating Steel Water Storage Tanks
- D107-10 Composite Elevated Tanks for Water Storage

Federal Aviation Administration (FAA)

- 70/7460-1H Obstruction Marking and Lighting

National Association of Corrosion Engineers (NACE)

- RP0178 Recommended Practice - Fabrication Details, Surface Finish Requirements and Proper Design Considerations for Tanks and Vessels to be Lined for Immersion Service

National Fire Protection Association (NFPA)

- NEC National Electric Code
- 780 Standard for the Installation of Lightning Protection Systems

National Sanitation Foundation (NSF)

- 61 Standard for Drinking Water System Components

Occupational Safety and Health Administration (OSHA)

- 29 CFR Part 1926 Safety and Health Regulations for Construction

Steel Structures Painting Council (SSPC)

- VIS-89 Visual Standard for Abrasive Blast Cleaned Steel

1.02 QUALIFICATIONS OF MANUFACTURER

- A. The Contractor shall have a minimum of five years experience in the design and construction of "Composite Column" elevated water storage tanks. Each bidder shall provide a list of their qualifications and any sub-contractors qualifications such projects stating location, size, date of completion, contact names and telephone numbers. The owner reserves the right to disqualify a bidder if the Contractor's qualifications are deemed by the Owner as inadequate.

1.03 OWNER SUPPLIED INFORMATION

- A. A Geotechnical investigation has been completed for the site and a copy of the report is included with the Specifications.
 - 1. Should the Contractor require additional subsurface information, the cost for those services shall be covered by the Contractor.
- B. The Owner has filed with the FAA to obtain their requirements on height restriction, obstruction markings or obstruction lighting. Clearance has been obtained.

1.04 SUBMITTALS UPON AWARD

- A. Construction Drawings
 - 1. Provide elevation, plan and sectional view drawings of the foundation, support structure, tank and all appurtenant equipment and accessories. Show the location, dimensions, material specifications, and finish requirements. The submission shall be sealed by either a registered professional engineer or a registered structural engineer in the State of Illinois for Structural components.
 - 2. Foundation details shall include excavation, soil protection and backfill.

3. Reinforced concrete details shall include construction joints, openings and inserts. Reinforcement shall be clearly indicated on the structural drawings and identified by mark numbers that are used on the fabrication schedule. Placement and fabrication details shall conform to ACI 318.
4. Steel tank details shall include weld joints and a layout showing all primary and secondary shop and field welds.

B. Construction Procedures

1. Provide design, detail drawings and procedures for the support structure forming system. Details shall include location of form and construction joints, rustications and ties. Procedures shall include form removal criteria and minimum elapsed time for adjacent concrete placement.
2. Provide shop and field weld procedures for all structural joints on the steel tank.

C. Design Data

1. Provide a table showing capacity of the tank in gallons at all levels in one foot increments.
2. Provide a summary of the design for the foundation, support structure, tank and other components. Include the design basis, loads and load combinations and results.

D. Product Data

1. Provide a separate concrete mix design for each concrete compressive strength required or specified and indicated on the drawings.
2. Provide technical data and color samples of all coating products.
3. Provide manufacturers descriptive information for appurtenant equipment and accessories that are not detailed on the construction drawings.

E. Reports/Certification

1. Provide documentation of all tests, inspections and certifications required by this section.
2. Provide qualifications of all welders.

F. Operation/Maintenance

1. Provide operating instructions and maintenance procedures for the elevated tank and applicable appurtenant equipment, mechanical components and accessories.

1.05 DELIVERY, STORAGE & HANDLING

A. Handling and Shipping

1. The Contractor shall handle materials and fabricated components in a manner that will protect them from damage. Allow painted materials adequate cure time prior to stacking or shipping.

B. Storage and Protection

1. Protect delivered materials and equipment from damage. Store in well drained areas and provide blocking to minimize contact with the ground.

1.06 PROJECT CONDITIONS

A. Permits and Easements

1. Permits, licenses, and easements required for permanent structures, changes in existing facilities

or advancement of the construction as specified shall be secured and paid for by the Owner prior to the start of construction. These include building permits, airspace authority approval, site access easements, highway crossing permits, etc.

2. Licenses or permits of a temporary nature required by specific trades shall be the responsibility of the Contractor.

B. Existing Conditions

1. A geotechnical investigation has been carried out at the site and a report has been incorporated within these specifications. The Contractor shall be responsible for securing any further geotechnical information required beyond that provided in this report.

C. Access

1. The Contractor shall provide access from public road to the tank site, site work and fencing for the area.

D. Working Conditions

1. Safety and Health – The Contractor shall comply with safe working practices and all health and safety regulations of OSHA, state and local health regulatory agencies and Material Safety Data Sheets (MSDS). The Contractor shall also provide protective and lifesaving equipment for persons working at the site.

1.07 SEQUENCING AND SCHEDULING

A. Schedule

1. The Contractor shall provide a schedule for design, submittals, site work and the major components of construction including foundation, support structure and steel tank. In addition, show tank painting, electrical installation and other significant activities. Update the schedule as required.

B. Notification

1. The Contractor shall provide notification of the intent to start work at least seven days prior to commencing each major phase of work.

C. Certifications

1. Provide certification from the engineer of record that the elevated tank has been designed in accordance with the requirements of the specification.
2. Provide certification that testing and inspection requirements have been performed and the results comply with the requirements of the specification.

1.08 GUARANTEES

- A.** The Contractor shall guarantee the structure, appurtenant equipment and accessories provided under this section against defective design, workmanship or materials for a period of one year from the date of substantial completion. If notified within this period, the Contractor shall repair any defects at no cost to the Owner.
- B.** All guarantees for materials, equipment and accessories provided under this section shall be obtained by the Contractor and submitted.

2.00 PRODUCTS

2.01 COMPOSITE ELEVATED TANK

COMPOSITE - ELEVATED WATER STORAGE TANK

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A. Elevated Tank

1. The Composite elevated tank shall consist of the following: foundation, reinforced concrete support structure and a welded steel water tank. The support structure shall extend vertically from the foundation as a circular concrete wall. A domed concrete slab shall be provided as structural support for the steel tank within the perimeter of the wall. A reinforced concrete ring beam shall be provided to connect the steel tank, concrete dome and concrete support wall. The elevated tank shall be in accordance with the shape, dimension, and details required by these specifications and drawings. Dimensions may be adjusted to suit tank manufacture's standard tank shape.

B. The design and construction shall be a "Composite" elevated storage tank and shall have a capacity of not less than 2,000,000 gallons. The operating parameters are as follows:

Composite Tank (Located next to Water Plant)	
1. Minimum capacity within operating range	2,000,000 gallons
2. Head Range	43.0 ft
3. Maximum fill rate	6,000 gpm
4. Elevation – overflow/top capacity level	846.50 ft
- grade slab	686.00 ft
- final ground	686.50ft

C. General Design Standards

1. Structural design of the elevated storage tank shall conform to the following design standards except as modified by this section. In case of conflict between the Code and the criteria listed below, the more stringent requirement shall apply.
 - a) Reinforced Concrete Foundation - ACI 318
 - b) Concrete Support Structure – AWWA D107 and ACI 318
 - c) Welded Steel Water Tank - AWWA D107
2. Environmental Loads – AWWA D107and ASCE 7
 - a) Wind Load – Wind pressure shall be determined in accordance with AWWA D107, Section 4.2.6. Basic wind speed used in the Wind Pressure formula shall be determined using the mapped site location and Figure 2 of AWWA D107. For tanks located in coastal regions, the Owner's Engineer shall consider the use of an increased basic wind speed as appropriate.
 - b) Seismic Load – Seismic loads shall be determined in accordance with AWWA D107, Section 4.2.8. Seismic design criteria shall be determined in accordance with AWWA D107, Section 4.2.7.
 - c) Snow Load – Snow load shall be determined in accordance with AWWA D107, Section 4.2.5 (20 psf minimum loading).
3. Foundation Design – AWWA D107
 - a) The foundation shall be designed by the Composite Elevated Water Storage Tank Contractor to safely support the structure based on the foundation recommendations within the geotechnical consultant's soil report (See also 1.7.2). Foundations shall be sized in accordance with load combinations defined by AWWA D-107, Sec. 4.3

2.02 MATERIALS

A. Reinforced Concrete

1. Concrete materials and reinforcement shall comply with ACI 318 and AWWA D107, except as

COMPOSITE - ELEVATED WATER STORAGE TANK

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modified in this section.

B. Steel Tank

1. Steel tank components, including steel plates, sheets, structural shapes and filler metals shall be in accordance with AWWA D107.

2.03 CONCRETE FOUNDATION

- A. The foundation shall be designed and constructed to safely and permanently support the structure.
- B. Loads imposed by openings in the base of the support structure shall be accommodated in the foundation design.
- C. Contractor shall furnish the concrete foundation and footings. The concrete foundation shall be designed in accordance with ACI 318. Minimum specified compressive strength shall be 4000 psi at 28 days. The service load reinforcement tension stress shall not exceed 30,000 psi under dead plus water load unless flexural cracking is otherwise controlled in accordance with ACI 318. The Contractor will furnish detailed plans for the foundation and footings to the Engineer for review. The foundation plans shall bear the seal of a Registered Professional Structural Engineer in the State of Illinois.
- D. Any pipe passing through the foundation shall be properly insulated.

2.04 CONCRETE SUPPORT STRUCTURE

- A. The concrete support structure shall be designed in accordance with ACI 318. The specified compressive strength of concrete shall be as required by design, but not less than 4000 psi at 28 days. The maximum specified compressive strength of concrete for the wall and dome shall be 5500 and 4500 psi respectively.

1. Support Wall

- a) Support wall shall be reinforced concrete with a minimum thickness of 8 inches exclusive of any architectural relief. Wall thickness shall be provided such that the average compressive stress due to the weight of the structure and stored water is limited to 25% of specified compressive strength, but not greater than 1000 psi. A minimum total wall reinforcement of 0.15% vertically and 0.20% horizontally shall be distributed approximately equally to each face. A minimum of 0.75% vertical reinforcement shall be provided in the top 6 ft. of the wall extending into the concrete ring beam. Minimum concrete cover for interior / exterior faces shall be 1 inch and 1-1/2 inches respectively.

2. Tank Floor

- a) Tank floor shall be a reinforced concrete dome not less than 6 inches thick. The average compressive stress due to the weight of the structure and stored water shall not exceed 15% of the specified compressive strength, nor greater than 600 psi. Minimum total reinforcement in orthogonal directions shall be 0.40% distributed approximately equally to each face. Additional reinforcement shall be provided for stress caused by edge restraint effects.

3. Openings

- a) The effects of openings in the wall shall be considered in the design. Not less than 60% of the interrupted reinforcement in each direction shall be placed each side of the opening. Reinforcement shall extend past the opening not less than half the transverse opening dimension.
- b) Openings wider than 3 ft. 6 in. shall be subjected to a rigorous analysis taking into account the stress concentrations and diminished lateral support that exist in the vicinity

of such openings. Each side of the opening shall be designed as a column in accordance with ACI 318.

- c) Openings 8 ft. 0 in. or wider used for vehicle access shall be strengthened against vehicle impact and local buckling by means of an internal buttress located on each side of the opening. The buttress shall consist of a thickened, reinforced concrete wall section that is integrally formed and placed with the support wall.

2.05 CONCRETE SUPPORT STRUCTURE/STEEL TANK INTERFACE

A. Interface Region

- 1. The interface region includes those portions of the concrete support structure and steel tank affected by the transfer of forces from the tank cone and the tank floor to the concrete support wall. This includes a ring beam and connection details. The Contractor shall provide evidence that a thorough review of the interface region has been performed. Finite element and finite difference analyses are the required methods for examining such local stresses in detail.
- 2. The geometry of the interface shall provide for positive drainage and not allow either condensate or precipitation to accumulate at the top of the concrete wall or ring beam.

B. Ring Beam

- 1. The ring beam shall be reinforced concrete with a nominal width and height of at least two times the support wall thickness. Minimum radial and circumferential reinforcement shall be 0.25%. For direct tension, reinforcement shall be provided such that the average service load stress in tension reinforcement due to the weight, of the structure and stored water does not exceed 12,750 psi.
- 2. Ring beam design shall consider unbalanced forces from the steel tank cone and concrete dome, load conditions varying with water level, eccentricity of loads resulting from design geometry, and allowance for variations due to construction imperfection and tolerance.

2.06 STEEL TANK

A. General

- 1. The steel tank shall be all welded construction and shall be designed in accordance with applicable sections of AWWA D107. The required capacity and dimensions of the tank are noted on the drawings and in this section of the specifications. All exposed lap joints shall be fully seal welded on both sides.

B. Plate Thickness

- 1. All members shall be designed to safely withstand the maximum stress to which they may be subjected during erection and operation. The minimum thickness of any steel plate shall be 1/4 in. The minimum thickness of any steel plate not in contact with water shall be 3/16 in.

C. Roof Support

- 1. All structural members supporting the roof of the steel tank shall be flat bar or sealed square tubular sections. I-beams or other sections with horizontal projections may be used if the nominal depth is 10 in. or greater. Support beams shall be seal welded to the underside of the roof plate along the entire length of the beam.

D. Cone

- 1. For areas of the elevated tank where the water is supported by a steel cone, the Contractor shall submit evidence that the design is based on one of the methods described in AWWA D107, Section 5.3.5.

2. Inspections and reports shall be provided to the extent required by AWWA D107.

E. Bottom Liner

1. Liner plates shall be shop fabricated to conform to the shape of the concrete dome. They may be placed directly on the concrete. All liner plate seams shall be lap welded on the topside only with a continuous fillet welds or continuous butt welds with backup bars. The minimum thickness for liner plates shall be ¼ inch.

2.07 COATING PRODUCTS

A. All coatings specified herein are to be manufactured by one of the following companies:

1. Tnemec Company, Inc., North Kansas City, Missouri
2. Carboline Company, St. Louis, Missouri
3. Approved Equal

B. Materials specified are those that have been evaluated for the specific service. Only one coatings manufacturer shall be used by the contractor for this project.

C. Manufacturers color charts shall be submitted to the Owner at least 30 days prior to paint application. Contractor shall coordinate work so as to allow sufficient time for paint to be delivered to the job site.

D. Colors, where not specified, shall be as selected by the Owner.

2.08 APPURTENANCES AND ACCESSORIES

A. General

1. Accessories shall comply with the minimum requirements of the Specifications, Codes and Standards current applicable in the safety regulations, and the operating requirements of the structure.

B. Ladder Access

1. Ladders shall be provided from the slab on grade inside the base of the support wall to the upper walkway platform located below the tank floor. The tank floor manhole shall be provided with ladder access from the upper platform. A ladder shall extend from the upper platform, through the access tube interior to the roof. A ladder mounted on the access tube exterior shall be provided for access to the tank interior, extending from the roof manhole to the tank floor.
2. Ladders that terminate at platforms or landings shall extend a minimum of 48 in. above the platform elevations. A safety extension shall be provided at the top of the ladder under hatch(s). The safety extension shall be a Ladder Up Safety Post as manufactured by Bilco or equal. The post shall extend 42-inches above the top of the ladder and be constructed of hot dip galvanized steel. Mounting hardware shall be galvanized.
3. Ladder side rails shall be a minimum 3/8 inch by 2 inch with a 16 inch clear spacing. Rungs shall be a minimum ¾ inch diameter, spaced at 12 inch centers and plug welded into holes drilled in the side rails.
4. Ladders shall be secured to the adjacent structure by brackets located at intervals not exceeding 10 feet. Brackets shall be of sufficient length to provide a minimum distance of 7 inches from the center of rung to the nearest permanent object behind the ladder. Ladder brackets located on the access tube exterior shall be reinforced at the access tube shell so that potential ice damage is confined to the ladder and bracket and not to the access tube shell.
5. Ladders located in the concrete support structure and access tube interior shall be galvanized steel. Tank interior ladders shall be coated in accordance with the tank interior coating system.

6. Ladders shall be designed in accordance with OSHA standards.

C. Safe Climbing Device/Safety Equipment

1. OSHA compliant safe climbing system shall be provided on all ladders. Two sleeves with snap hooks shall be provided that are designed to be operated with the system. Two harnesses with shock resistant lanyards shall be provided with the system.

D. Access Tube

1. Provide a minimum 48 in. diameter centrally located access tube through the steel tank to provide access to the tank roof from the upper walkway platform. The access tube shall incorporate a 2 in. by 2 in. channel to collect condensation that may form on the interior surface. A flexible 1 1/2 in. PVC hose shall drain the channel to the overflow pipe.
2. The area under the access tube shall be provided with a galvanized drip pan to prevent condensation from dripping onto the concrete floor slab below. The drip pan shall extend 3 in. beyond the drip line of the access tube. A 3 in. PVC drain pipe shall be provided to drain condensate to the overflow.

E. Rest Platforms

1. Rest platforms shall be provided at maximum 50 ft. intervals along the support wall ladder. Platforms shall be nominal 5 ft x 5 ft and complete with handrails, mid rails and toe plates shall be in accordance with OSHA requirements. Grating shall be used for the walking surface and shall be suitably hinged at the ladder penetration. Platforms shall be arranged for straight run ladder and operable without removing fall protection equipment. All platform components shall be galvanized steel and attachment hardware shall be zinc plated.

F. Platforms

1. A 4 ft. wide upper walkway platform shall be located at the top of the support wall to provide access from the support wall ladder to the roof access ladder located on the interior of the access tube. Platforms shall be provided with handrails, mid rails and toe plates in accordance with OSHA requirements. Grating shall be used for the walking surface. All components shall be galvanized steel.

G. Support Wall Doors

1. Personnel Door - Door frames shall be 16-gauge with concealed reinforcement at hardware locations. Expansion type anchors for existing openings shall be installed near the top, bottom and intermediate point of each jamb to rigidly secure the frame. Doors shall be 1 3/4 in. thick insulated, reinforced, full, flush type with 18-gauge face sheets and concealed reinforcement at hardware locations. All edges shall be finished flush with watertight seams. Shop applied finish for the frame and door shall be baked on rust inhibitive primer. Field finish shall be compatible with the tank exterior. Standard hardware shall be stainless steel and include three 4 1/2 in. by 4 1/2 in. hinges, industrial duty closer and lockset.
 - a) Location, size and hardware schedule of personnel door shall be as shown on the drawings.
2. Overhead Vehicle Door – Provide a manually operated overhead steel rolling 10' X 14' door located in the base of the tower. The door frame shall be fabricated of galvanized steel plate, fastened and reinforced on the interior face of the pedestal tower. The curtain shall be formed of 22-gauge steel interlocking slats for a wind loading of 20 psf. A 24-gauge steel hood shall be provided with a weather seal to protect the assembly. The curtain, bottom bar, brackets, guides, hood, pipe and chain shall be galvanized. Provide with locking device.
 - a) Location, size and hardware schedule of vehicle door shall be as shown on the drawings.

- b) Provide two (2) eight inch diameter steel safety posts outside of the opening to protect the door. Safety posts shall be filled with concrete and shall be painted safety yellow.

H. Antenna / Roof Railing:

1. A new circular 42" high safety railing shall be provided and installed on the top of the tank roof.
2. The handrail diameter shall be large enough to encompass the existing access manway(s) and vent and shall allow for sufficient access into the roof manway(s) (minimum 15' diameter). The handrail shall be circular. Straight rails forming a polygon will not be allowed.
3. The handrail shall include a long post for every two short posts installed to allow antennas to be mounted to the long post. The railing post shall consist of C5 x 9 x 3'6" (short) and C5 x 9 x 5'6" (long).
4. The post shall include a 6" square x 1/4" bearing plate.
5. The top rail shall consist of a 2 1/2" x 2 1/2" x 1/4" angle.
6. The mid rail shall consist of a 2" x 3/8" bar.
7. The toe plate shall consist of a 4" x 1/4" bar.
8. The handrail shall be fabricated and installed in accordance with these specifications or the requirements set forth in OSHA 29 CFR Part 1910, whichever is greater.

I. Tank Openings

1. Floor - Provide one (1) 30 in. diameter manhole through the tank floor. The manhole shall be operable from a ladder located on the upper platform and shall be designed to withstand the pressure of the tank contents without leakage. The manhole assembly shall include a stainless steel hand wheel operator and threaded components.
2. Roof - Provide two (2) 30 in. diameter weather proof access hatches on the roof of the tank. One hatch shall allow egress from the access tube to the roof. The second hatch, located adjacent to the first, shall allow access to the interior of the tank via the ladder mounted on the exterior of the access tube. The opening shall have a minimum 4 in. curb. Provide aluminum covers with a 2 in. down turned edge, stainless steel hardware, hold open arm and a locking mechanism.
3. Roof – Provide one (1) 24 in. diameter exhaust hatch located adjacent to the roof hatch. The exhaust hatch will be flanged with a bolted removable cover and designed such that an exhaust fan may be connected for ventilation during painting. The opening shall have a minimum 4 inch curb.

J. Rigging Access

1. Provide a 24 in. x 36 in. opening at the top of the support wall. This opening shall be accessible from a platform and shall provide access to the exterior rigging rail located at the tank/support wall intersection. The access opening shall be provided with a hinged stainless steel cover or a removable vent in accordance with 2.06.M.2.
2. A minimum 24 in. diameter opening shall be provided on the tank roof to provide access to the tank interior rigging rail.

K. Rigging Rails

1. Provide permanently installed painters rails suitable for rolling trolleys at the interior of the tank at the wall/roof and access tube/roof connections.

2. Provide an exterior utility rail at the base of the tank adjacent to the support structure.
3. Provide an interior utility rail at the top of the pedestal in order to assure access for maintenance of piping.

L. Piping

1. Inlet/Outlet Pipe - Provide a 30 inch diameter inlet/outlet pipe that extends from the base of the support structure to the tank floor elevation as indicated on the project drawing. Inlet/outlet pipe shall be stainless steel within the support column and carbon steel inside the tank bowl as indicated on the plans. Stainless steel pipe shall be minimum Schedule 40 Type 316L. Piping below the grade slab shall be flanged cement lined ductile iron suitably restrained to prevent movement.
 - a) The inlet/outlet pipe shall be designed to support all related static and dynamic loads. Suitable galvanized steel brackets, guides and hangers shall be provided on the support wall and tank floor at intervals not exceeding 20 feet.
 - b) The inlet/outlet pipe shall be designed and constructed to accommodate any differential movement caused by settlement and by thermal expansion and contraction over the range of extreme temperature differences expected for the support wall and pipe. The required flexibility shall be provided by an expansion joint located near grade in the vertical section of pipe as well as at the interface between the bowl and support column.
2. Overflow Pipe - Provide a 30 inch diameter overflow. The top of the overflow shall be located within the tank at the overflow elevation. A suitable weir box shall be provided with the crest at High Water Level. The overflow pipe shall be routed beside the central access tube and extend to grade inside the pedestal. A base elbow shall direct the overflow through the support pedestal wall, where the pipe shall be terminated with a flap valve at the discharge point to prevent the ingress of birds and insects. Pipe material within the support structure shall be stainless steel. Stainless steel pipe shall be minimum Schedule 40 Type 316L. If the top of overflow is located above top capacity level, the tank shall be designed for the additional capacity provided by the difference.
 - a) The entrance to the overflow pipe shall be designed for the maximum inlet flow rate. The design shall be based on the water level cresting within 6 in. above the overflow elevation. A weir shall be provided if the entrance capacity of the overflow pipe diameter is not adequate. A vortex prevention device shall be used.
 - b) The overflow shall be designed to support all related static and dynamic loads. Galvanized steel brackets, guides and hangers shall be provided on the support wall and tank floor at intervals not exceeding 20 ft. The overflow pipe and weir section within the tank shall be carbon steel and supported by the central access tube.
 - c) The overflow pipe shall be designed and constructed to accommodate any differential movement caused by settlement and by thermal expansion and contraction over the range of extreme temperature differences expected for the support wall and pipe. The required flexibility shall be provided by an expansion joint located near grade in the vertical section of pipe as well as at the interface between the bowl and support column.
 - d) The overflow pipe shall penetrate the support wall approximately 18 inches above grade and discharge through a flap valve onto a concrete splash pad.
 - e) Flap valve and 24 gauge stainless steel screen shall be provided.
3. Stainless Steel Requirements - Pipe and fittings shall be Type 316L stainless steel fabricated from material meeting the requirements of ASTM A240. Fabrication, inspection, testing, marking and certification of pipe and fittings shall be in accordance with ASTM A778 and A774 respectively. All fittings less than 18 inches shall be smooth flow, fittings larger than 18 inches may be of five section mitre construction. Backing flanges shall be in accordance with ASTM

A285-C drilled to ANSI B16.5 Class 150. Pipe, fittings and welds shall be cleaned and passivated.

- a) Pipe, fittings and flange thickness shall be in accordance with the manufacturers certified pressure rating for the applicable service pressures.
4. Tank Drain - A tank drain shall be provided to completely drain the tank contents if the inlet/outlet pipe does not intersect the low point of the tank. A six (6) inch drain pipe located at the low point of the tank floor shall be fitted with a six (6) inch non-freeze draw off drain valve. Six (6) inch schedule 40 PVC pipe shall connect and drain to the overflow pipe.

M. Ventilation

1. Tank Ventilation - A tank vent shall be provided, located centrally on the tank roof above the maximum weir crest elevation. It shall consist of stainless steel or aluminum components, including a support frame, screened area and cap. The support shall be fastened to a flanged opening in the tank roof. The vent cap shall be provided with sufficient overhang to prevent the entrance of wind driven debris and precipitation. A minimum of 4 in. shall be provided between the roof surface and the vent cap.
 - a) The tank vent shall have an intake and relief capacity sized to prevent excessive pressure differential during the maximum flow rate of water, either entering or leaving the tank. The overflow pipe will not be considered as a vent. The maximum flow rate of water exiting the tank shall be calculated assuming a break in the inlet/outlet at grade when the tank is full. Vent capacity shall be determined based on open area provided by the screen.
 - b) The vent shall be designed, constructed and screened so as to prevent the ingress of wind driven debris, insects, birds and animals. The vent shall be aluminum and shall not be painted. The vent should be designed to operate when frosted over or otherwise clogged. The screens or relief material shall not be damaged by the occurrence and shall return automatically to operating position after the blockage is cleared. The screen shall be 18 gauge mesh (stainless steel).
2. Support Structure Ventilation - As a minimum, one louvered vent shall be provided at the top of the support wall. This vent shall be accessible from the upper platform and may also be designed to provide access to the exterior rigging rails located at the tank/support wall intersection. Vents shall be accessible from the interior ladders, platforms or floors provided. Vents shall be stainless steel or aluminum and provided with a removable insect screen.

N. Interior Floors

1. Slab on Grade - Provide a 6 in. thick, 3500 psi concrete floor slab in the base of the support structure. The slab shall be supported on compacted granular fill and shall be reinforced with #4 reinforcing steel at 12 in. centers each way. Provide 1/2 in. expansion joint between floor slab and support wall and at pipes and supports that extend through the floor. Place cap strip and sealant over the expansion joint. The slab shall be sloped at 0.5% toward the overhead door for drainage.

O. Level Monitoring

1. General – Provide one (1) ¾ inch threaded nipple welded to the inlet/outlet pipe in the valve pit per drawings. Each coupling shall be provided with a stainless steel nipple and an isolation valve.
2. Pressure Gauge – Provide a pressure gauge in accordance with ASME B20.1 Grade 2A. The dial shall be 4 ½ inch diameter with black markings on white background. Pressure range is 0-100 psi.

P. Lightning Protection

1. Provide a lightning protection system for the elevated tank structure and any roof mounted equipment that may be damaged by lightning. Install the system in accordance with NFPA 780 with materials that meet UL96 and UL96a.
2. Minimum requirements include *two* 28 strand by 14 gauge copper conductors bonded to the steel tank 180 degrees apart. The conductors shall be fastened to the interior support wall at 3 foot minimum spacing, and shall terminate with buried 5/8 inch diameter by 8 foot long copper clad ground rods.
3. Lightning protection for obstruction lights shall consist of an air terminal mounted on the support and formed to fit around the fixture. The 1/2 inch diameter copper air terminal shall extend a minimum of 10 inches above the light fixture and shall connect to a copper conductor that terminates in a bonding plate secured to the tank roof.

Q. Identification Plate:

1. A tank identification plate shall be mounted near the personnel door. The identification plate shall be corrosion resistant and contain the following information.
 - a) Tank Contractor
 - b) Contractor's project or file number
 - c) Tank capacity
 - d) Height to High Water Level
 - e) Date erected

R. Lighting and electrical:

1. Waterproof light sockets with conduit, wiring, and switch shall be provided for lighting the inside of the support structure and access tube with locations specified by the manufacturer.
2. Exterior access lighting shall be provided above the access door and overhead door at the base of the structure and shall be on photoelectric cell type switches and motion detection switches. The exterior access lighting shall only turn on after dusk when motion is detected and shall remain on for an adjusted time. Contractor shall provide a MH wall pack similar to Cooper Lighting – Lumerk (Model MHWL-175MT) or equal.
3. Nine (9) interior waterproof light jackets with conduit, wiring, and switch shall be provided inside the pedestal and access tube. There shall be one (1) light located at the top of the access tube, one (1) light near the top of the pedestal below the tank, one (1) light at the mid-point of the supporting pedestal, one (1) light above the condensate ceiling, three (3) lights in the base cone and two (2) lights in the valve vault. The conduit and wiring shall terminate with a lighting panel in the base of the pedestal.
4. Contractor shall provide a properly sized main breaker in the lighting panel and install a 20 amp GFCI convenience outlet adjacent to the lighting panel.
5. A double obstruction light shall be provided on the roof of the tank. The lights shall be enclosed in aviation red obstruction light globes as approved by FAA, complete with an automatic photoelectric cell type switch.
6. All wiring shall be in conduit. The conduit and wiring shall connect with the lighting panel in the base of the support structure.
7. The Contractor shall provide a properly sized main breaker in the lighting panel and shall be responsible for connecting electrical service to the panel with a convenience outlet adjacent to the lighting panel.

S. Provisions for Antennas and Related Equipment:

1. The roof railing shall accommodate antenna mounting as previously described.

2. Standoff mounting hardware shall be provided for cables and antenna wiring, inside the pedestal.
 - a) Standoffs shall be provided at intervals of +/- 4 feet.
 - b) Standoffs shall be cantilever design and shall be fillet welded to the tank. They shall be capable of supporting four (4) separate cables.
 - c) Cable centerlines shall be spaced at least 6" apart and at least 8" from the tank walls.
 - d) All mounting hardware shall be coated according to the applicable coating specification pertinent to the portion of the tank, i.e., mounting hardware on the exterior shall receive the exterior coating system and mounting hardware on the dry interior shall receive the dry interior coating system.
3. Inside the access tube cables shall be mounted tight to the wall to maximize passage space.
4. In no case shall cable and antenna wiring support systems be mounted to any ladders nor shall they interfere or obstruct ladders, manways, or manholes.

T. Hydrodynamic Mixing System

1. The Hydrodynamic Mixing System (HMS) shall passively utilize the energy provided by the inlet water supply to generate sufficient inlet momentum to achieve a complete homogeneous blending of the water volume within the reservoir. Determination of complete homogeneous blending shall be demonstrated by modeling software and supporting calculations and results shall be provided for the specific system configuration as defined within the plans and specifications.
2. The HMS shall consist of a bi-directional flow manifold equipped with checked, variable orifice inlet nozzles and outlet flow check valves that are NSF61 certified. The HMS manufacturer shall be responsible for designing the system to ensure complete homogeneous blending of the water volume within the reservoir.
3. The system shall be sized to allow for a maximum inlet flow rate of 1800 gpm and a maximum withdrawal rate of 5000 gpm.
4. The system shall be comprised of one manifold pipe with checked inlet nozzles and outlet check valves in order to minimize the amount of pipe, fittings and appurtenances required to separate the inlet and outlet and shall have the following characteristics:
 - a) The system shall passively operate and shall not require any outside energy source.
 - b) Complete mixing shall be achieved using multiple (but less than 10) turbulent inlet jets.
 - c) The inlet ports shall discharge an elliptically shaped jet that provides faster mixing and dilution of the inlet water into the tank water and shall have a check feature to prevent reverse flow.
 - d) The outlet check valves shall be separated spatially from the inlet nozzles to mitigate short circuiting.
 - e) Piping shall be schedule 80 PVC, 304 Stainless Steel, or Carbon Steel.
 - f) All piping components shall be acceptable for use in potable water.
 - g) Stainless steel piping, nuts, bolts, components and other appurtenances shall be electrically isolated from carbon steel and from the carbon steel tank by means of an NSF approved elastomeric gasket, bearing pad, grommet, etc.

- h) Carbon steel or ductile iron piping, nuts, bolts, valves, components, and other appurtenances shall receive surface preparations and coatings systems as specified for the interior of the tank.
- i) HMS Bracing shall be kept to a minimum so as to easily permit future tank maintenance, including removal of the coating system and installation of a new coating system, without removing the HMS. There shall be no bracing or support structures that attached to the tank walls.

U. Insulation:

- 1. The inlet/outlet line within the support structure shall be insulated as required. Provide insulation to protect against freezing in accordance with the Lowest One-Day Mean Temperature depicted in AWWA D100-96, Figure 15.
- 2. Insulation shall be minimum 2 inches rigid foam with vapor barrier and minimum k factor of 0.19. The insulation shall be covered with 0.016 inch aluminum jacket banded with ½ inch aluminum strapping.

2.09 STEEL TANK PAINT

- A. Refer to Section 3.07 through 3.12 for paint and tank painting. Galvanized, stainless steel and concrete surfaces are not coated.

2.10 SOURCE QUALITY CONTROL

A. Tests

- 1. Review mill test certifications of all steel plate, structural components and reinforcement to ensure compliance with specification requirements.

B. Inspections

- 1. Provide quality assurance of shop fabricated components in accordance with AWWA D100 upon arrival onsite.

3.00 EXECUTION

3.01 EXAMINATION

A. Environmental Conditions

- 1. Prior to performing any work, verify the expected temperature, humidity and weather conditions are within the specified limitations for executing the work.

B. Elevated Tank Components

- 1. After completion of each major component and prior to proceeding with the next stage of construction, verify that tolerance inspections and material quality control tests conform to this specification.

3.02 FOUNDATION

A. Excavation

- 1. The foundation bearing surface and excavation shall be inspected by a representative of the geotechnical engineer prior to foundation construction. Verification of the applicable design and construction recommendations is required. The geotechnical engineer shall be retained by the Contractor. After verification of the foundation bearing surface, provide a 2 in. thick concrete working slab within the lower excavation limits. Grade the site to prevent runoff from entering the excavation.

B. Concrete Construction

1. For shallow foundations, reinforcement placed adjacent to a concrete working slab shall have a 2 in. minimum cover, and shall be supported by precast concrete block, metal or plastic bar supports.
2. The sides of foundations shall be formed using any suitable system conforming to ACI 318. Earth cuts shall not be used as forms for vertical surfaces. Forms shall be provided on top sloping surfaces steeper than 2.5 horizontal to 1 vertical. Straight form panels may be used to form circular foundation shapes. The minimum design radius shall be maintained at all sections.

C. Finish

1. Formed surfaces shall have a smooth form finish when exposed and a rough form finish when not exposed.
2. Unformed surfaces shall have a troweled finish when exposed and floated finish when not exposed.

3.03 CONCRETE SUPPORT STRUCTURE

A. Architectural Concrete Construction

1. The exposed exterior surface of the concrete support wall is designated architectural concrete. The concrete and formwork requirements of this section shall be strictly enforced to ensure concrete of the highest practicable architectural standard. Formwork design, installation and removal shall comply with the minimum requirements of ACI 318, ACI 117 and the applicable requirements of ACI 347 and ACI 371R, except as modified by this Section.
2. Attention shall be given to ensure the same concrete design mix is used throughout the support wall. The proportion, type and source of cement and aggregates shall not be changed. Uniform moisture content and placing consistency shall be maintained.
3. Placement is crucial to achieving architectural concrete. All wall concrete shall be placed vertically and directly inside the reinforcement with drop chutes to prevent form splatter and the resulting surface finish variations. Placement methods that introduce concrete horizontally through wall reinforcement are strictly prohibited. Vertical pour rate shall be a minimum of 15 feet per hour.
4. Forming Systems:
 - a) Support wall reinforcement installed with plastic supports shall have a maximum spacing of supports for welded wire fabric shall be 5 ft. centers, horizontal and vertically. Forming systems shall be designed with the provision of ties and bracing such that concrete components conform to the correct dimensions, shape, alignment and elevation. Embedded items shall be properly positioned and secured. Form surfaces shall be thoroughly cleaned of concrete residue and coated with a release agent prior to placing reinforcement. Do not allow excessive release agent to accumulate on the form surface. Steel forms shall be coated with a non-staining, rust preventative form oil or otherwise protected. Rust stained steel formwork shall not be used.
 - b) Forming systems not designed for lateral pressures associated with full height plastic concrete shed shall be designed with the provision of ties and bracing such that concrete components conform to the correct dimensions, shape, alignment and elevation without leakage of mortar. Formwork systems shall be designed to safely support all loading conditions. Embedded items shall be properly positioned and secured. Form surfaces shall be cleaned of foreign materials and coated with a release agent prior to placing reinforcement. Do not allow excessive release agent to accumulate on the form. Steel forms shall be coated with a non-staining, rust preventative form oil or otherwise protected.
 - c) The forming system for the pedestal wall shall be fully engineered and detailed with procedures to meet the increased demands of architectural concrete. The support wall

shall be constructed with a jump form process using form segments prefabricated to match the wall curvature. Concrete pour height shall be a minimum of 4 ft. and a maximum of 10 ft. Form panels shall extend the full height of the concrete pour using only vertical panel joints. Form system shall be designed to lap and be secured to the previous wall pour. The space between the form and the previous pour shall be sealed to prevent grout leakage. Wall forms shall incorporate a positive means of adjustment to maintain dimensional tolerances specified. Panels shall be designed for lateral pressures associated with full height plastic concrete head, and support and bracing shall be provided for construction related impact loads and wind loads. Working platforms that allow safe access for inspection and concrete placement shall be provided. Form surfaces shall be steel, plastic or fiberglass coated material.

- d) The form system shall incorporate a uniform pattern of vertical and horizontal rustications to provide architectural relief to the exterior wall surface. Rustication strips shall be sealed to the form face to eliminate the grout leakage that results in broken corners, color variations and rock pockets. Broken edges and chamfers will not be accepted. All construction joints and panel joints shall be located in rustications. Vertical panel joints shall be sealed using closures which combine with the form pattern to eliminate grout leakage and panel joint lines. All joints shall be grout tight to prevent leakage during concrete placement. The vertical and horizontal rustications shall be proportioned and combined to impart a symmetrical architectural pattern to the completed structure. Form ties shall be located in a uniform pattern. No architectural form treatment is required on the interior surface.
5. Support wall concreting shall be capable of segmented placement procedures, when required. Temporary vertical bulkheads shall divide the wall pour into segments corresponding to a single batch (truckload) of concrete. The bulkheads shall be located at rustications, braced rigid and tight to maintain vertical alignment under concrete load without grout leakage. Wall segment concrete shall be placed continuously to full form height from a single load. Placement from multiple batches is not permitted. Temporary bulkheads shall not be removed until adjacent concrete is placed. Multiple form movements and concrete placements within a day are not permitted.
6. Wall forms shall not be disturbed or removed until the concrete has attained sufficient strength to prevent forming operations or environmental loads from causing surface damage or excessive stress. Form removal shall be based on early age concrete strength testing. The minimum concrete strength shall be established by the Contractor, based on an analysis of stress at critical stages throughout the forming and concrete operations. Early age concrete testing shall be in accordance with ACI 228.1R-95 or 03.
7. The formwork system for the domed structural floor shall be designed to support all construction loads. Adequate shoring and bracing shall be provided to transfer loads without appreciable movements. Form surfaces shall be steel, plastic or fiberglass coated material. Shoring and forms for the structural dome slab shall remain in place until the concrete has gained sufficient strength to carry the floor weight without damaging deflections.
8. Concrete surfaces shall be protected in accordance with the recommendations of ACI 306.

B. Concrete

1. Concrete proportioning, production, placement, quality control and curing procedures shall comply with ACI 318 and ACI 117. Concrete shall satisfy the specific structural, durability and architectural requirements of the completed components.
 - a) Proportioning – The proportions of materials for concrete shall be established to provide adequate workability and proper consistency to permit concrete to be worked readily into the forms and around reinforcement without excessive segregation or bleeding. If high range water reducer is used, concrete slump prior to addition shall be 3 to 4 inches. The slump, after addition of high range water reducer, shall be a maximum of 9 inches. Air shall be entrained to provide concrete with 3.5% to 6.5% air content.

- b) Production – Concrete that arrives at the project with slump below that suitable for placing, may have water added within the limits of the maximum permissible water-cement ratio. Maximum slump shall not be exceeded. The water shall be incorporated by additional mixing equal to at least half of the total mixing time required. For concrete with site-administered high range water reducer, the preplasticized minimum slump requirement shall be attained as permissible by addition of water and mixing prior to the addition of the water reducer.
- c) Placement – Prior to concrete placement, all snow, ice, water or other foreign material shall be removed from the spaces that the concrete will occupy. Concrete shall be deposited in its final position in accordance with ACI 318 or the applicable building code. Drop chutes or tremies shall be used in walls and columns to prevent free-fall of the concrete and to allow the concrete to be placed through the cage of reinforcing steel. These shall be moved at short intervals to prevent stacking of concrete.
- d) All concrete shall be consolidated by vibration so that the concrete is thoroughly worked into the corners of forms and around the reinforcement and embedded items to eliminate all air or stone pockets which may cause honeycombing. Internal vibrators shall be the largest practical size that can be used in the work and shall be operated by competent workmen.

C. Finish

- 1. Provide a smooth form finish without rub for the interior and exterior support wall. Tie holes shall be plugged using grout on the interior and manufactured plugs on the exterior which match the color of the cured concrete as closely as possible. Provide a light sandblast to the exposed exterior concrete support wall surface.
- 2. Provide a smooth form finish without nib for the interior dome slab. The unformed surface shall have a floated finish.

D. Weather

- 1. Concrete shall not be placed during precipitation or extreme temperatures unless protection is provided.
 - a) During cold weather the recommendations of ACI 306 shall be followed.
 - b) During hot weather the recommendations of ACI 305 shall be followed.

E. Dimensional Tolerances

- 1. Support structure concrete construction shall conform to the following:

Variation in thickness:

wall -3.0% to +5.0%
 dome -6.0% to +10%

Support wall variation from plumb:

in any 5 feet of height 3/8 inch
 in any 10 feet of height 1 inch
 in any 50 feet of height 2 inches
 maximum in total height 3 inches

Support wall diameter variation 0.4%

Dome floor radius variation 1.0%

Level alignment variation:

from specified elevation 1 inch
 from horizontal plane 1/2 inch
 not to exceed 3 inches

Offset between adjacent pieces of formwork:

exterior exposed surfaces 1/8 inch

interior exposed surfaces 1/4 inch
unexposed surfaces..... 1/2 inch

3.04 STEEL TANK

A. Welding

1. Welding procedures and general welding requirements shall be in accordance with AWWA D100.
2. No structural welding is permitted to any steel embedded in hardened concrete, unless the weld is at least 2 ft. from the embedment interface.
3. Grinding of weld contour shall approximate Condition "D" of NACE Standard RP'0178.

B. Fabrication

1. Layout, cutting, forming, edge preparation and workmanship for steel tank components and fabrications shall be in accordance with AWWA D100.

C. Tank Erection

1. Steel tank erection procedures and general requirements shall be in accordance with AWWA D100.

D. Tolerances

1. Steel tank tolerances shall be in accordance with the requirements of API 650.

E. Grouting

1. The interface between the steel tank floor plate and the supporting structural concrete slab shall be constructed with a minimum 1 in. void. Subsequent to testing, the void shall be filled with a flowable grout mix.

F. The tank contractor shall furnish and erect all materials necessary for the construction of the tank and accessories as specified.

G. All construction work shall conform to AWWA D100.

H. Only qualified and skilled workmen shall be employed for the erection of the tank. All welders shall be qualified by ASME Section IX requirements for all positions.

I. All lap seams are to be seal welded. All interior seams are to be seal welded (above and below the waterline).

J. Contractor shall employ an independent testing laboratory (approved by Engineer) for quality testing of shop and field welds. Testing shall be radiographic method and shall not be made until welding of the tank is 100% complete. Costs of testing shall be borne by Contractor. This testing and inspection shall comply with AWWA D100 Section 11. Scheduling of the x-ray testing and test locations shall be subject to Engineer's approval.

K. Contractor shall provide necessary rigging and safety devices for Owner and Owner's representatives during erection and painting of the tank for inspection purposes.

3.05 FIELD QUALITY CONTROL

A. Concrete Testing and Inspection

1. The evaluation and acceptance of concrete shall be in accordance with Section 5.6 of ACI 318 and ACI 117, except as modified in this section.

2. Three cylinders shall be made from each sample required. A 7-day compressive strength test shall be used to supplement the 28 day tests.
3. Slump, air, temperature and compressive cylinder testing shall be performed by an independent laboratory. The Contractor shall retain the independent laboratory and provide the Contractor with copies of all test results.
4. The support wall radius, plumbness and thickness shall be verified for each concrete lift at 45 degree intervals. An inspection report by the tank manufacturer shall be provided to the Owner at project completion.

B. Steel Tank Testing & Inspection

1. Inspection procedures for the steel tank shall be as required by AWWA D107, Section 9, "Inspection". Radiographic inspection of full penetration butt-welded joints shall be made by an independent inspection company retained by the Contractor.
2. Conical sections of the welded steel water tank designed using Method 2 or Method 3 of AWWA D107 shall be inspected in accordance with Section 9.4 of AWWA D107.
3. Weld joints of plate over the structural concrete floor shall be tested for leaks by vacuum box / soap solution testing, or equivalent method prior to grouting.

3.06 SITE CLEANING

- A. The project site shall be kept in a clean and safe condition at all times. The Contractor shall remove all construction equipment and debris at project completion.

3.07 TANK PAINTING

- A. After completion of the erection of the tank, it shall be painted in accordance with AWWA Standard D102 unless otherwise specified.

3.08 SAFETY

- A. In accordance with the requirements of the OSHA Regulations for Construction, the Contractor shall provide and require the use of personal protective and lifesaving equipment for all persons working in or about the project.
- B. All pertinent local, state and federal safety regulations shall be adhered to rigidly. All safety precautions noted on the manufacturers Product Data Sheet and Material Safety Data Sheet shall be observed.
- C. Material Safety Data Sheets (MSDS) and Product Data Sheets for all paint, solvents and chemicals used, shall be available on the job site at all times.
- D. No smoking will be permitted in water tanks.
- E. Spray equipment must be grounded at all times during sandblasting and painting. Ground to scaffolding is not sufficient.
- F. Head and face protection and respiratory devices: Applicable health and safety precautions required by appropriate regulatory agencies such as OSHA, ANSI, etc. shall be followed.
- G. Ventilation shall be adequate to reduce the concentration of air contaminant to the degree that a hazard to the worker does not exist.
- H. Whenever the occupational noise exposure exceeds the maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protective devices. Noise levels cannot exceed OSHA or local regulations for other workers or residents.

- I. All temporary ladders and scaffolding shall conform to the applicable requirements of the OSHA Regulations for Construction. They shall be erected where requested by the Owner's Representative to facilitate proper inspection and be moved by the Contractor to locations requested by the Owner's Representative.
- J. The Contractor shall follow and strictly adhere to all applicable health and safety regulations and precautions as required by local, state, and federal regulatory agencies such for the surface preparation, removal, and waste disposal of all paint systems.
- K. Contractor shall hold Owner and Engineer harmless from any and all work relating to this project.

3.09 SURFACE PREPARATION

- A. No coating work shall begin before the prepared surfaces or the manner of preparation, is inspected and no exceptions to the work are taken by the Owner, or Owner's Representative.
- B. All surfaces shall be prepared in accordance with the coating manufacturer's current Product Data Sheets which are generally outlined below.
- C. After abrasive blasting, dust and spent sand shall be removed from the surfaces by brushing or vacuum cleaning. The prime coat shall be applied as soon as possible after the blasting preparation is finished and always before the surface starts to rust. No abrasive blasted surface shall stand overnight before coating, exception being by Owner's approval.
- D. Only unused fresh sand, grit, or abrasive materials will be used.
- E. All sharp edges and welds shall be ground smooth to a rounded contour and all weld spatter shall be removed after sandblasting.

3.10 PAINT SYSTEMS

- A. Surface Preparation: Surface preparation will vary according to the requirements of each coating system. The applicable methods are described in following paragraphs of this specification. Surface preparation will be based upon comparison with: "Pictorial Surface Preparation Standard for Painting Steel Surfaces" – SSPC-Vis-1-89 Visual Standard for Abrasive Blast Cleaned Steel. No coatings shall be applied before prepared surfaces or the manner of preparation is inspected and no exceptions to the work are taken by the Owner, or Owner's representative.
- B. Application: No coating shall be applied: When the surrounding air temperature or the temperature of the surface to be coated is below manufacturers printed instructions; too wet or damp surfaces or in rain, snow, fog or mist; when the temperature is less than 5°F above the dew point; when it is expected the air temperature will drop below recommended temperatures six hours after application of coating. Dew point shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with US Department of Commerce Weather Bureau Psychrometric Tables.
 - 1. If above conditions are prevalent, coating shall be delayed or postponed until conditions are favorable. The day's coating shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.
- C. Inspection Devices: The Contractor shall furnish, until final acceptance of coating, inspection devices in good working condition for detection of holidays and measurement of dry-film thickness gauge and certified instrumentation to test accuracy of holiday detectors.
 - 1. Dry-film thickness gauges and holiday detectors shall be made available for the Engineer's use at all times until final acceptance of application. Holiday detection devices shall be operated in the presence of the Engineer.
- D. Include on label of container:
 - 1. Manufacturer's name, product name, and number.

2. Type of paint and generic name.
 3. Color name and number.
 4. Storage and temperature limits.
 5. Mixing and application instructions, including requirements for precautions which must be taken.
 6. Drying or curing time.
- E. Material shall be mixed, thinned and applied according to the manufacturer's printed instructions.
- F. Finish coats shall be uniform in color and sheen without streaks, laps, runs, sags or missed areas.

3.11 SHOP PRIMER

- A. Shop prime coating with necessary field touch-up will be acceptable for the first coat. If shop priming is used, sandblasting shall be used before any paint is applied to remove loose mil scale, rust and other foreign material. Sandblasting shall then be used in the field for cleaning bare areas before touch-up painting.
1. If shop priming is to be used for the prime coat, all surface preparation and shop priming shall be monitored and tested by an independent NACE certified individual, approved by the Engineer. Tests shall include surface profile tests, visual surface preparation review and dry film thickness tests. A schedule of proposed test locations and frequencies shall be submitted and a record of the results, including pictures, shall be provided to the Owner.
 2. If the contractor so chooses, the shop priming can be removed in the field in lieu of the shop monitoring by an independent representative approved by the Engineer. In this case, all shop priming shall be removed by field blasting according to the specified surface preparation method (SSPC-SP10 or SSPC-SP6) and a field applied primer shall be installed.
- B. If no shop prime coating is used, sandblasting shall be used in the field to clean the entire surface prior to the application of any paint.

3.12 PAINT APPLICATION

- A. All coatings shall be mixed and applied in strict accordance with the manufacturer's instructions. Solvents for thinning or cleaning shall be the same manufacture as the coating.
- B. Suitable industrial type vacuum cleaners shall be provided and used to remove all residual sand and dust from all surfaces after sandblasting and prior to coating. All coated surfaces shall be cleaned before subsequent coats are applied. Particular attention shall be given to removal of sand and dust from welds, lids and edges of structural shapes and other crevices where sand may be trapped.
- C. Blasting and painting shall proceed only when the metal surface is free from dampness (precipitation and condensation). All blasted areas shall be primed within six hours after blasting, except that there shall remain unpainted a 6" to 12" border of blasted steel at the end of each work day, to prevent rusting and oxidation of cleaned surfaces. Exception of above only by Owner's written approval.
- D. The Tank shall be painted in accordance with AWWA Standard D102 unless otherwise specified.
- E. Coating System:
1. Previous coats of paint must be cured in accordance with the manufacturer's data sheet before application of succeeding coats. Each coat of paint shall be tinted to make it distinguishable from succeeding coats. Each coat of paint shall be inspected and approved by the Owner's Representative before application of succeeding coats; otherwise, no credit for coat applied will be given; and the work in question shall be re-coated.

2. The coatings listed are two-part systems, consisting of a base and catalyst. Mix as directed in the manufacturer's instruction to ensure complete chemical interaction and homogeneity. Pot life stated in manufacturer's product data sheets shall be strictly observed. Any material which thickens or excessively jells shall be discarded.

F. Wetted Interior Coating System:

1. Interior paint shall be applied in strict accordance with the manufacturer's standards. The manufacturer's standards herein are Tnemec, , or approved equal. The interior paint system shall be NSF approved and listed in NSF Standard 61.
 - a) Surface preparation: SSPC-SP10 Near-White Metal Field Blast (including welds) for wetted surfaces.
 - b) Primer: 1 full coat Tnemec Series 91-H20 Hydro-Zinc MCU or Tnemec Series 94-H20 Hydro-Zinc MCU, color-Greenish-gray; 2.5-3.5 dry film thickness.
 - c) Weld Seam Repair: All field weld seams shall be blast cleaned in accordance with SSPC-SP10 Near White Metal Blast. apply one full coat of Tnemec Series 91-H20 Hydro-Zinc MCU at 2.5-3.5 mils dry film thickness. Allow adequate drying time prior to recoating in accordance with manufacturer's recommendations.
 - d) Stripe Coat: Brush apply one full coat of Tnemec Series N140-1255 Pota-Pox Plus to all weld seams at 2.0 to 3.0 mils dry film thickness.
 - e)
 - f) Finish Coat: 1 full coat Tnemec Series 21 Epoxoline. Finish: color- WH16Off-White; 4.0-6.0 dry film thickness.

G. Dry Interior Coating System:

1. Interior paint shall be applied in strict accordance with the manufacturer's standards. The manufacturer's standards herein are Tnemec, equivalent products by Carboline, or approved equal. The interior paint system shall be NSF approved and listed in NSF Standard 61.
 - a) Surface preparation: SSPC-SP6 Commercial Blast Cleaning (including welds) for dry surfaces.
 - b) Primer: 1 full coat Tnemec Series 91-H20 Hydro-Zinc MCU or Tnemec Series 94-H20 Hydro-Zinc MCU, color-Greenish-gray; 2.5-3.5 dry film thickness.
 - c) Weld Seam Repair: All field weld seams shall be blast cleaned in accordance with SSPC-SP6 Commercial Blast Cleaning. apply one full coat of Tnemec Series 91-H20 Hydro-Zinc MCU at 2.5-3.5 mils dry film thickness. Allow adequate drying time prior to recoating in accordance with manufacturer's recommendations.

Finish Coat: 1 full coat Tnemec Series 21 Epoxoline. Finish Color – WH16 Off-White 14.0-16.0 dry film thickness.

H. Exterior Coating System (System 1):

1. Exterior paint shall be applied in strict accordance with manufacturer's standards or approved equal.
 - a) Surface Preparation: SSPC-SP6 Commercial Blast Cleaning.
 - b) Primer: 1 full coat Tnemec Series 91-H20 Hydro-Zinc MCU or Tnemec Series 94-H20 Hydro-Zinc MCU, color-Greenish-gray; 2.5-3.5 dry film thickness.
 - c) Field Weld Seam Repair: All field weld seams shall be blast cleaned in accordance with SSPC-SP6 commercial blast cleaning. apply one full coat of Tnemec Series 91-H20 MCU at 2.5-3.5 dry film thickness. Allow adequate drying time prior to recoating in

accordance with manufacturer's recommendations.

- d) Second Coat: 1 full coat Tnemec Series 73-Color Endura-Shield III, Color-ByTnemec's color lab; 2.5-3.0 dry mils.
- e) Third Coat: 1 full coat Tnemec Series V700 HydroFlon Fluoropolymer Polyurethane; 2-3 dry mils. Color by Owner.

I. Lettering

Lettering shall be provided by the Contractor. Size, style, color and location of the lettering shall be received in writing from the Owner. Lettering shall be applied by using 2 coats Fluoropolymer Polyurethane, 2.0-3.0 mils per coat, Tnemec Series V700 HydroFlon.

J. Logo and Logo Lettering

1. Refer to the end of the specifications for a visual rendering.
2. The dimensional attributes will vary with tank size as well as optional tank style as defined within the proposal. An estimated size of 12' +/- shall be considered until further sizing can be established based upon the size and type of tank awarded. The Contractor shall coordinate with the Owner positioning and sizing of the logo and lettering.
3. The colors of the logo and lettering shall be selected by the Owner.
4. The logo and lettering shall be applied by using one coat of aliphatic acrylic polyurethane TNEMEC series 1075 Endura-Sheild or similar as recommended by the manufacturer and approved by the Engineer.

K. General:

1. The paint shall be applied as received, shall be consumed within 6 months of its manufacture, possess good leveling properties and be easily applied. Each coat of paint shall be allowed to dry at least 24 hours before the next coat is applied, unless otherwise recommended by manufacturer.
2. In the event that under certain conditions thinning becomes necessary, as determined by the Engineer, the type and amount of thinner shall be in accordance with the directions of the manufacturer and as approved by the Engineer. However, if the material is thinned, wet film thickness shall be increased proportionally.
3. Application of the paints may be either sprayed or brushed on the required areas.
 - a) After completion of interior surface preparation, all weld seams, ladders, angles, edges, etc., shall be hand brushed with a twenty percent (20%) thinned down hi-build epoxy working into welds to obtain a proper seal.
 - b) If applied by spraying, care must be taken that suitable nozzles are used. Care must be taken that no spray falls on nearby structures. Spraying of exterior surfaces shall be confined to quiet days when it will not adversely affect adjacent property. The Contractor shall be responsible for any and all damage resulting from drifting of spray.
 - c) If the paint is applied by brushing, it shall be brushed in one direction and then smoothed in a direction at right angles to the original brushing to produce as uniform a thickness of coat and as complete a coverage as possible.
4. Paint shall be applied only when air temperature is at or above that recommended by manufacturer.
5. No paint shall be applied during wet or foggy weather or upon damp surfaces or metals coated with frost.

6. All interior accessories shall be painted as specified for the tank interior. All exterior accessories shall be painted as specified for the tank exterior. Do not paint galvanized safety climb rail system.
7. Finish coats shall be uniform in color and sheen without streaks, laps, runs, sags or missed areas.
8. Request acceptance of all sandblast and/or cleaning prior to painting operations.
9. Request acceptance of each coat by Engineer/Inspector before applying the next coat.
10. Correct work that is not acceptable and request reinspection by Engineer/Inspector.

3.13 Testing and Disinfection:

- A. Upon completion of the tank, after the final coat of the interior and exterior paint has been applied and dried sufficiently, the tank shall be tested and disinfected by the following procedure:
 1. All disinfection procedures shall be in accordance with AWWA C652 and shall utilize Chlorination Method 2.
 2. The tank walls and floor shall be cleaned by washing with hoses to remove all dirt, scum and other objectionable matter. The mains leading into and out of the tank shall also be cleaned and disinfected.
 3. The tank interior surfaces, including roof, shall then be sprayed with a chlorine solution containing at least 200 ppm concentration.
 4. Any chlorine solution in the bottom of the riser shall be removed immediately following the spray-down. No dilution with water shall be allowed at this time.
 5. One hour following spray-down, the tank shall be filled with an acceptable supply of potable water.
 6. Bacteriological analyses of water samples shall be made in accordance with the State Regulatory Agency (two (2) samples on two (2) consecutive days taken 24 hours apart).
 7. In the event that any bacteriological analysis of water samples prove not to be acceptable to the State Regulatory Agency, the disinfection process shall be repeated until satisfactory samples have been obtained.
 8. Any leaks that appear during this test shall be repaired to the satisfaction of the Engineer.
 9. This procedure shall be repeated until all leaks are corrected and the disinfection and testing shall be repeated.
- B. Other methods of disinfection shall be subject to the approval of the Engineer.

3.14 INSPECTION (RESIDENT PROJECT REPRESENTATION)

- A. Contractor shall maintain a Level 1 NACE Certified Coatings Inspector on-site at all times during the surface preparation and painting activities.
- B. At all times the Owner's and/or the Owner's Representative shall have access to the work in progress. Contractor shall assist, when requested, in the inspections. Tests will be made for surface condition and profile after blasting, wet film thickness, dry film thickness and pin holes. No pinholes will be allowed. The Resident Project Representative will also check application practices. The Contractor shall re-paint all areas found defective and remove and replace any coatings placed using improper practices.
- C. In addition to the tests for surface profile, wet film thickness, dry film thickness and pin holes, which will be made during the progress of the work, the Owner will check the coatings after completion of the application for compliance with these specifications. All defects shall be promptly corrected by the Contractor.

- D. Owner or Owner's Representative shall be kept informed by Contractor as to the progress of the work. If Contractor fails to notify the Owner or Owner's Representative of progressing work and the Resident has doubts of uninspected work, the Contractor will be responsible to take whatever measures necessary including but not limited to re-blasting and/or re-painting areas in question.
- E. Key Areas of Owner or Owner's Representative Notification by Contractor:
 - 1. Profile of blast
 - 2. Prime coat film thickness
 - 3. Stripe coat application and film thickness
 - 4. Finish coat film thickness
- F. Owner or Owner's Representative shall be kept informed by Contractor as to progress of work and any delays due to weather or equipment failure.
- G. Request acceptance of each coat by Engineer/Resident before applying the next coat.
- H. Correct work that is not acceptable and request reinspection by Engineer/Resident.

3.15 CLEAN-UP

- A. The Contractor is responsible for removing all sand and paint residue from the project.
- B. Upon completion of job, all debris, cans, rags, etc., shall be removed from the site by Contractor.
- C. Damage, if any, to buildings, fences, grounds (to include shrubs and trees), and roads shall be repaired and returned to their original condition.

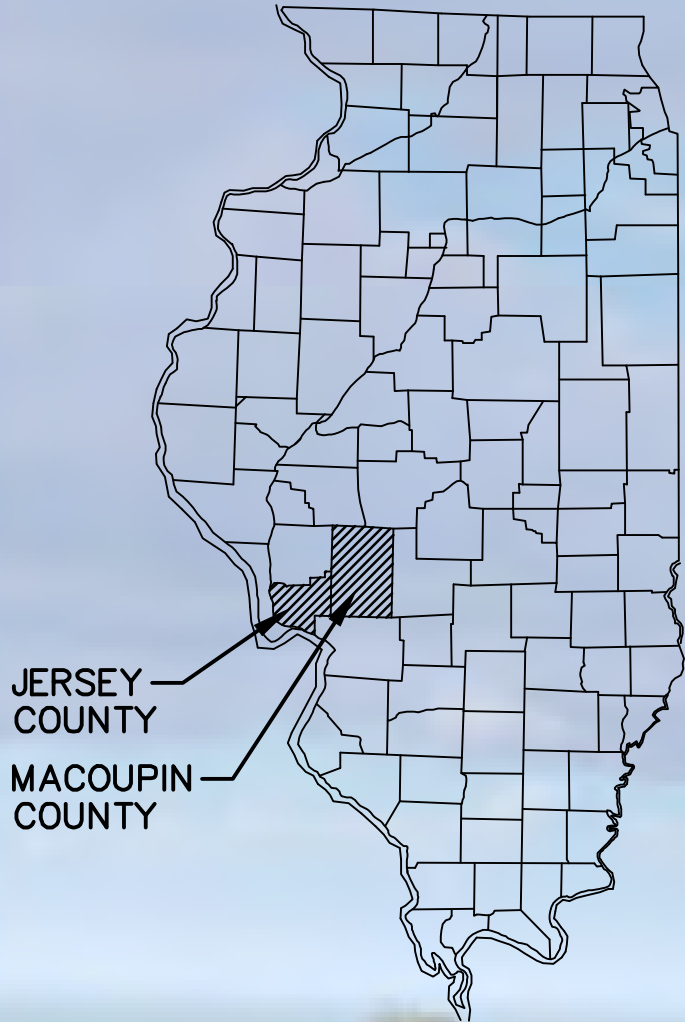
3.16 WARRANTY

- A. The Contractor shall warrant and guarantee that the materials and workmanship furnished under this contract shall be as specified and shall be free from defects for a period of **three (3) years** from the date of final payment.
- B. Within the guarantee period and upon notification of the Contractor by the Owner, the Contractor shall promptly make all needed adjustments, repairs, or replacements arising out of defects that, in the judgment of the Owner, and/or Owner's Consultant, become necessary during such period. Inspection and repair will be per AWWA D102.
- C. The costs of all materials, parts, labor, transportation, supervision, special tools and supplies required for replacement of parts, repair of parts, or correction of abnormalities shall be paid for by the Contractor, or by his surety under the terms of the Performance and Payment Bond.
- D. The Contractor also extends the terms of this guarantee to cover repair work and all replacement parts furnished under the guarantee provisions for a period of two years from the date of completion thereof.
- E. The coating will be inspected after one year and two years to assure that no coating failure has occurred. If any corrosion, bubbling, delaminating or other indications of failure are detected, the Contractor will repair all affected areas. Inspection and repair will be per AWWA D102, Section 9.

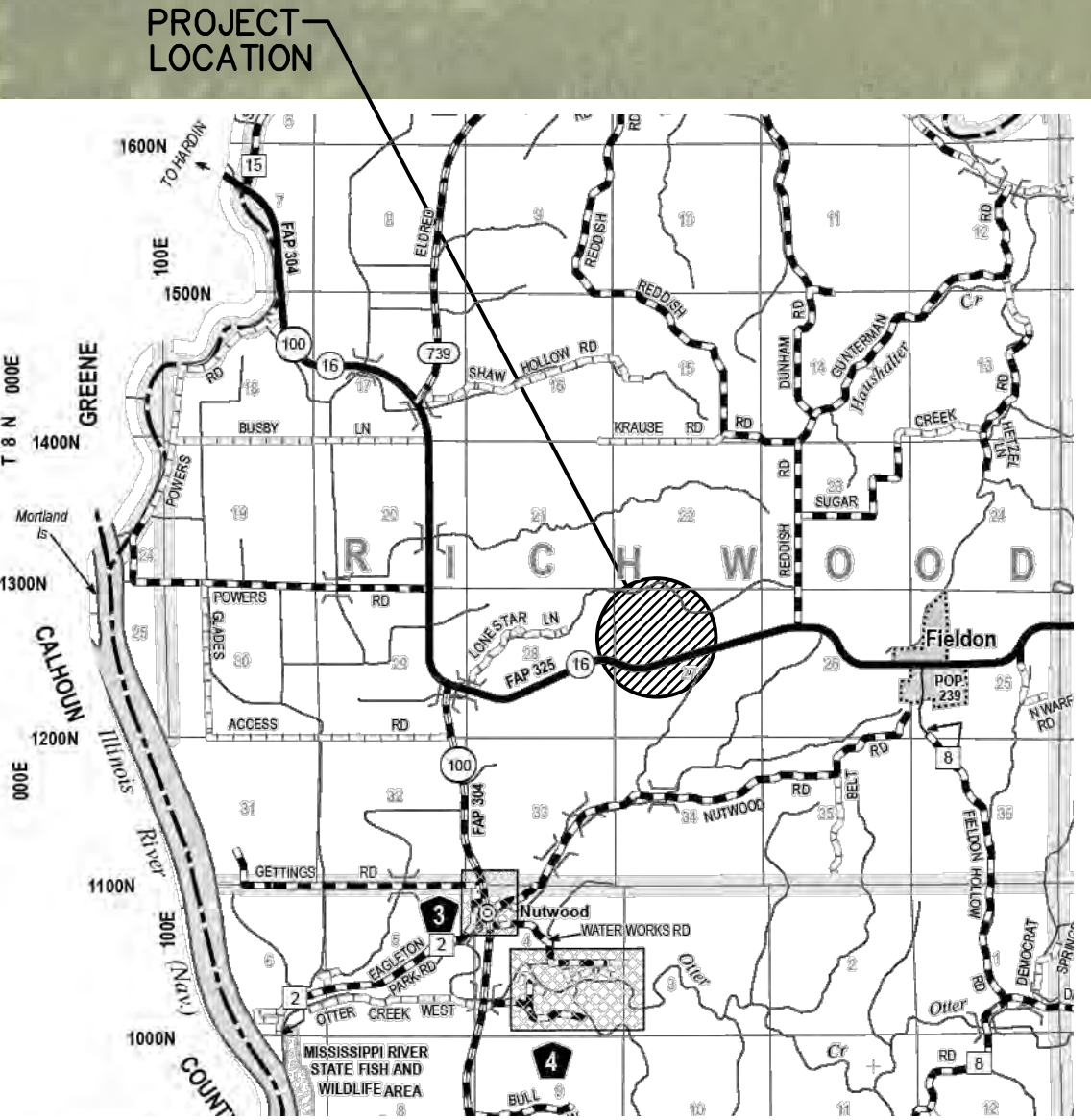
END OF SECTION 331619

CONSTRUCTION PLANS FOR
CONTRACT "D" (PHASE "1B")
2,000,000 GALLON ELEVATED
STORAGE TANK

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
14500 STATE HIGHWAY 16, FIELDON, ILLINOIS 62031
2026



STATE OF ILLINOIS



LOCATION MAP

CAUTION:
INFORMATION ON DRAWINGS
CONCERNING TYPE AND LOCATION
OF UNDERGROUND AND OTHER UTILITIES
IS NOT GUARANTEED TO BE ACCURATE
OR ALL INCLUSIVE. THE CONTRACTOR IS
RESPONSIBLE FOR MAKING HIS OWN
DETERMINATION AS TO THE TYPE AND
LOCATION OF UNDERGROUND AND OTHER
UTILITIES AS MAY BE NECESSARY TO
AVOID DAMAGE THERETO.



PROJECT CONTACT INFORMATION

MAX MIDDENDORF
OFFICE PHONE: (217) 285-2550
EMAIL: mmiddendorf@mecoengineering.com

UTILITY PROVIDER INFORMATION

JERSEY COUNTY RURAL WATER COMPANY (618) 498-9534
MJM ELECTRIC CO-OPERATIVE (217) 707-6156

IARWC BOARD MEMBERS

JERSEY COUNTY RURAL WATER: ALLEN DAVENPORT
BUNKER HILL: JOHN CHAPMAN
DORCHESTER: SUE CAMPBELL
CARLINVILLE: SARAH OSWALD
FIELDON: JULIA DIXON
CENTRAL MACOUPIN COUNTY
RURAL WATER DISTRICT: RANDY DARR
FOSTERBURG WATER DISTRICT: STEVE RUPPERT

PLANS ACCEPTED BY:

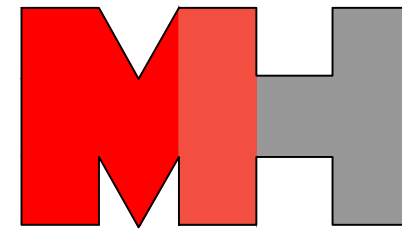
BOARD PRESIDENT: ALLEN DAVENPORT

ENGINEER'S CERTIFICATION

I HEREBY CERTIFY THAT THESE PLANS
WERE PREPARED BY ME OR UNDER MY
DIRECT SUPERVISION AND THAT I AM
A DULY REGISTERED PROFESSIONAL
ENGINEER EXISTING UNDER THE LAWS
OF THE STATE OF ILLINOIS

MAX F. MIDDENDORF, P.E. # 062-049419 ILL.

MECO-HENEGHAN
ENGINEERS, LLC



www.meco-heneghan.com

DESIGN FIRM NUMBERS:
IL: 184.007845-0010
035.003949
EXPIRES: APRIL 30, 2027
MO: 2018004041
EXPIRES: DECEMBER 31, 2027

400 N. FIFTH STREET
SUITE 107
ST. CHARLES, MO 63301
P: (636) 395-7055

REVISIONS

DATE

NO.

PHASE 1B

CONTRACT "D" - PHASE "1B"
2,000,000 GALLON ELEVATED
STORAGE TANK
COVER SHEET/LOCATION MAP

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
JERSEY & MACOUPIN COUNTIES, ILLINOIS

DRAWN BY: D. MOORE
CHECKED BY: K. GARNETT
APPROVED BY: M. MIDDENDORF

HORIZONTAL SCALE:

N/A

VERTICAL SCALE:

N/A

PROJECT NO.

700-003

DATE:

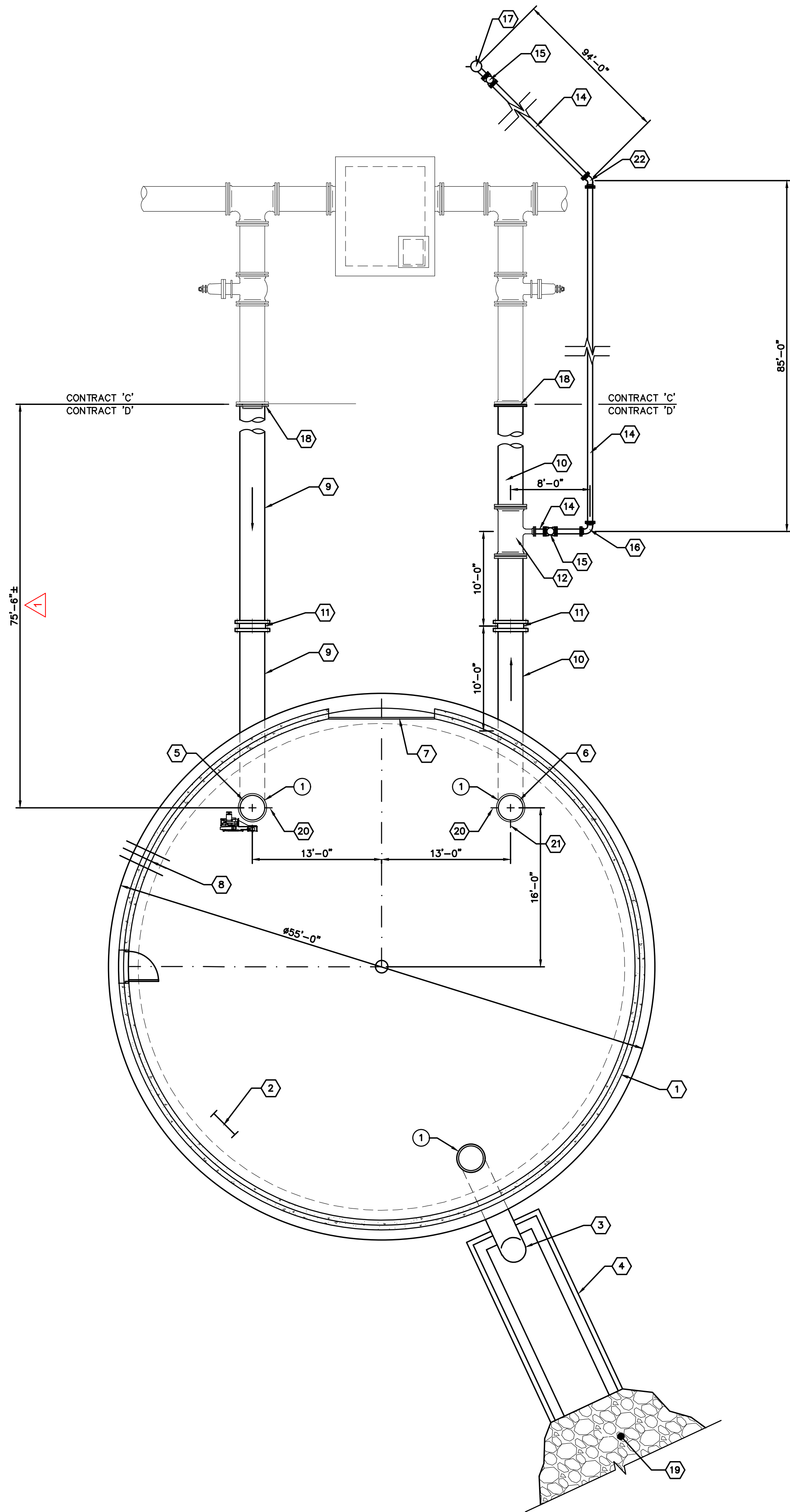
02/14/26

SHEET NO.

G1

1 OF 6 SHEETS

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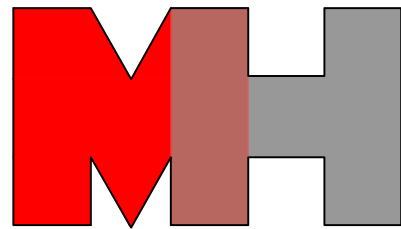


1
C1

SITE PLAN

INDEX OF DRAWINGS	
SHEET NUMBER	SHEET TITLE
G1	COVER SHEET
C1	INDEX OF DRAWINGS / ELEVATED WATER STORAGE TANK SITE PLAN / ELECTRICAL SCHEDULE
C2	ELEVATED WATER STORAGE TANK SECTIONS
C3	ELEVATED WATER STORAGE TANK PIPING / ELECTRICAL SCHEMATIC DETAILS
C4	TYPICAL 30" PIPE VALVE / THRUST BLOCKS AND TRENCHING DETAILS
C5	ELEVATED WATER STORAGE TANK MISCELLANEOUS SITE DETAILS

MECO-HENEGHAN
ENGINEERS, LLC



www.meco-heneghan.com

DESIGN FIRM NUMBERS:
IL: 164.007845-0010
035.003949
EXPIRES: APRIL 30, 2027
MO: 2018004041
EXPIRES: DECEMBER 31, 2027

400 N. FIFTH STREET
SUITE 107
ST. CHARLES, MO 63301
P: (636) 395-7055

PANEL NAME / NUMBER:		VOLTAGE L-L: 240		PHASE: 1		IER (AMPS): 10kA					
Panel ET		VOLTAGE L-N: 120		WIRE: 3		BUS RATING (AMPS): 60					
		MAIN BREAKER: 100 AMPS		Hz: 60		ENCLOSURE: NEMA 1					
		MAIN LUG ONLY: N/A AMPS				MOUNTING: SURFACE					
CKT NO.	LOAD DESCRIPTION	LOAD CRITERIA		BKR		BKR	LOAD CRITERIA		LOAD DESCRIPTION	CKT NO.	
		DEM	VA	AMPS	P	Ø	AMPS	P	VA	DEM	
1	HEAT TRACING RECEPTACLES	R	500		20	2	L1	20	1	200	C
3	SPARE				20	1	L2	20	1	200	C
5	SPARE				20	1	L1	20	1	540	R
7	SPARE				20	1	L2	20	1	360	R
9	PREPARED SPACE						L1	20			SPARE
11	PREPARED SPACE						L2	20			SPARE
13	PREPARED SPACE						L1	20			SPARE
15	PREPARED SPACE						L2				
17	PREPARED SPACE						L1				
19	PREPARED SPACE						L2				
21	PREPARED SPACE						L1				
23	PREPARED SPACE						L2				
PHASE L1 CONNECTED:		1,240 VA		PHASE L1:		10 AMPS		NOTES:			
PHASE L2 CONNECTED:		560 VA		PHASE L2:		5 AMPS		1.			
TOTAL CONNECTED:		1,800 VA		AT: 240		= 8 AMPS					
DEM											
C	CONTINUOUS LOADS (+25%) (PER NEC 210-20a): 100 VA										
M	LARGEST MOTOR LOAD (+25%) (PER NEC 430-24): 0 VA										
R	RECEPTACLE LOAD REDUCTION (PER NEC 220-44): 0 VA										
K	KITCHEN LOAD REDUCTION (PER NEC 220-56): 0 VA										
TOTAL DEMAND:		1,900 VA		AT: 240		= 8 AMPS					

2 ELECTRICAL SCHEDULE

GENERAL NOTE

- 1 ALL EXPOSED PIPING TO AIR INSIDE OF TANK SHALL HAVE FROST JACKETING INSTALLED.

KEY NOTES

- 1 ELEVATED WATER STORAGE TANK
CONCRETE BASE WALL
- 2 SUPPORT STRUCTURE LADDER
- 3 30" DIA. STN. STL. OVERFLOW PIPE
- 4 20'-0" x 8'-0" SPLASH PAD
- 5 30" STN. STL. INLET PIPE
- 6 30" STN. STL. OUTLET PIPE
- 7 10' WIDE OVERHEAD DOOR ABOVE
- 8 ELECTRICAL ENTRANCE - LOCATION TBD
- 9 30" DUCTILE IRON INLET PIPE CLASS 250
- 10 30" DUCTILE IRON OUTLET PIPE CLASS 250
- 11 30" DUCTILE IRON PIPE COUPLER
- 12 30"x6" DUCTILE IRON TEE (M.J. x M.J. x M.J.)
WITH THRUST BLOCK
- 13 30" "M&H" B'FLY GATE VALVE (M.J.) (OR EQUAL)
WITH ADJUSTABLE VALVE BOX AND THRUST BLOCK
- 14 6" DUCTILE IRON PIPE CLASS 250
- 15 6" "M&H" GATE VALVE (OR EQUAL) WITH
ADJUSTABLE VALVE BOX AND THRUST BLOCK
- 16 6" DUCTILE IRON 90° BEND (M.J. x M.J.)
WITH THRUST BLOCK
- 17 6" FLUSH HYDRANT
- 18 PROVIDE TEMPORARY CAP IF PIPING
(BY CONTRACT 'C') IS NOT COMPLETE
- 19 24" THICK RIPRAP AREA
- 20 3/4" DIAMETER TAP FOR SMOOTH NOSE SAMPLING
TAP WITH ISOLATION VALVE
- 21 3/4" DIAMETER TAP FOR 3/4" HOSE BIBB
WITH ISOLATION VALVE
- 22 6" DUCTILE IRON 45° BEND (M.J. x M.J.)
WITH THRUST BLOCK

REVISIONS

DATE

NO.

ADDENDUM
NO. 1

CONTRACT "D" - PHASE 1B
INDEX OF DRAWINGS /
ELEVATED WATER STORAGE
TANK SITE PLAN /
ELECTRICAL SCHEDULE

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
JERSEY & MACOUPIN COUNTIES, ILLINOIS

DRAWN BY: R. H. / J. McNEFF
CHECKED BY: K. GARNETT
APPROVED BY: M. MIDDENDORF

HORIZONTAL SCALE:

1/8" = 1'-0"

VERTICAL SCALE:

PROJECT NO.

700-003

DATE:

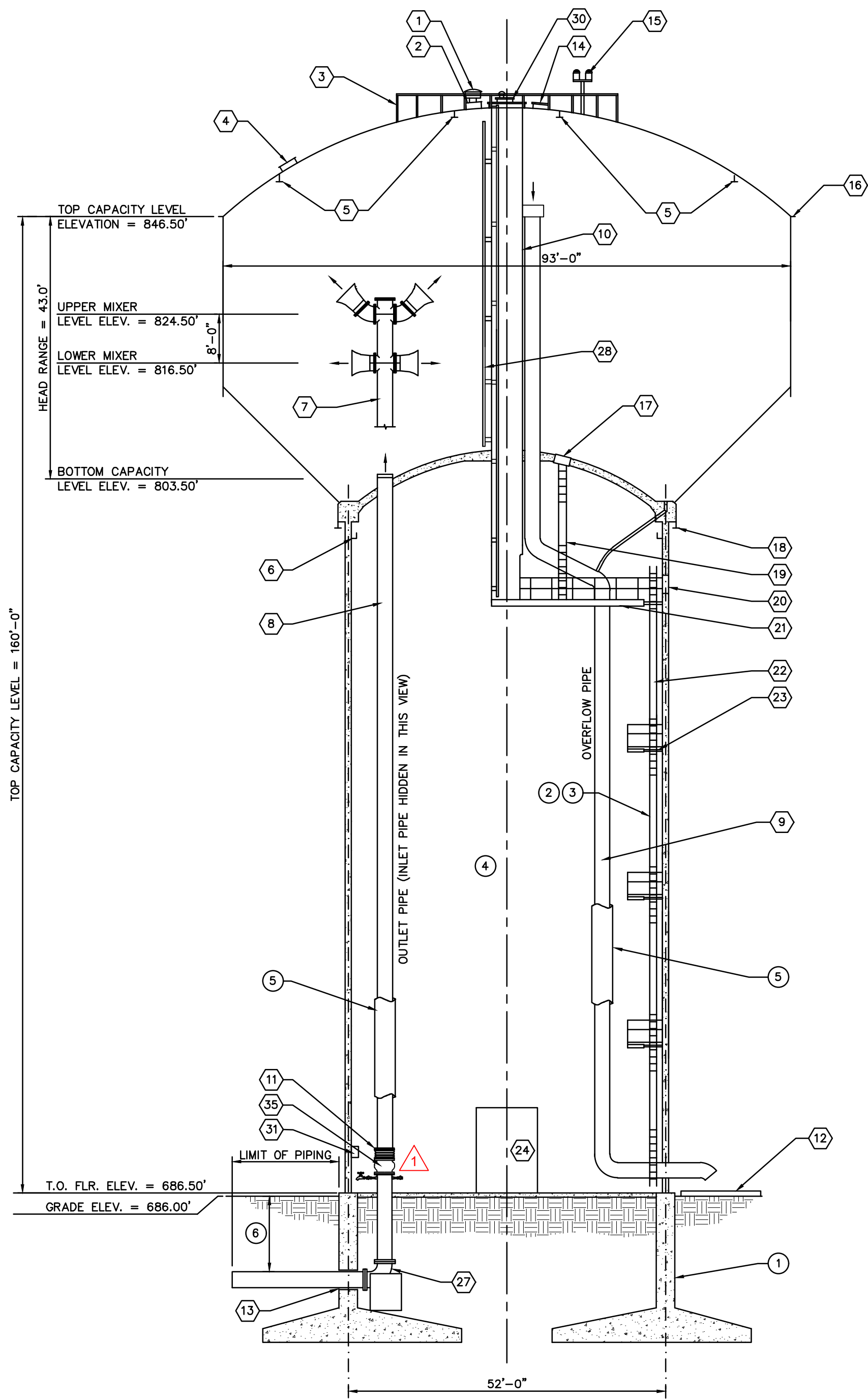
09/04/26

SHEET NO.

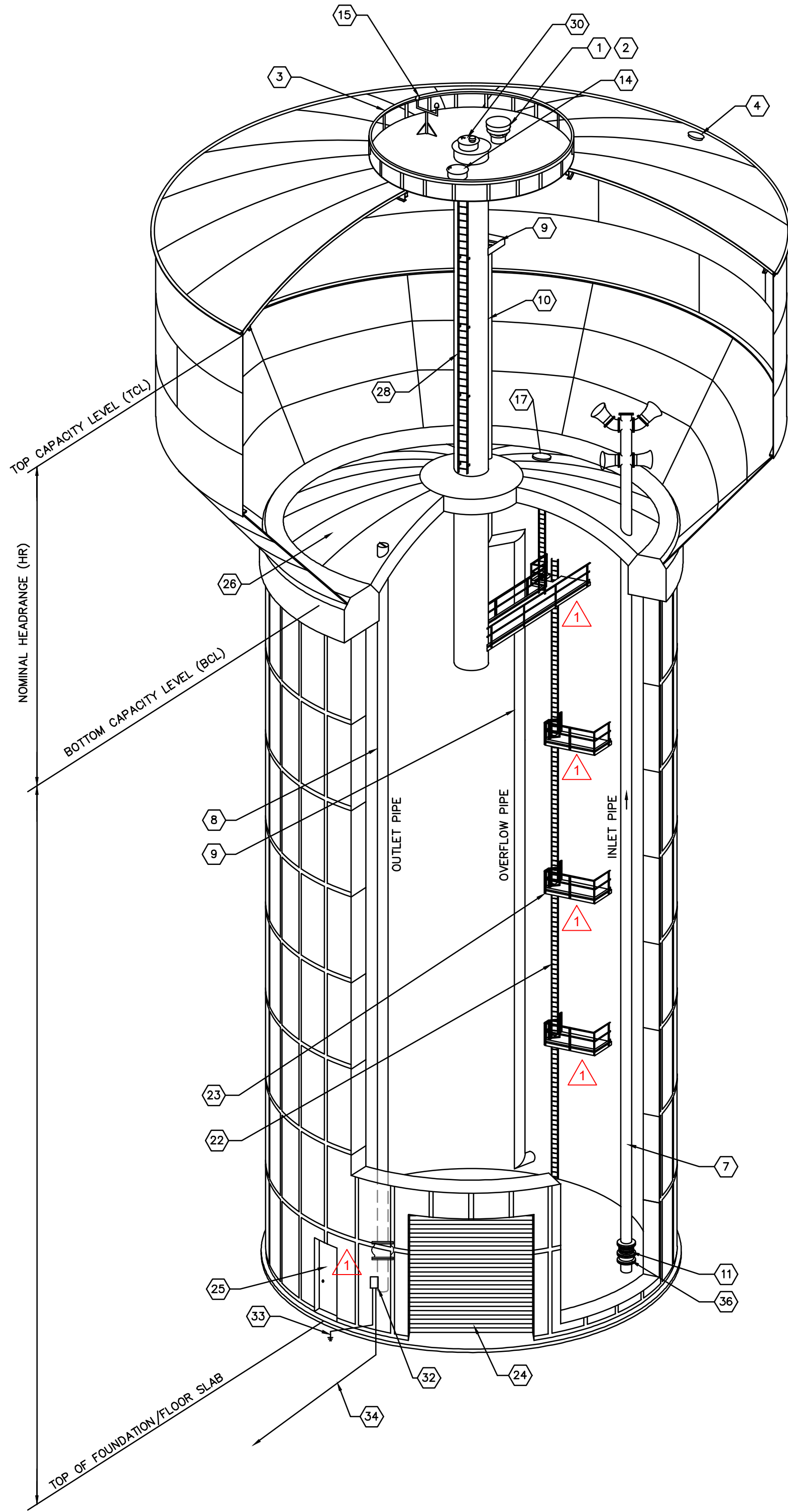
C1

2 OF 6 SHEETS

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PLOTED: 10/6/2026 @ 8:12:15 AM BY zebard hoxes



1 SECTION
C2 SCALE: 1/16" = 1'-0"



2 3-D SECTION
C2 N.T.S.

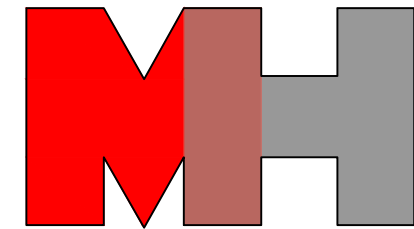
GENERAL NOTES

- CONCRETE SUPPORT STRUCTURE DIAMETER AND DIMENSIONS OF FOUNDATION SHALL BE DETERMINED BY THE TANK CONTRACTOR BASED UPON THE SOIL BEARING SPECIFIED AND THE RECOMMENDATIONS IN THE SOIL REPORT
- A GALVANIZED LADDER SAFETY DEVICE MEETING OSHA STANDARDS SHALL BE PROVIDED.
- ALL LADDERS, LANDINGS, AND ASSOCIATED COMPONENTS INSTALLED INSIDE THE CONCRETE SUPPORT STRUCTURE SHALL BE HOT DIPPED GALVANIZED.
- SECTIONS ON THIS SHEET SHOW GENERAL RELATIONSHIPS OF TANK ELEMENTS AND EQUIPMENT. SEE PLAN FOR ACTUAL LOCATION AND ORIENTATION.
- ALL PIPING EXPOSED TO AIR INSIDE OF BASE SHALL HAVE FROST JACKETING INSTALLED.
- 6" MIN. COVER OVER PIPE

KEY NOTES

- ALUMINUM PRESSURE - VACUUM VENT
- 24" DIAMETER FLANGED EXHAUST HATCH
- ANTENNA CORRAL
- 24" DIAMETER PAINTER'S ACCESS HATCH
- INTERIOR PAINTER'S RAIL, TYP.
- INSPECTION RAIL
- 30" DIAMETER STN. STL. INLET PIPE
- 30" DIAMETER STN. STL. OUTLET PIPE
- 30" DIAMETER STN. STL. OVERFLOW WITH #4 MESH SCREENED OUTLET
- ACCESS TUBE (ACCESS TO ROOF)
- STAINLESS STEEL EXPANSION JOINT (FLG. x FLG.)
- 20'-0" x 8'-0" CONCRETE SPLASH PAD
- RINGWALL OPENING
- 30" DIAMETER RAINPROOF ROOF HATCH
- OBSTRUCTION LIGHTING
- DRIP RING
- 30" DIAMETER TANK BOTTOM MANHOLE
- EXTERIOR PAINTER'S RAIL
- ACCESS LADDER
- 24" x 36" PAINTER'S ACCESS MANHOLE WITH VENTILATION LOUVER
- WALKWAY
- STRAIGHT LADDER
- PLATFORMS (MAX. 30' SPACING)
- 10' WIDE x 14' TALL OVERHEAD DOOR
- PERSONNEL DOOR
- CONCRETE DOME WITH STEEL LINER PLATE
- 30" DUCTILE IRON 90° BEND (M.J. x M.J.) WITH THRUST BLOCK
- INSIDE TANK LADDER (NOT RECOMMENDED FOR COLD CLIMATES)
- ACCESS TUBE HATCH
- PROVIDE GFCI RECEPTACLE OR JUNCTION BOX FOR HEAT TRACE
- PROVIDE CIRCUIT BREAKER PANEL WITH FEED FROM THE HIGH SERVICE BUILDING. REFER TO PANEL SCHEDULE FOR ADDITIONAL INFORMATION LOCATION IN FIELD.
- 3/4" x 10' COPPERCLAD GROUND ROD WITH #8 COPPER CADWELDED TO IT
- (3) #2. (1) #8 GROUND, 2" PVC UNDERGROUND FEEDER FROM HIGH SERVICE BUILDING
- 30" VAL-MATIC 1800 SILENT CHECK VALVE (FLG. x FLG.)
- 30" DIAMETER FULL BODY BUTTERFLY VALVE (FLG. x FLG.) WITH MOTORIZED ACTUATOR, SEE PLAN FOR ORIENTATION

MECO-HENEGHAN
ENGINEERS, LLC



www.meco-heneghan.com

DESIGN FIRM NUMBERS:
IL: 184.007845-0010
035.003949
EXPIRES: APRIL 30, 2027
MO: 2018004041
EXPIRES: DECEMBER 31, 2027

400 N. FIFTH STREET
SUITE 107
ST. CHARLES, MO 63301
P: (636) 395-7055

REVISIONS
CHANGED CHECK VALVE TYPE AND LADDER LAYOUT

DATE
10/05/26

NO.
1

ADDENDUM
No. 1

CONTRACT "D" - PHASE "1B"
ELEVATED WATER STORAGE
TANK SECTIONS

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
JERSEY & MACOUPIN COUNTIES, ILLINOIS

DRAWN BY: R.H. / J. McNEFF
CHECKED BY: K. GARNETT
APPROVED BY: M. MIDDENDORF
HORIZONTAL SCALE:

AS SHOWN

VERTICAL SCALE:

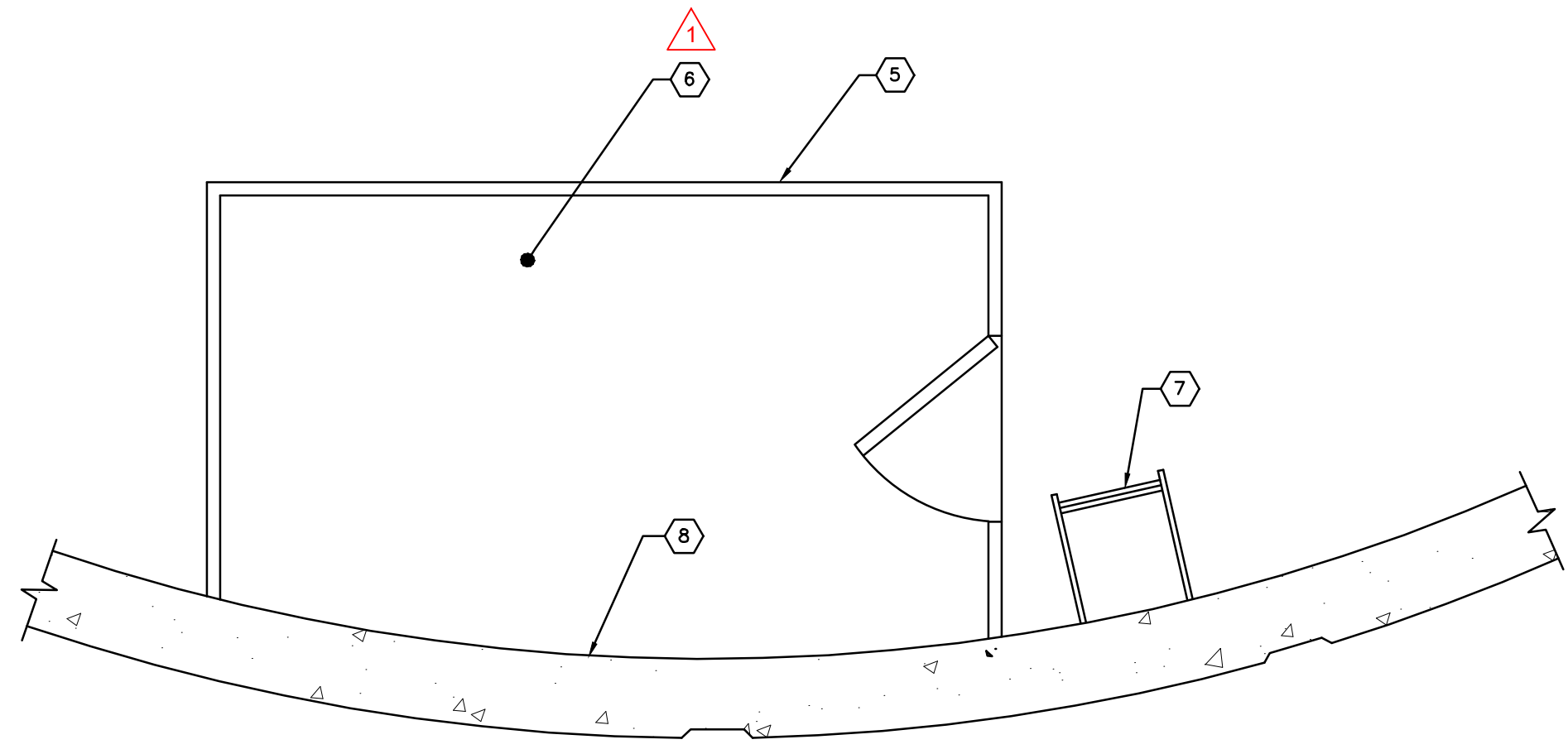
PROJECT NO.
700-003

DATE:
09/04/26

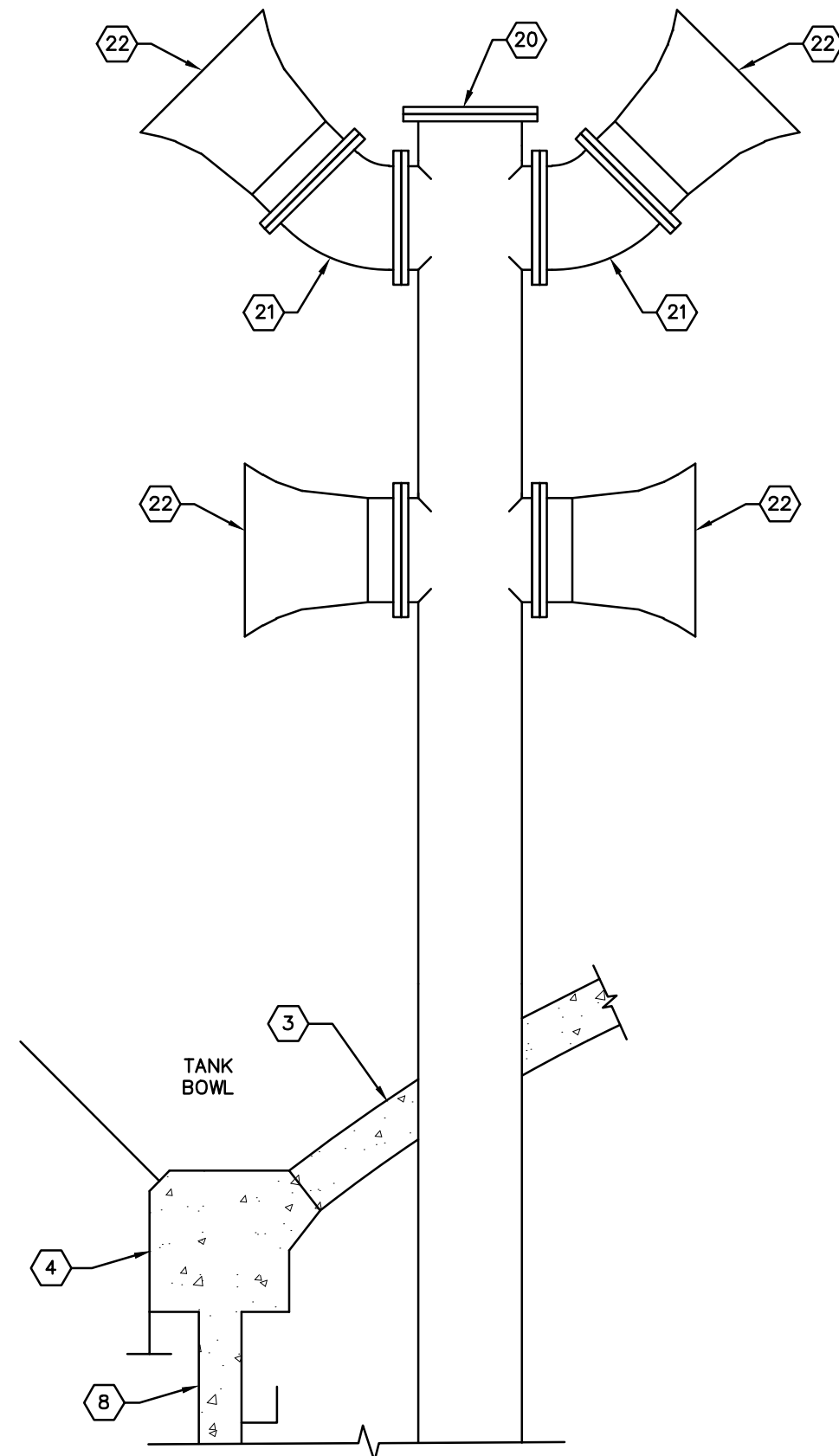
SHEET NO.
C2

3 OF 5 SHEETS

PATH=\\i:\projects\7000\700 illinois alluvial regional water company\003 larwc basic services\contract d - elevated storage tank\7000003 c1-c5 elev tank.dwg
PLOTED: 10/6/2026 @ 8:12:36 AM BY richard boyes



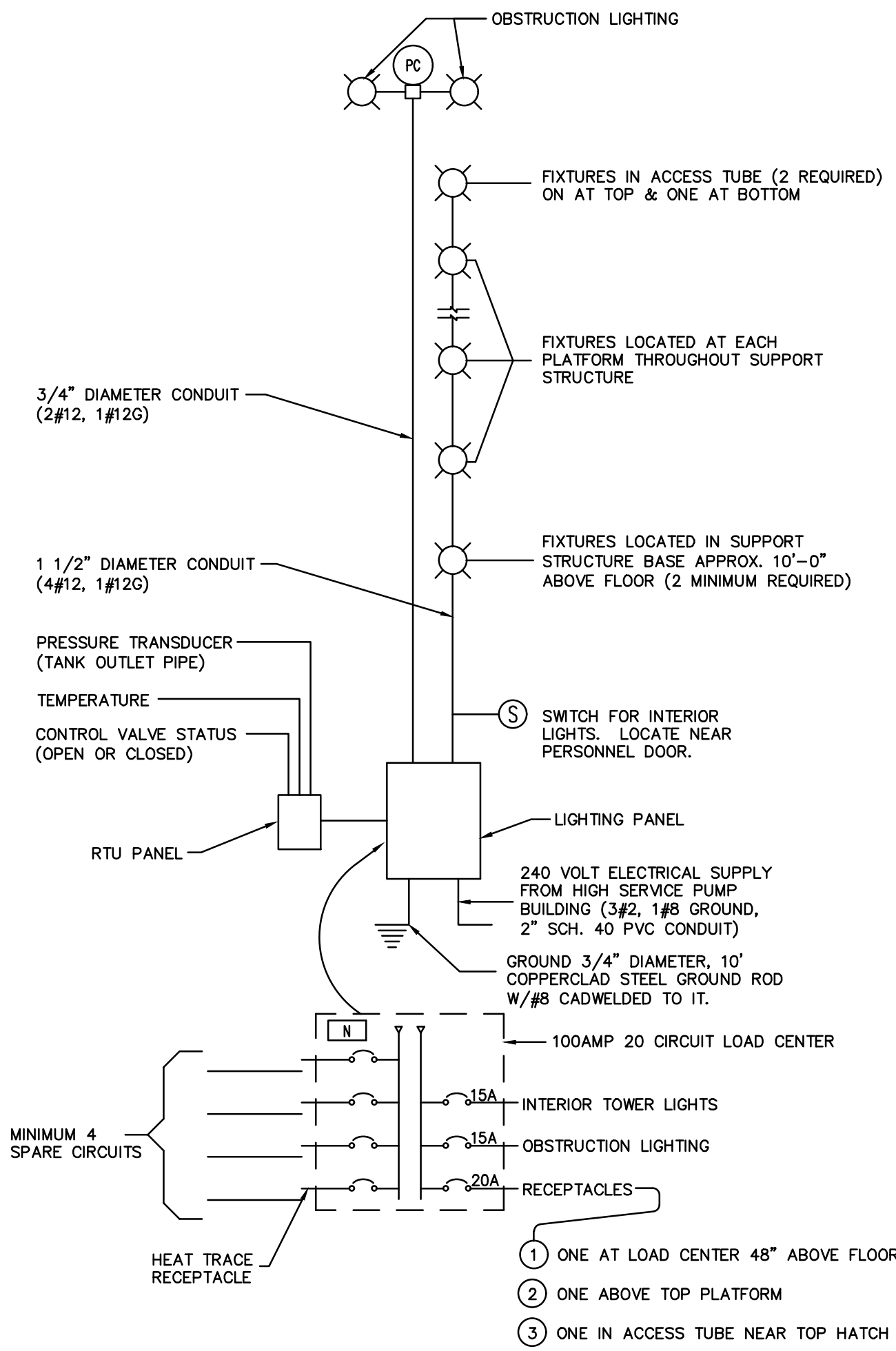
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C3 **INTERMEDIATE PLATFORM PLAN**
SCALE: 1/2" = 1'-0"



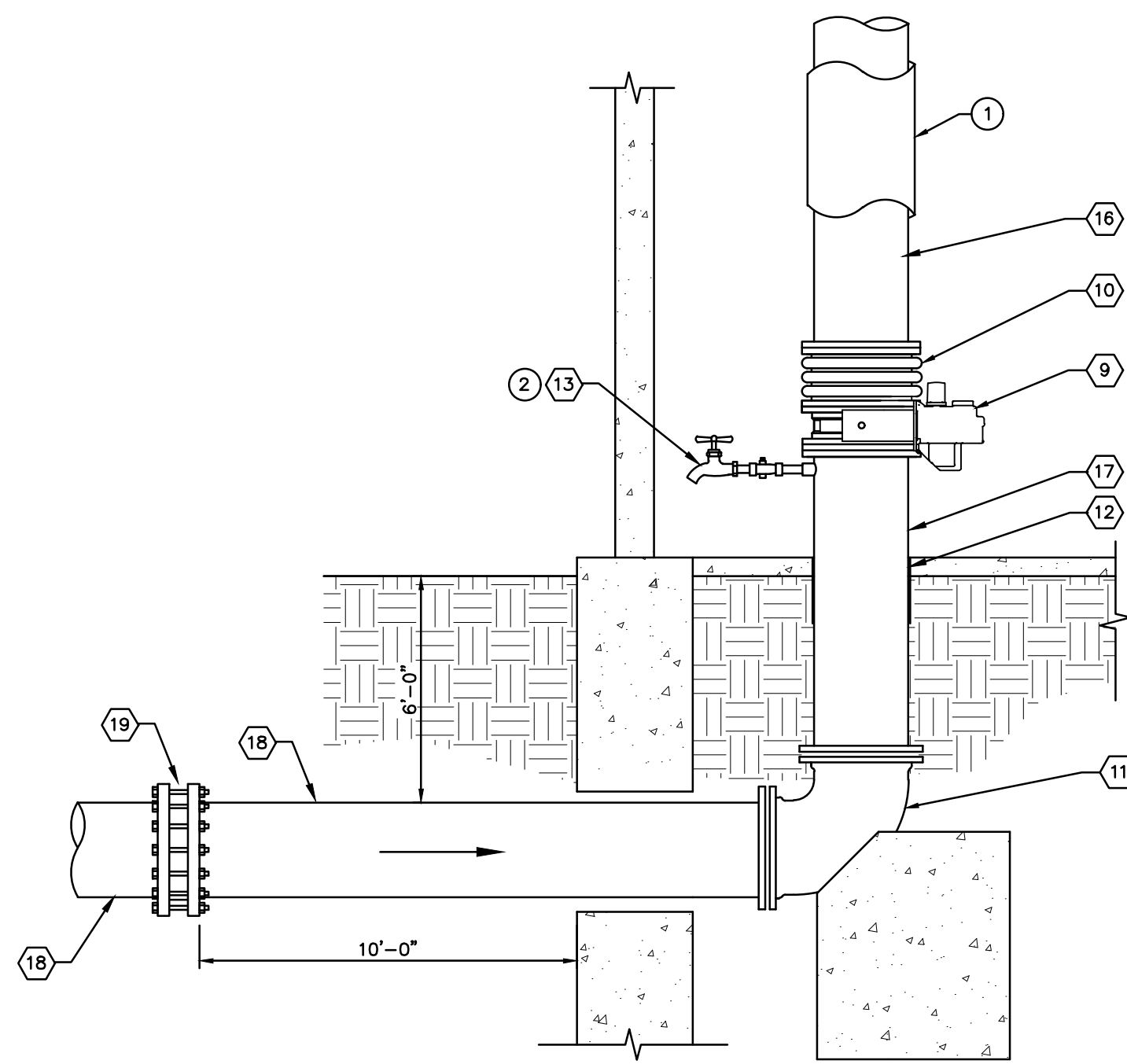
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C3 **TANK MIXING PIPING DETAIL**
SCALE: 1/4" = 1'-0"



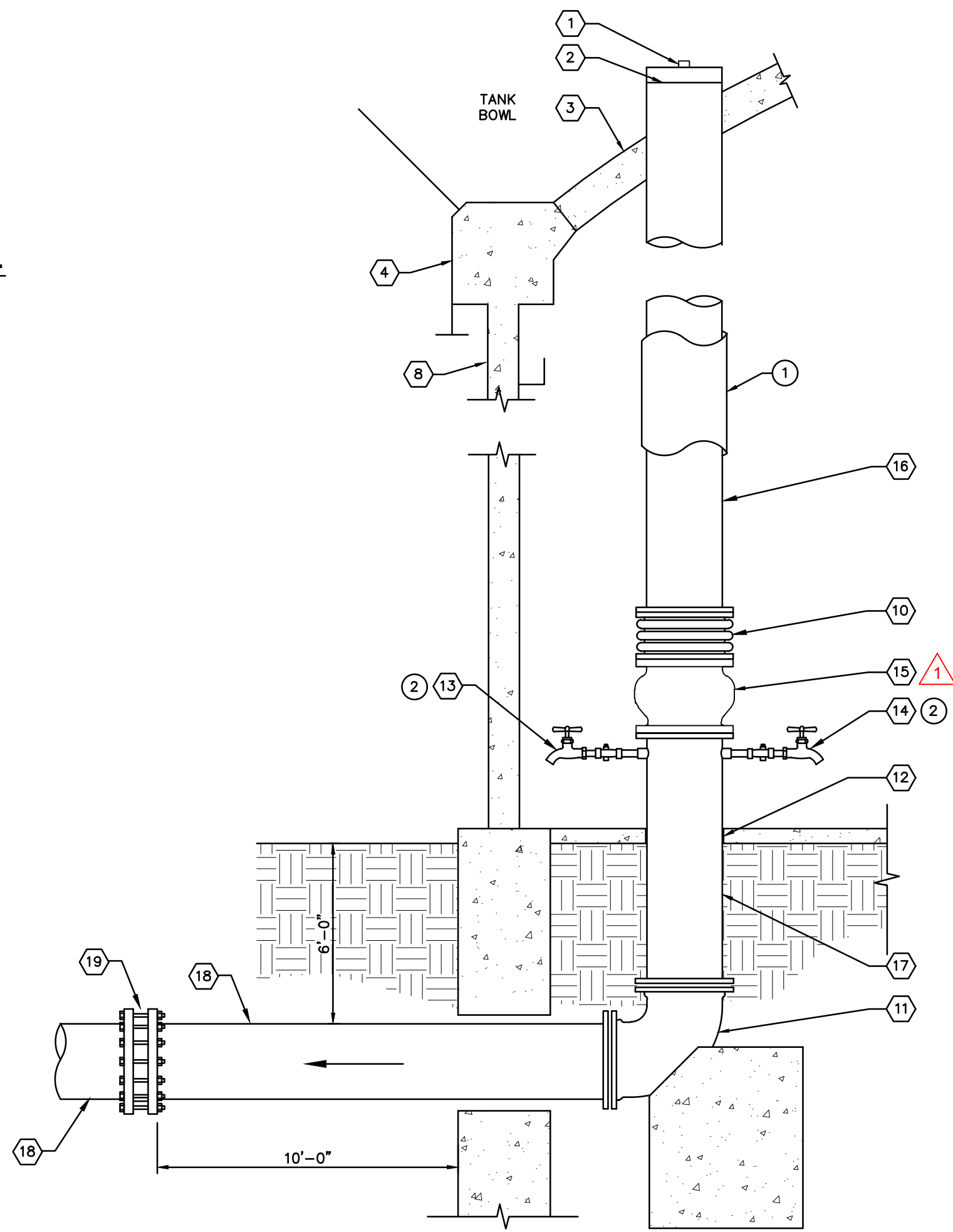
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C3 **TANK LOGO ELEVATION (OPTIONAL)**
SCALE: 1/16" = 1'-0"



1
C3 **ELECTRICAL SCHEMATIC**
N.T.S.



3
C3 **TANK MIXING PIPING DETAIL**
SCALE: 1/4" = 1'-0"



5
C3 **OUTLET PIPING DETAIL**
SCALE: 1/4" = 1'-0"

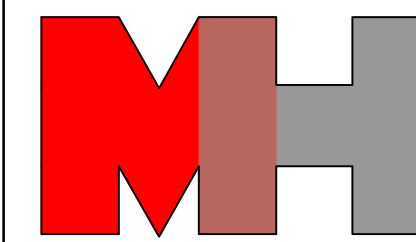
GENERAL NOTE

- ALL PIPING EXPOSED TO AIR INSIDE OF BASE SHALL HAVE FROST JACKETING INSTALLED.
- INSTALL FROST JACKETING AND HEAT TRACE AROUND SAMPLE TAP AND HOSE BIBB.

KEY NOTES

- BAR OVER OUTLET PIPE
- REMOVABLE SILT STOP
- CONCRETE DOME WITH 1/4" STEEL LINER PLATE
- CONCRETE RINGBEAM
- HANDRAIL
- PLATFORM WITH SELF CLOSING SWING GATE
- LADDER
- ELEVATED WATER STORAGE TANK CONCRETE SUPPORT STRUCTURE
- 30" DIAMETER FULL BODY BUTTERFLY VALVE (FLG. x FLG.) WITH MOTORIZED ACTUATOR, SEE PLAN FOR ORIENTATION
- 30" STAINLESS STEEL EXPANSION JOINT (FLG. x FLG.)
- 30" DIAMETER 90° BEND (M.J. x M.J.) WITH RETAINER GLANDS AND THRUST BLOCK
- 1/2" EXPANSION JOINT MATERIAL
- 3/4" DIAMETER TAP FOR SMOOTH NOSE SAMPLING TAP WITH ISOLATION VALVE
- 3/4" DIAMETER TAP FOR 3/4" HOSE BIBB WITH ISOLATION VALVE
- 30" VAL-MATIC 1800 SILENT CHECK VALVE (FLG. x FLG.)
- 30" DIAMETER STAINLESS STEEL PIPE
- 30" DIAMETER DUCTILE IRON PIPE SPOOL PIECE CLASS 250 (FLG. x P.E.)
- 30" DUCTILE IRON PIPE CLASS 250 (P.E. x P.E.)
- 30" DUCTILE IRON PIPE COUPLING
- 30" STN. STL. BLIND FLANGE
- 30" STN. STL. 45° BEND (FLG. x FLG.)
- 30" "TIDEFLEX" SERIES 35 (OR EQUAL) WITH STN. STL. MOUNTING RING FLANGE

**MECO-HENEGHAN
ENGINEERS, LLC**



www.meco-heneghan.com

DESIGN FIRM NUMBERS:
IL: 184.007845-0010
035.003949
EXPIRES: APRIL 30, 2027
MO: 2018004041
EXPIRES: DECEMBER 31, 2027

400 N. FIFTH STREET
SUITE 107
ST. CHARLES, MO 63301
P: (636) 395-7055

REVISIONS	DATE	NO.	CHANGED CHECK VALVE TYPE AND LADDER LAYOUT
	10/05/26	1	

**ADDENDUM
No. 1**

**CONTRACT "D" - PHASE "1B"
ELEVATED WATER STORAGE
TANK PIPING / ELECTRICAL
SCHEMATIC DETAILS**

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
JERSEY & MACOUPIN COUNTIES, ILLINOIS

DRAWN BY: R.H. / J. McNEFF
CHECKED BY: K. GARNETT
APPROVED BY: M. MIDDENDORF
HORIZONTAL SCALE:

AS SHOWN

VERTICAL SCALE:

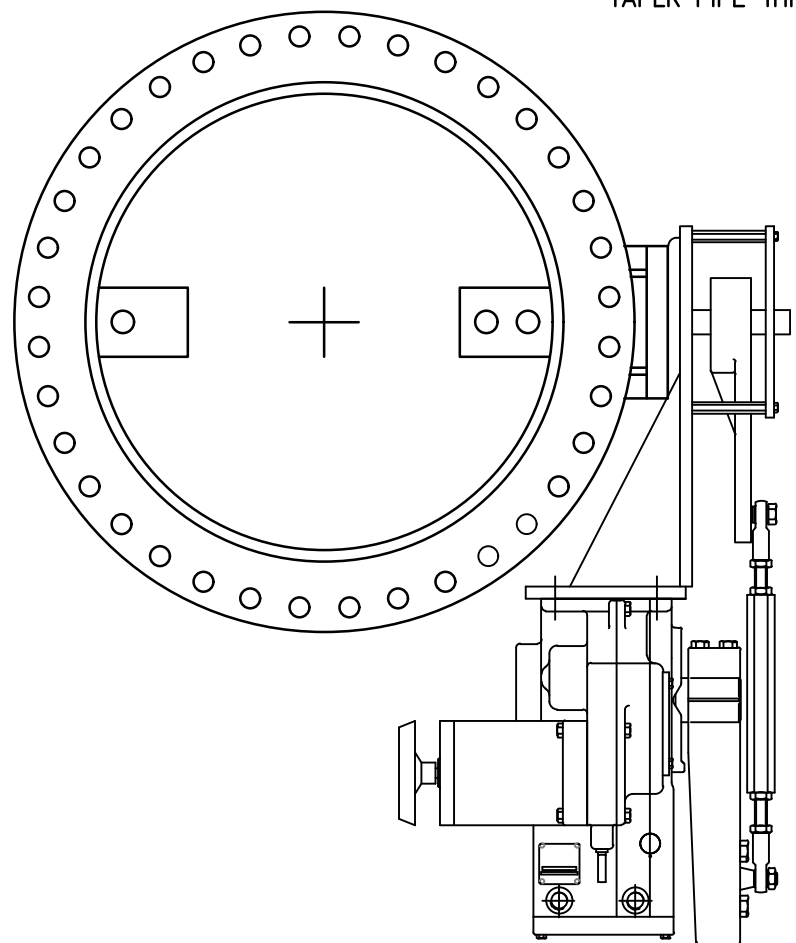
PROJECT NO.
700-003

DATE:
09/04/26

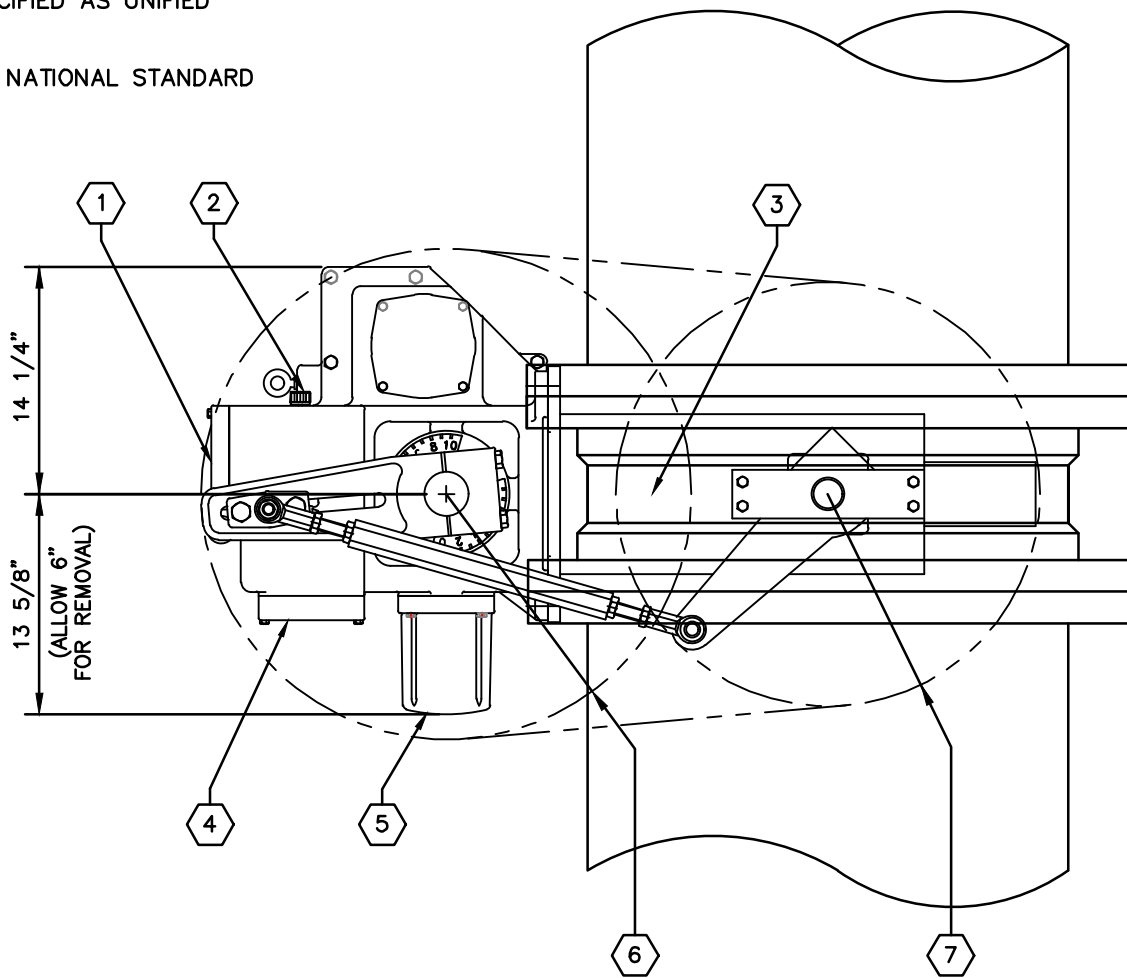
SHEET NO.
C3

4 OF 6 SHEETS

PATH=\\i:\projects\700\700 illinois alluvial regional water company\003 larwc basic services\contract d - elevated storage tank\700003 c1-c5 elev tank.dwg
PLOTED: 10/5/2026 @ 4:45:02 PM BY richard boyes



PLAN



ELEV.

NOTES:

1. ALL DIMENSIONS ARE TYPICAL.
2. TOLERANCES: $\pm 1/4"$.
3. IF SPECIFIC DIMENSIONS ARE REQUIRED, PLEASE CONTACT "D" FACTORY REPRESENTATIVE
4. SCREW TORQUES FOR MOUNTING HARDWARE WILL BE SUPPLIED WITH SPECIFIC VMS.
5. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
6. THREADS AND TAPPED HOLES ARE SPECIFIED AS UNIFIED THREAD SIZES ONLY.
7. CONDUIT PIPE THREADS PER AMERICAN NATIONAL STANDARD TAPER PIPE THREADS (N.P.T.)



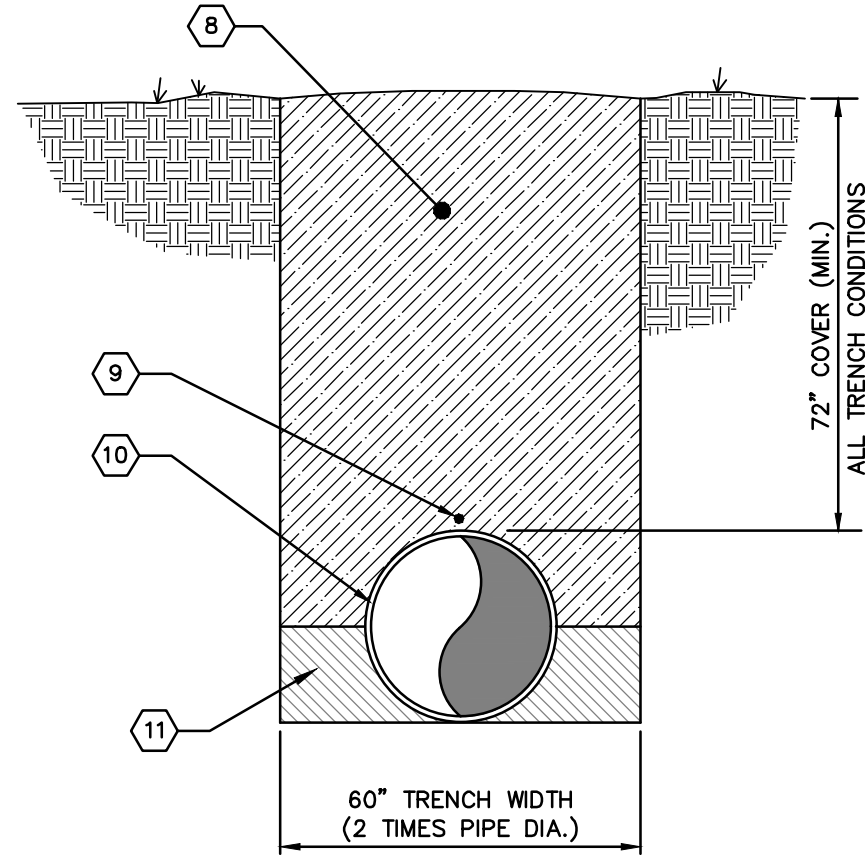
1
C4

INLET VALVE DETAILS

SCALE: 1" = 1'-0"

KEY NOTES

- 1 EXTERNAL WIRING
- 2 HANDSWITCH
- 3 CENTERLINE OF SHAFTS
- 4 COVER ELECTRONIC SIGNAL RECEIVER
- 5 COVER POSITION SENSING DEVICES
- 6 15 3/8" [391] R. MIN. RECOMMENDED CRANKARM SWING CLEARANCE
- 7 13 1/4" [337] R. MIN. RECOMMENDED LEVER ARM SWING CLEARANCE
- 8 FINAL BACKFILL MATERIAL
- 9 LOCATE WIRE
- 10 30" D.I.P. RAW WATER MAIN
- 11 BACKFILL LIGHTLY CONSOLIDATED TO CENTERLINE OF PIPE
- 12 REINFORCING BARS
- 13 GROUND
- 14 REINFORCING BARS #4 @ 12" CENTERS. FOR PIPE SIZES GREATER THAN 12" REINFORCING SHALL BE AS SPECIFIED BY ENGINEER.
- 15 ASSUMED HORIZONTAL
- 16 VERTICAL COMPONENT OF THRUST = TABULATED VALUE

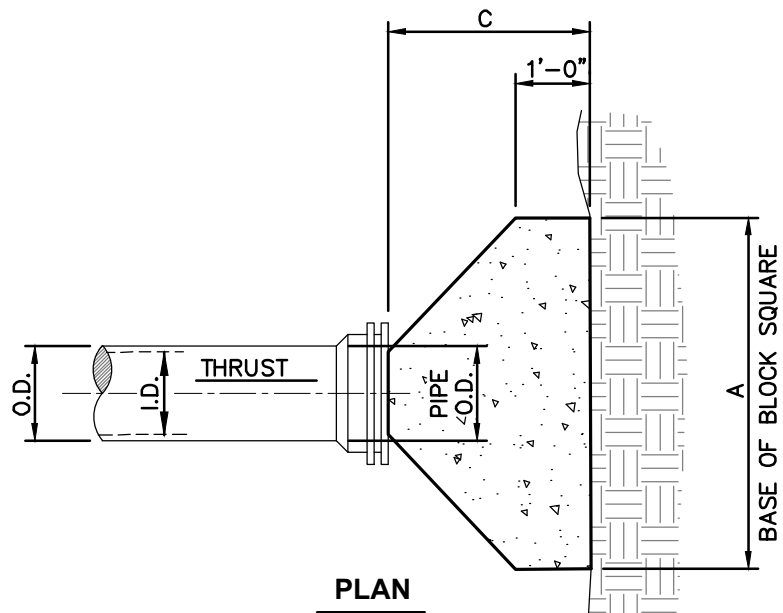


TYPE 2 TYPICAL TRENCH
DETAIL @ 30" PIPE

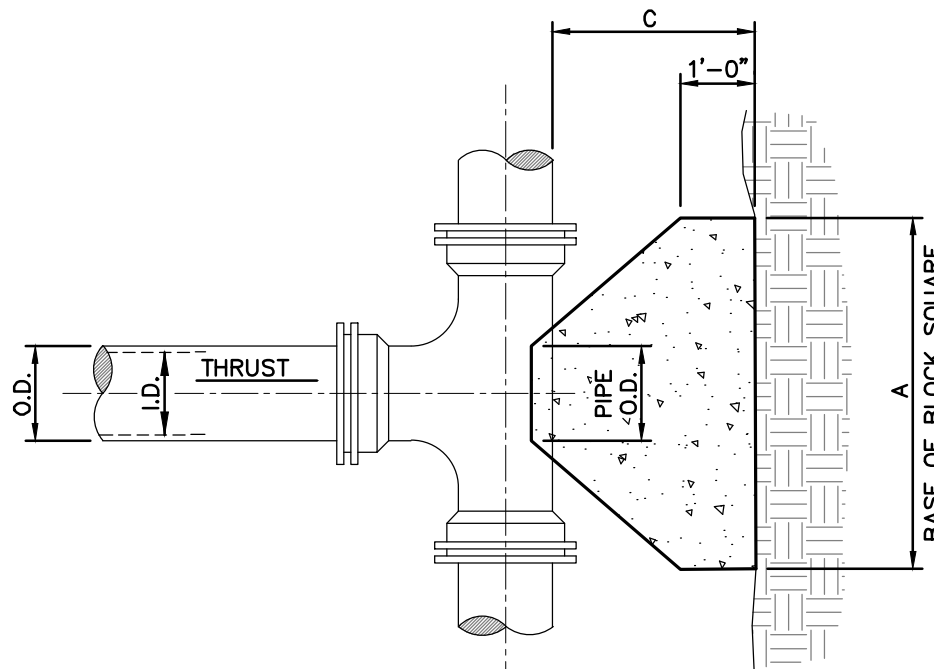
SCALE: 3/8" = 1'-0"

GENERAL NOTES FOR
ALL THRUST BLOCKS

1. CONCRETE FOR BLOCKING SHALL BE CLASS "B" (SEE NCTCOG 702.2.4.2)
2. ALL CALCULATIONS ARE BASED ON INTERNAL PRESSURE OF 250 PSI.
3. VOLUMES OF THRUST BLOCKS ARE NET VOLUMES OF CONCRETE TO BE FURNISHED. THE CORRESPONDING WEIGHT OF THE CONCRETE (CLASS "B") IS EQUAL TO OR GREATER THAN THE VERTICAL COMPONENT OF THE THRUST ON THE VERTICAL BEND.
4. WALL THICKNESS T (SEE TABLE) ASSUMED FOR ESTIMATING PURPOSES ONLY.
5. POUR CONCRETE FOR THRUST BLOCKS AGAINST UNDISTURBED EARTH.
6. DIMENSIONS MAY BE VARIED AS REQUIRED BY FIELD CONDITIONS WHERE AND AS DIRECTED BY THE ENGINEER / INSPECTOR. THE VOLUME OF CONCRETE BLOCKING SHALL NOT BE LESS THAN SHOWN IN TABLES.
7. THE CALCULATIONS ARE BASED ON BEARING PRESSURES EQUAL TO 1,000 lbs/sf IN SOIL AND 2,000 lbs/sf IN ROCK.
8. USE POLYETHYLENE WRAP BETWEEN CONCRETE BLOCKING AND BENDS, TEES AND CAPS TO PREVENT THE CONCRETE FROM STICKING TO FITTINGS.
9. CONCRETE SHALL NOT EXTEND BEYOND JOINTS.



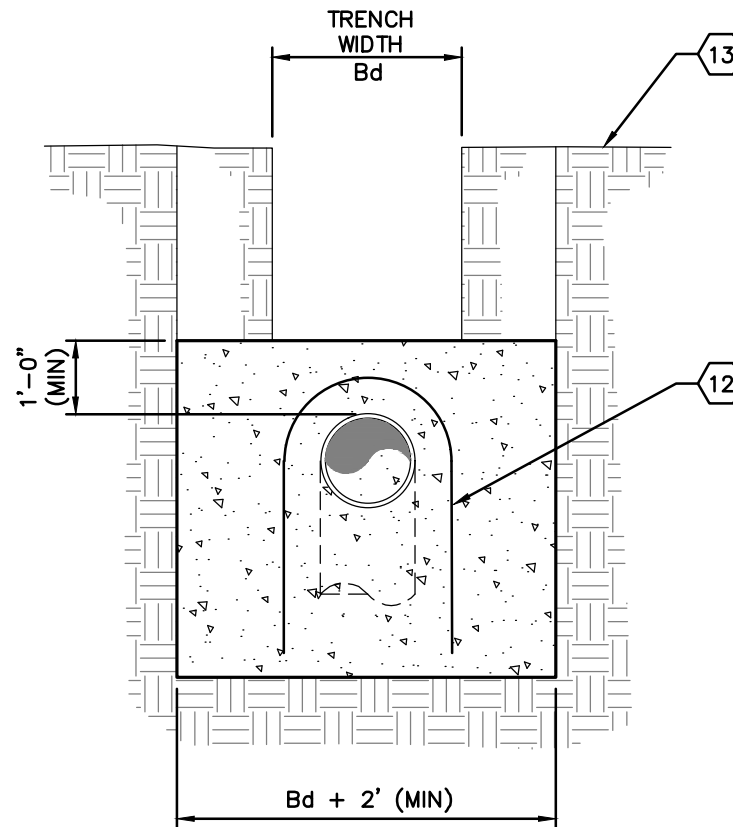
PLAN



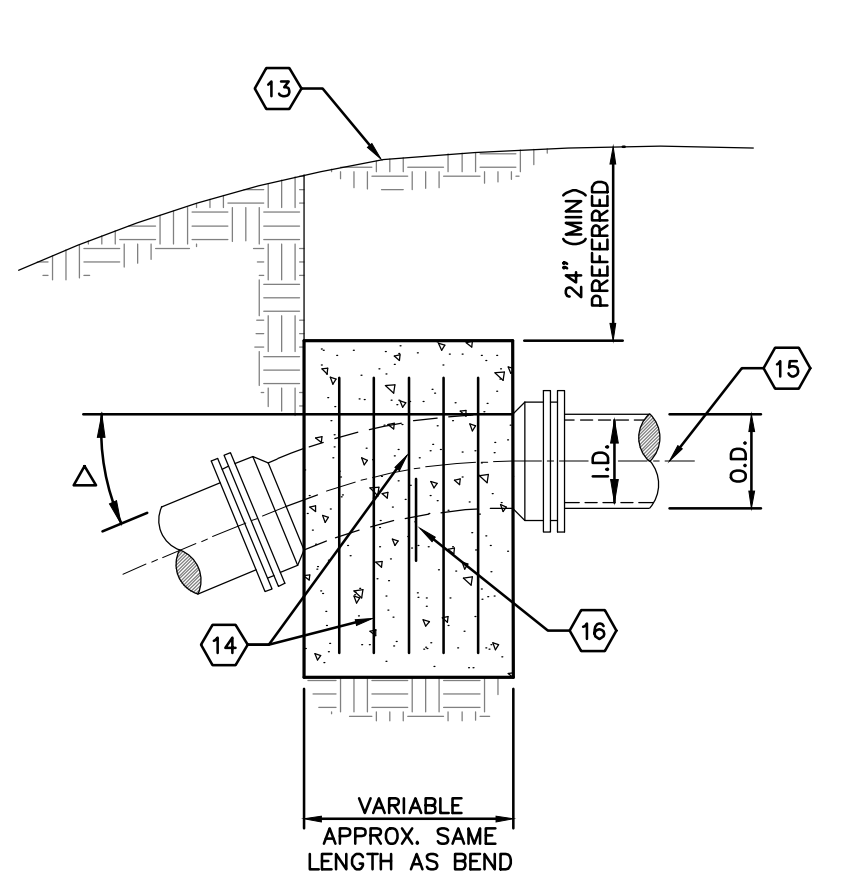
PLAN

I.D. (IN.)	THRUST (TONS)	C (FT.)	EARTH		ROCK		I.D. (IN.)
			A (FT.)	VOL. (C.Y.)	A (FT.)	VOL. (C.Y.)	
30"	53.0	3.0	7.25	4.1	5.5	2.4	30"

HORIZONTAL THRUST BLOCK AT TEES AND CAPS



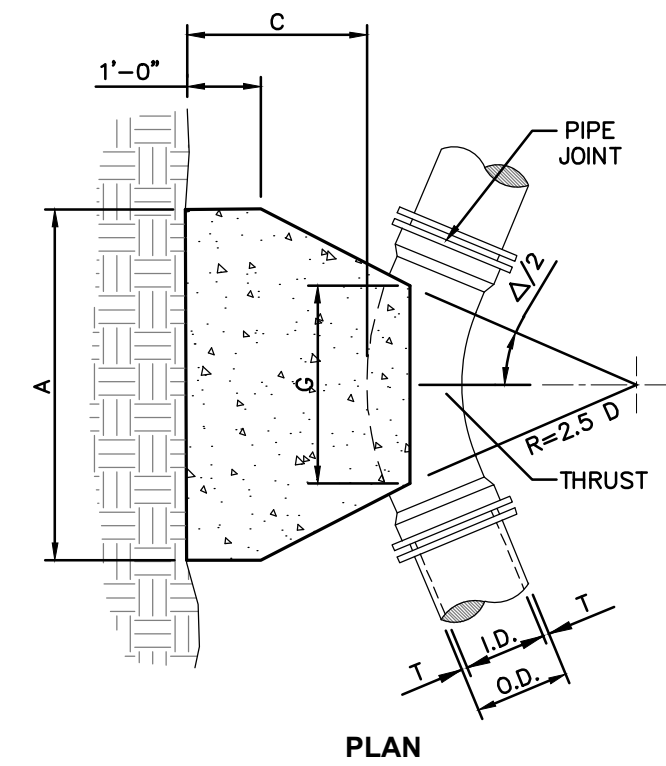
ELEVATION



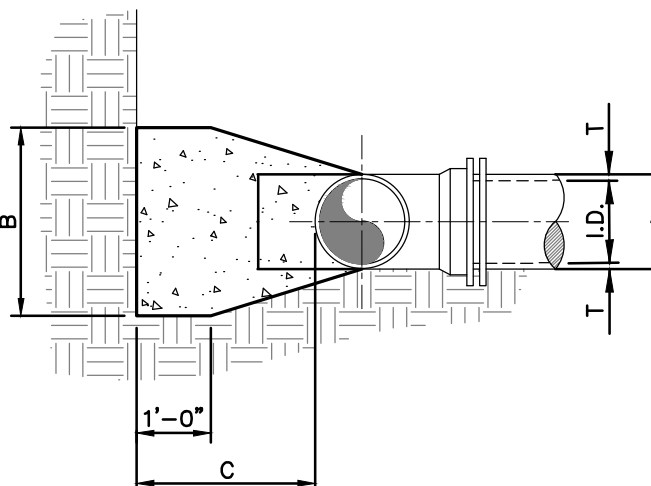
SECTION

Δ	11.25°	22.5°	45°	90°	Δ
I.D. (IN.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)
30"	10.5	5.2	20.3	10.1	37.5
					18.8
					53.1
					26.5
					30"

VERTICAL THRUST BLOCK AT PIPE BEND



PLAN



SECTION

I.D. (IN.)	T (IN.)	C Δ = 11.25° (FT.)	C Δ = 22.5° (FT.)	E (FT.)
30"	0.42	1.5	1.9	2.5

Δ = 11.25°									
I.D. (IN.)	G (FT.)	THRUST (TONS)	EARTH			ROCK			I.D. (IN.)
			A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	
30"	1.4	10.4	3.0	3.5	0.6	2.0	3.5	0.4	30"

Δ = 22.5°									
I.D. (IN.)	G (FT.)	THRUST (TONS)	EARTH			ROCK			I.D. (IN.)
			A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	
30"	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8	30"

Δ = 45°									
I.D. (IN.)	G (FT.)	THRUST (TONS)	EARTH			ROCK			I.D. (IN.)
			A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	
30"	5.4	40.5	8.5	5.0	3.2	5.5	4.0	1.6	30"

Δ = 90°									
I.D. (IN.)	G (FT.)	THRUST (TONS)	EARTH			ROCK			I.D. (IN.)
			A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	
30"	9.9	75.0	15.0	5.0	6.7	10.0	4.0	3.3	30"

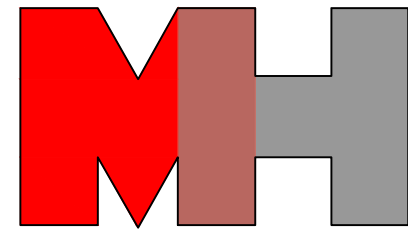
HORIZONTAL THRUST BLOCK AT PIPE BENDS

2
C4

THRUST BLOCK DETAILS

NO SCALE

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DESIGN FIRM NUMBERS:
IL: 164.007845-0010
035.003949
EXPIRES: APRIL 30, 2027
MO: 2018004041
EXPIRES: DECEMBER 31, 2027

400 N. FIFTH STREET
SUITE 107
ST. CHARLES, MO 63301
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REVISIONS

DATE

NO.

PHASE 1B

CONTRACT "D" - PHASE "1B"
TYPICAL 30" PIPE VALVE /
THRUST BLOCKS AND
TRENCHING DETAILS

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
JERSEY & MACOUPIN COUNTIES, ILLINOIS

DRAWN BY: R.H. / J. McNEFF
CHECKED BY: K. GARNETT
APPROVED BY: M. MIDDENDORF
HORIZONTAL SCALE:

AS SHOWN

VERTICAL SCALE:

PROJECT NO.

700-003

DATE:

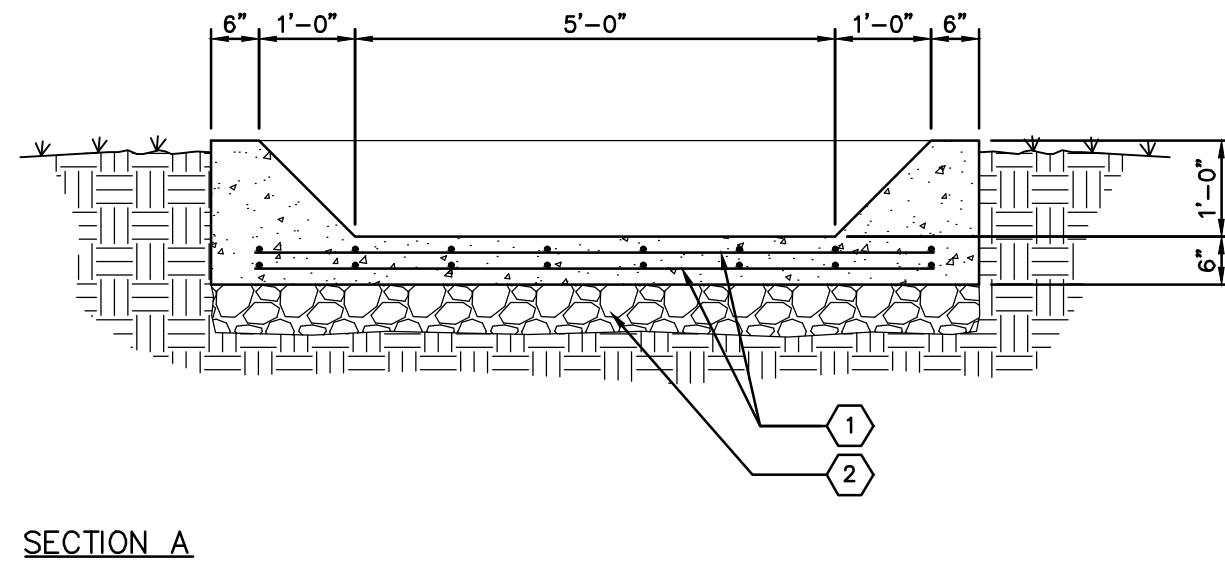
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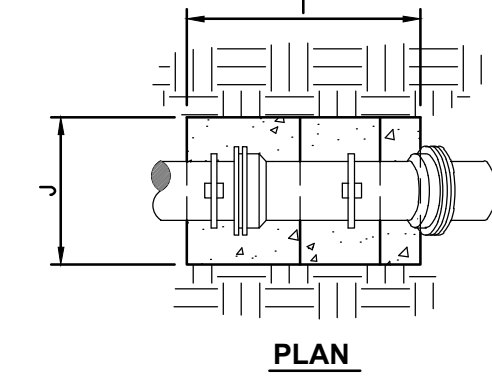
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5 OF 6 SHEETS

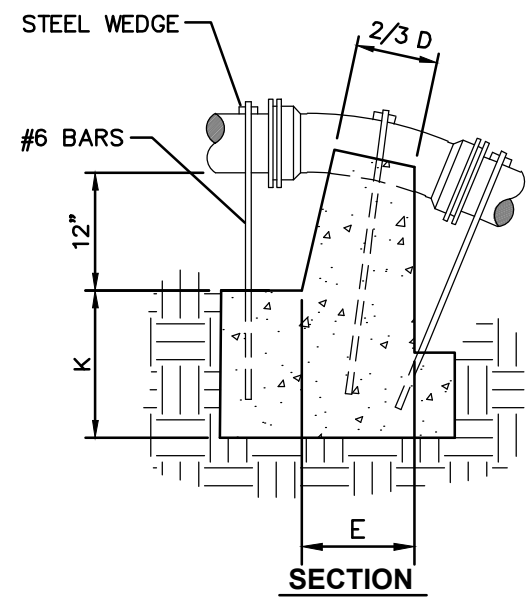
- 1 2 MATS OF #4 REBAR @ 12"O.C.
- 2 6" COMPACTED GRANULAR BASE
- 3 24" THICK RIPRAP
- 4 FINAL BACKFILL MATERIALS
- 5 CONTINUOUS #12 AWG LOCATOR WIRE W/
THIN BLUE INSULATION
- 6 8" COMPACTED CRUSHEDSTONE BASE
- 7 FLOWABLE FILL OR COMPACTED GRANULAR TRENCH
BACKFILL PLACED IN 6" LIFTS, AS REQ'D. ON
DRAWINGS OR IN THE CONTRACT DOCUMENTS
- 8 REPLACE PAVEMENT TO EQUAL OR BETTER THAN
EXISTING PAVEMENT, SEE NOTES 8 & 9.
- 9 STRAIGHT SAWED JOINTS
- 10 EXISTING PAVEMENT
- 11 SELECT BACKFILL MATERIALS
- 12 GRANULAR BEDDING LIMITS FOR D.I.P. (TYP.)
- 13 APPROVED BACKFILL
- 14 UNDISTURBED EARTH
- 15 CONC. THRUST BLOCK POURED IN PLACE
- 16 ADJUSTABLE VALVE BOX
- 17 6" GATE VALVE (M.W.)
- 18 ANCHORS SHALL BE MIN. #3 BARS
- 19 6" DUCTILE IRON PIPE CLASS 250
- 20 MUELLER SUPER CENTURION FIRE HYDRANT WITH
5 1/4" MAIN VALVE (2) HOSE NOZZLE (1) PUMPER NOZZLE
- 21 16 C.F. OF 1" CLEAN ROCK FOR HYDRANT DRAINAGE
- 22 CONCRETE BLOCKING AGAINST SOLID BANK
FILL VOIDS WITH SAK-CRETE. (DO NOT BLOCK DRAIN HOLE)
- 23 3"x6" SWIVEL ADAPTER OR GRADE LOCK COUPLING
- 24 ANCHORS SHALL BE MIN. #3 BARS
- 25 CONCRETE THRUST BLOCK POURED IN PLACE
- 26 MECHANICAL JOINT (REDUCING IF REQ'D) WITH THRUST BLOCK
(SEE THRUST BLOCK DETAIL)
- 27 6" M_J x M_J MUELLER GATE VALVE
- 28 ADJUSTABLE VALVE BOX
- 29 FIRE HYDRANT ISOLATION VALVE AND VALVE BOX



4 **SPLASH PAD**
C5 NO SCALE



MAXIMUM DESIGN PRESSURE = 200 PSI



5 THRUST BLOCKS
C4 NO SCALE

MINIMUM TRENCH WIDTH SHALL BE MAINTAINED FROM 6" BELOW PIPE TO 12" ABOVE THE TOP OF PIPE.

IF PAYMENT IS AUTHORIZED, PAY LINES FOR ROCK REMOVAL SHALL BE BASED UPON 2 TIMES PIPE DIAMETER.

PIPE BEDDING NOTE BELOW IS MINIMUM STANDARD, HOWEVER ANY MORE STRINGENT REQUIREMENTS SET BY PIPE SUPPLIER SHALL SUPERSEDE THE REQUIREMENTS SHOWN.

GRANULAR BEDDING GRADUATION SHALL BE AS FOLLOWS UNLESS REQUIRED BY THE PIPE MANUFACTURER OR APPROVED BY THE ENGINEER.

<u>MATERIAL</u>	<u>QUANTITY/CU YD</u>
CEMENT	70 POUNDS
FLY ASH	300 POUNDS
NE AGGREGATE	2600 POUNDS
WATER	50 GALLON

5. FLOWABLE FILL MIX SHALL BE AS FOLLOWS UNLESS OTHERWISE APPROVED BY THE ENGINEER.

MATERIAL	QUANTITY/CU YD
CEMENT	70 POUNDS
FLY ASH	300 POUNDS
FINE AGGREGATE	2600 POUNDS
WATER	50 GALLON
6. UNSUITABLE BACKFILL MATERIAL SHALL BE DISPOSED OF BY CONTRACTOR AT HIS EXPENSE AND SUITABLE REPLACEMENT MATERIAL PROVIDED AT NO ADDITIONAL COST TO OWNER.
7. ALL TRENCHES SHALL MEET O.S.H.A. REQUIREMENTS.
8. ROADWAY RESURFACING SHALL BE REPLACED AS SHOWN IN ACCORDANCE WITH PROJECT SPECIFICATIONS OR CURRENT REQUIREMENTS OF THE CONTROLLING AUTHORITY, WHICH EVER IS MORE STRINGENT AS DEFINED BY THE ENGINEER.
9. PAVEMENT REPLACEMENT SHALL CONSIST OF THE FOLLOWING:
ASPHALT

MATERIAL:	HOT MIX ASPHALT
THICKNESS:	MATCH EXISTING; BUT NOT LESS THAN 4" COMPACTED IN PLACE

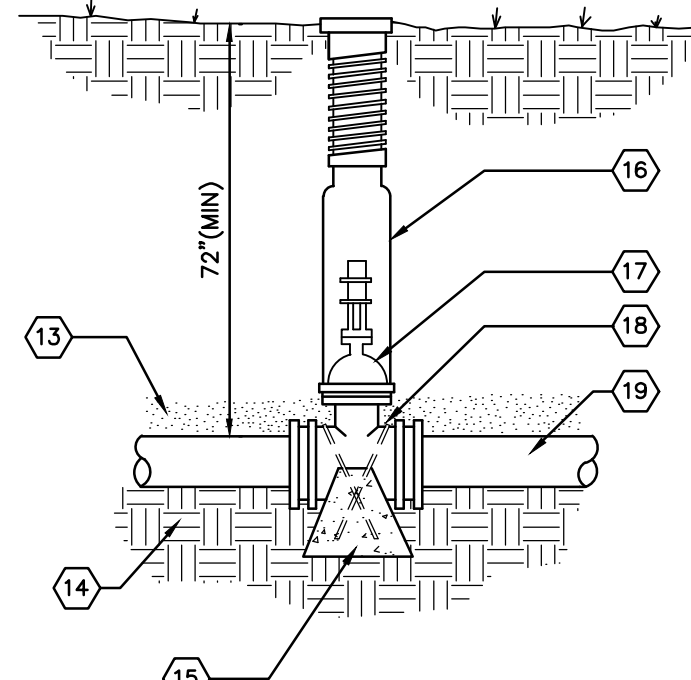
NOTE: DELETE CRUSHED STONE BASE IF FLOWABLE FILL IS USED,
TACK COAT TOP OF FLOWABLE FILL OR
PRIME CRUSHED STONE BASE AT
RATE OF 0.25 GALLON / SQUARE YARD.

CONCRETE
MATERIAL: PORTLAND CEMENT CONCRETE
4,000 PSI @ 28 DAYS
DOWEL W/#4x24" @ 24" O.C.
THICKNESS: MATCH EXISTING (NOT LESS THAN 6")
NOTE: DELETE CRUSHED STONE BASE IF FLOWABLE FILL IS USED.

GRAVEL
MATERIAL: 1" MINUS CRUSHED STONE
THICKNESS: MATCH EXISTING, BUT NOT LESS THAN
6" COMPACTED IN PLACE.

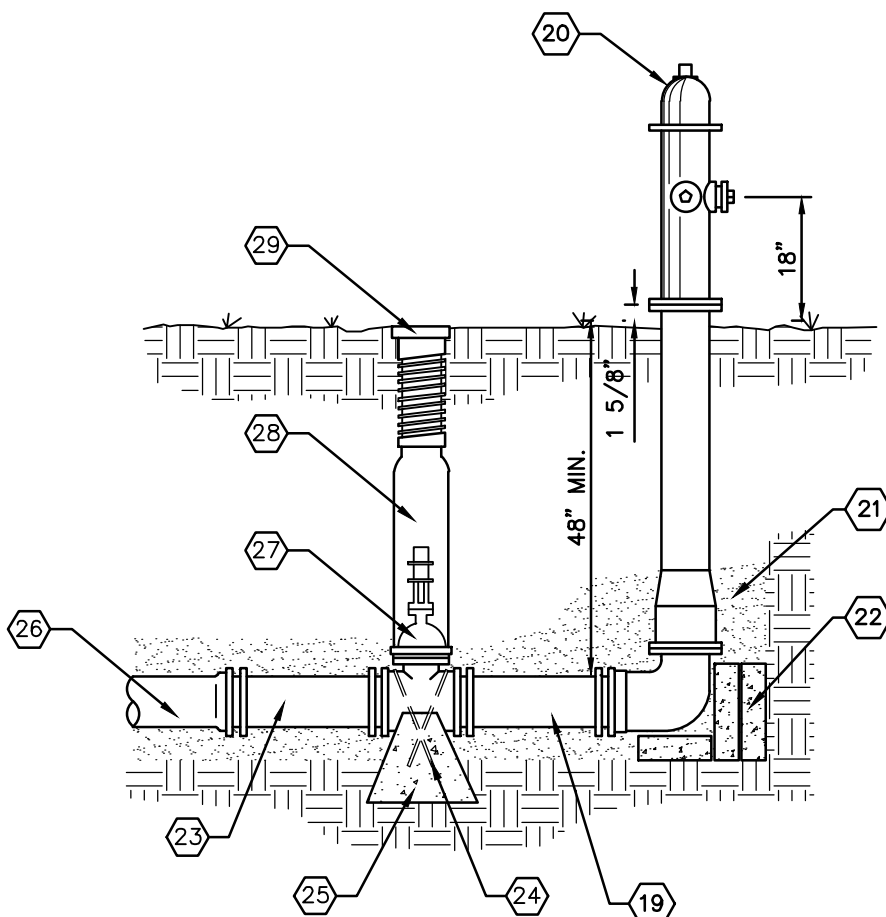


1 TRENCH CONDITIONS



**GATE VALVE WITH
CAST IRON VALVE BOX**

2
C5 NO SCALE



3 FIRE HYDRANT ASSEMBLY

C5 NO SCALE