

Addendum No. 1

for

“Phase 1b – Contract C2 – Water Treatment Plant
Illinois Alluvial Regional Water Company
Jersey County, Illinois

October 4, 2026

The contract documents prepared by MECO-Heneghan Engineers for Phase 1b – Contract C2 – Water Treatment Plant 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 ENDS

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.

3. SPECIFICATIONS

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

- A. Specification Section 464123 has been revised. The attached Section 464123 replaces any previous versions.



4. **DRAWINGS**

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

- A. Drawing Sheet C2 has been revised. The attached sheet C2 Revision 4 replaces any previous version of Sheet C2.

5. **GENERAL CLARIFICATIONS**

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

A. **ADMINISTRATIVE:**

- 1. 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.**
- 2. 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 C1.**

B. **SPECIFICATIONS:**

- 3. 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**
- 4. Section 22 12 19, Page 7, Article 2.01.B: Please confirm that Type 1L cement is acceptable for the proposed tank. **Yes, it is acceptable.**

C. **DRAWINGS:**

- 5. 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 (forthcoming) to address the revised grades, maintain planned pipe penetrations and alignments.**
- 6. Sheet M6.12: Please confirm that the top non-voided detail is a representation of the tank drain pipe 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 drain pipe below the proposed tank floor. **This is the surge relief line from pump building, not related to tank piping.**



7. 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.**
8. Sheet T1, Detail 1 (Tank No. 1 Plan): The distances shown for the through-floor piping from the inside of the proposed tank wall differ 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 drain pipes. **Use dimensions on Sheet T6.**
9. 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.**
10. 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.**
11. Sheet T5, Detail 1 (Guardrail Elevation): Please confirm that Hollaender SpeedRail joint fittings are acceptable for the proposed tank roof handrail. **Those are acceptable.**
12. 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.**

D. GEOTECHNICAL REPORT

1. The Terracon IARWC Proposed Water Treatment Plant 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 grade 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.**

END OF ADDENDUM NO. 1

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



exp. 11-30-2027

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 C-2					
Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Amount
1	Clearwell Storage Tank	1	EA	\$	\$
Total of All Unit Price Bid Items					\$

Dollars

(In Words)

Alternate A – Contract C-2					
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:

1. 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
2. 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.

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 ~~Supplementary~~General 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 ~~Supplementary~~General 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 ~~Supplementary~~General 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 46 – WATER AND WASTEWATER EQUIPMENT**SECTION 464123 – RESERVOIR HYDRODYNAMIC MIXING SYSTEM****1.00 GENERAL:**

- A. The Hydrodynamic Mixing System (HMS) is defined as a supplemental system installed within a potable water storage reservoir which passively utilizes the energy provided by the inlet water supply (via pumped or gravity head) and generates a sufficient inlet momentum to achieve a complete homogeneous blending of the water volume within the reservoir with the inlet supply flow. Determination of Complete Homogeneous Blending shall be defined by the modeling requirements and supporting hydraulic analysis as conducted by each individual manufacturer for their specific system configuration as defined within these specifications. System submittals not providing this validation shall not be considered as a viable Hydrodynamic Mixing System (HMS) and shall not be accepted as an equivalent to this system specification.
- B. The specifications in this section include all components of the Reservoir Hydrodynamic Mixing System (HMS) consisting of a bi-directional flow manifold equipped with variable orifice duckbill inlet nozzles and outlet flow check valves that are NSF61 certified. The HMS manufacturer shall be responsible for designing the system in accordance with the hydrodynamic criteria defined within these specifications and submit design calculations verifying compliance in accordance with the submittal requirements. The following is a description of the Hydrodynamic Mixing System.
- C. All modeling and hydraulic and mixing calculations pertaining to the HMS shall originate from the duckbill valve manufacturer. Modeling and calculations provided by parties other than the duckbill valve manufacturer are not allowed.
- D. The complete Hydrodynamic Mixing System shall be supplied by the variable orifice nozzle manufacturer to maintain single source responsibility for the system. The complete system shall be defined as all piping and appurtenances within the tank downstream of the tank penetration. Appurtenances include pipe, fittings, horizontal and vertical pipe supports, expansion joints, variable orifice duckbill check valves, and any other equipment specified within this section of the specifications. The pre-approved manufacturer for this system to be included within the Base Bid shall be manufactured by Red Valve Company/Tideflex Technologies and or equal. Local Equipment Supplier is Hydro-Kinetics – 314-647-6104 Alternate manufacturer's must be pre-approved by the Engineer. An alternate manufacturer, even if listed by name, must comply with all specifications contained herein including those in the "Submittals" section. In order for an alternate manufacturer to be approved, the Contractor shall submit to the Engineer at least ten days prior to the bid date a reference submittal package as defined within the "Submittals" section that will confirm they will be in compliance with all specifications.
- E. Material Sourcing (Domestic / International)
1. The steel material sourcing shall be in accordance with BABA (State Revolving Fund – American Iron & Steel Requirement).

1.01 Referenced Standards

- A. American National Standards Institute (ANSI)
1. B16.1 – Cast Iron Pipe Flanges and Flanged Fittings
 2. B16.5 – Pipe Flanges and Flanged Fittings
 3. B36.10 – American National Standard Weights and Dimensions of Welded and
a) Seamless Wrought Steel Pipe

RESERVOIR HYDRODYNAMIC MIXING SYSTEM (HMS)**464123/1**

B. American Society for Testing and Materials (ASTM)

1. A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
2. A240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
3. A351 – Standard Specification for Castings, Austenitic, Austenitic-Ferritic (Duplex), for Pressure-Containing Parts
4. A536 – Standard Specification for Ductile Iron Castings
5. C110 – Ductile Iron and Gray-Iron Fittings, 3 In. through 48 In. for Water
6. D1330 – Standard Specification for Rubber-Sheet Gaskets
7. D3261 – Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Fittings

C. American Iron and Steel Institute (AISI)

1. AISI 316 – 316 Stainless Steel Plate

D. American Water Works Association (AWWA)

1. C104 – Cement-Mortar Lining of Ductile Iron Pipe and fittings for Water
2. C110 – Ductile-Iron and Gray-Iron Fittings, 3 In. through 48 In. for Water
3. C115 – Flange Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges
4. C200 - AWWA Standard for Steel Water Pipe 6" and Larger
5. C207 – Standard for Steel Pipe Flanges for Waterworks Service – Size 4 In. to 144 In.
6. C220 – AWWA Standard for Stainless Steel Pipe, 4" and Larger
7. C906 – AWWA Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4 In. Through 63 In. for Water Distribution

E. American Water Works Association Research Foundation (AwwaRF)

1. Project No. E20-J08 – Physical Modeling of Mixing in Water Storage Tanks (Forthcoming)

F. National Sanitation Foundation (NSF)

1. NSF Standard 14 – Plastic Piping System Components and Related Materials
2. NSF Standard 61 – Drinking Water System Components – Health Effects

1.02 Delivery, Storage, and Material Handling

- A. Individual nozzles and outlet valves shall be packaged separately from the piping equipment.
- B. All flanges shall be protected by using plastic inserts or plank wood, pipe sections are to be fully supported to prevent pipe deflection or damage to fittings or connections.
- C. All equipment shall be shipped on pallets capable of fully supporting the pipe sections across their entire length. Pallets should be accessible for fork lift transport or strap and hoist means without causing any load to the pipe equipment.
- D. All stainless steel components shall be stored separately away from any carbon steel or other materials that could stain or deface the stainless steel finish from run-off of oxidized ferrous materials.
- E. All pipe equipment should be covered and stored in areas free from contact with construction site sediment erosion to prevent accumulation of materials within the pipe and fittings.

- F. Duckbill nozzles should be protected from contact with rigid objects during handling and storage. The contractor shall be responsible for replacing any duckbill nozzles or elastomeric components that are damaged after arrival on the site through installation and start-up of the system.

1.03 Submittals

A. Independent CFD Modeling Validation

1. The mixing system designer/supplier must supply data or report from at least one project where an independent company conducted CFD modeling on their mixing system design and the modeling results verified the design achieved complete mixing.

B. Full Scale Tracer Study Validation

1. The mixing system designer/supplier must supply data or report from at least one project where a full scale tracer study using calcium chloride was conducted on a circular reservoir and the tracer study results verified the mixing system design achieved complete mixing.
2. The mixing system designer/supplier must supply data or report from at least one project where a full scale tracer study using calcium chloride was conducted on an elevated tank and the tracer study results verified the mixing system design achieved complete mixing.

C. Duckbill Check Valve Inlet Nozzle and Waterflex Outlet Valve Testing and Validation

1. Verification of independent hydraulic testing to determine headloss and jet velocity characteristics on a minimum of eight (8) sizes of duckbill valves ranging from 2" through 48". The testing must include multiple constructions (stiffness) within each size and must have been conducted for free discharge (discharge to atmosphere) and submerged conditions.
2. Verification of Independent Laboratory Testing for Manufacturing Consistency - the duckbill valve manufacturer shall provide summary documentation of a report conducted by an Independent Laboratory for hydraulic testing where multiple duckbill valves (at least four) of the same size and construction (stiffness) were tested to validate the submitted headloss characteristics and to prove the repeatability and consistency of the manufacturing process to produce the same hydraulic characteristics.
3. Report of independent testing that studied the flow distribution characteristics of duckbill valves installed on multiport manifolds. The manufacturer must have been in the business of manufacturing duckbill valves at the time the report was published.
4. Verification of Finite Element Analysis (FEA) of duckbill valves. The duckbill valve manufacturer shall provide summary documentation of Finite Element Analysis modeling on representative duckbill nozzle sizes to determine deflection, stress and strain characteristics under various load conditions. Modeling must have been done for flowing conditions (positive differential pressure) and reverse differential pressure.
5. Verification of independent hydraulic testing to determine headloss characteristics on a minimum of three (3) sizes of perforated disc/elastomeric membrane check valves ranging from 6" through 36". Testing must have been conducted with and without the membrane installed. At least two (2) sizes shall have tested two (2) different membrane thicknesses.
6. Verification of Finite Element Analysis (FEA) modeling on a perforated disc/elastomeric membrane check valve to determine stress and deflection characteristics under reverse differential pressure.

D. Validation of Long-term performance

1. The mixing system designer/supplier must supply at least one inspection report showing proper operation of, and no deterioration of, the duckbill valves after being in service in a water storage tank mixing application for a minimum of 10 years.

E. NSF61 Certification

1. Copy of the NSF61 Certified listing for the valves used in the Hydraulic Mixing System (HMS).
 2. The valves themselves must be NSF61 certified, not just the elastomer used in construction of the valves. NSF61 approved/certified materials will not be accepted in lieu of valve certification.
 3. The NSF61 Certification for the valves must be for a minimum volume of 2,000 gallons. Valves with NSF61 Certification for minimum volume of greater than 2,000 gallons are not acceptable.
- F. Test Report on Elastomer Exposure to Chlorine and Chloramine
1. Copy of test report from an accredited independent laboratory that confirmed there is no degradation in the elastomer when exposed to chlorine and chloramine per the ASTM D471-98 "Standard Test Method for Rubber Property – Effect of Liquids."
- G. System Installation Drawings
1. The duckbill valve manufacturer shall be responsible for providing engineering installation drawings of the complete manifold piping system as supplied by the manufacturer. These drawings shall include plan view piping arrangement, sections and elevations as required, support bracket installation details, duckbill nozzle orientation details, and all dimensions required for locating the system within the specified dimensions of the tank.
 2. Six (6) sets of plans shall be provided to the Engineer for review and approval.
 3. Drawings shall be a minimum of 11 x 17 inches and provided in digital PDF format.
 4. Two (2) sets of final fabrication and installation drawings shall be included with the shipment of the manifold piping equipment.

2.00 PRODUCTS

2.01 Duckbill Check Valve Variable Orifice Duckbill Inlet Nozzles

- A. Inlet ports/nozzles shall be duckbill-style check valves that allow fluid to enter the reservoir during fill cycles and prevent flow in the reverse direction through the nozzle during draw periods. Inlet ports/nozzles may not be fixed-diameter ports or pipes.
- B. The flange drilling shall conform to ANSI B16.1 Class 125/ANSI B16.5, Class 150 standards. The duckbill valve shall be furnished with stainless steel 316 back-up rings for installation.
- C. The duckbill valves shall be NSF61 Certified. NSF61 approved/Certified materials will not be accepted in lieu of valve certification.
- D. Inlet ports/nozzles shall have a variable diameter vs. flow hydraulic profile that provides a non-linear jet velocity vs. flow characteristic and a linear headloss vs. flow characteristic. The hydraulic characteristics of the duckbill valves shall be defined by "Hydraulic Code".
- E. The inlet ports/nozzles shall discharge an elliptically shaped jet. The nozzle must have been modeled by an independent laboratory using Laser Induced Fluorescence (LIF).
- F. Manufacturer shall have conducted independent hydraulic testing to determine headloss and jet velocity characteristics on a minimum of eight (8) sizes of duckbill valves ranging from 2" through 48". The testing must include multiple constructions (stiffness) within each size and must have been conducted for free discharge (discharge to atmosphere) and submerged conditions.

- G. Manufacturer shall have conducted an independent hydraulic test where multiple valves (at least four) of the same size and construction (stiffness) were tested to validate the submitted headloss characteristics and to prove the repeatability of the manufacturing process to produce the same hydraulic characteristics.
- H. Manufacturer shall have conducted independent hydraulic testing to study the flow distribution characteristics of duckbill valves installed on multiport manifolds.
- I. Manufacturer to have conducted Finite Element Analysis (FEA) on various duckbill valves to determine deflection, stress, and strain characteristics under various load conditions. Modeling must have been done for flowing conditions (positive differential pressure) and reverse differential pressure.
- J. Manufacturer must have conducted in-house backpressure testing on duckbill valves ranging from ¾" to 48".
- K. Manufacturer shall have at least fifteen (15) years experience in the manufacturing of "duckbill" style elastomeric valves.
- L. Manufacturer must have duckbill valves installed on manifold piping systems in at least 100 distribution system reservoirs.
- M. Manufacturer must have representative inspection videos showing the duckbill valves discharging water into the reservoir during an initial fill (unsubmerged). Manufacturer must also have representative underwater inspection videos showing the operation of the valves when submerged. Representative videos can be submitted upon request from the engineer.
- N. The duckbill style nozzles shall be one-piece elastomer matrix with internal fabric reinforcing designed to produce the required discharge velocity and minimum headloss requirements as stipulated in the Submittals section. The flange portion shall be an integral portion of the nozzle with fabric reinforcing spanning across the joint between the flange and nozzle body.
- O. The elastomer used in construction of the duckbill valves must have been tested by an accredited independent laboratory that confirmed there is no degradation in the elastomer when exposed to chlorine and chloramine per the ASTM D471-98 "Standard Test Method for Rubber Property – Effect of Liquids."
- P. The manufacturer's name, plant location, serial number and product part number which designates nozzle size, material and construction specifications shall be bonded onto the surface of the nozzle.

2.02 Waterflex Outlet Check Valves

- A. The outlet flow valves shall be perforated disc type with elastomeric membrane.
- B. The valves shall be NSF61 Certified. NSF61 approved/Certified materials will not be accepted in lieu of valve certification.
- C. The perforated disc shall be fabricated of stainless steel 316L plate with or without welded support gussets depending on maximum backpressure. The disc shall be flanged and drilled to mate with ANSI B16.1, Class 125/ANSI B16.5 Class 150 flanges. The disc shall have three (3) tapped holes used for fastening the membrane and support rod to the disc with stainless steel 316L bolts, nuts, and lock washers. The top of the disc shall be tapped and supplied with lifting eyebolt for installation.
- D. The membrane shall be circular, one piece rubber construction with fabric reinforcement. The diameter of the membrane shall allow adequate clearance between the membrane O.D. and the pipe I.D. The membrane shall be vulcanized with a specified convex radius to produce a compression set to allow the membrane to seal against the perforated disc at low reverse differential pressure.

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- E. The support rod shall be stainless steel 316L and drilled with three (3) longitudinal holes to allow fastening of rod to membrane and perforated disc.
- F. When line pressure inside the valve exceeds the backpressure outside the valve, the line pressure forces the membrane to open, allowing flow to pass through the perforations in the disc. When backpressure exceeds the line pressure, the membrane seats on the perforated disc preventing backflow.
- G. The valve allows flow out of the reservoir during draw cycles and prevents flow into the reservoir during fill cycles.
- H. The elastomer used in construction of the membrane must have been tested by an accredited independent laboratory that confirmed there is no degradation in the elastomer when exposed to chlorine and chloramine per the ASTM D471-98 "Standard Test Method for Rubber Property – Effect of Liquids."
- I. The manufacturer's name, plant location, serial number and product part number which designates membrane size, material and construction specifications shall be bonded onto the surface of the membrane.

2.03 Stainless Steel Pipe and Fittings

- A. Stainless steel pipe and fittings shall conform to the associated standards listed in Section 1.01: Reference Standards.
- B. Dimensions for stainless steel fittings shall conform to AWWA C110, unless otherwise specified.
- C. Piping shall be Schedule 10s stainless steel 316L made fabricated from material per ASTM-A240.
- D. All flanges shall be plate ring flanges, unless otherwise specified on the drawings. Flange drilling pattern shall be in accordance with ANSI B16.1/B16.5 standards.
- E. Ring flanges shall be continuously welded on both sides.
- F. All welded joints shall be free of sharp edges and burrs.
- G. All shop welds shall be manually scrubbed or brushed with non-metallic pads or stainless steel wire brushes to remove weld discoloration. Welds to be chemically passivated with nitric or citric acid.
- H. Field welding of stainless steel pipe and fittings will not be allowed unless approved by the Engineer.

2.04 Flange Gaskets

- A. Flange gaskets shall be full-faced and shall be in accordance with ASTM D1330.
- B. Flange gasket drilling pattern shall conform to ANSI B16.1/B16.5.
- C. Flange gaskets shall be 1/8" thick.
- D. Gasket material shall be EPDM.

2.05 Fasteners

- A. Hex head bolts and nuts shall be stainless steel 316 conforming to ANSI/ASME B18.2.1 and ANSI/ASME B18.2.2.
- B. Plastic insulating sleeve/washers shall be utilized to isolate dissimilar bolt and flange metals where required.

2.06 Pipe Supports

- A. For flanged pipe in carbon steel tanks, the pipe supports shall be carbon steel with a stainless steel 316L U-bolt in accordance with the associated standards. For flanged pipe in concrete or bolted tanks, all components of the pipe supports shall be stainless steel 316L in accordance with the associated standards.
- B. The pipe supports shall consist of four components:
 - 1. A base plate. For all-stainless steel pipe supports, the base plate will have four thru holes for expansion anchors and a pipe welded to the base plate with a hex nut welded to the top of the pipe to serve as a guide for the all-thread of the top-works weldment.
 - 2. For carbon steel supports, a top-works weldment that consists of structural channel and angle iron. The angle iron has predrilled holes for the U-bolt. The TMS piping shall rest on the angle iron and the U-bolt is used to retain the TMS pipe.
 - 3. For stainless steel supports, a top-works weldment that consists of structural angle iron with predrilled holes for the U-bolt. The TMS piping shall rest on the angle iron and the U-bolt is used to retain the TMS pipe. All-thread rod shall be welded to the bottom of the angle iron and shall thread into the hex nut of the base plate weldment. The top-works weldment can be rotated into or out of the hex nut to provide height adjustability.
 - 4. U-bolt with four hex nuts.
 - 5. An 1/8" thick EPDM strip with a length equivalent to the circumference of the pipe. The strip shall be placed between the pipe and the angle iron and U-bolt.
- C. For steel tanks, the channel of the top-works weldment shall be field fit and modified to the required length. The channel shall then be field welded to the base plate.
- D. For steel tanks, the base plate shall be field welded to the tank floor or shell. The location of the base plate shall avoid welded joints in the floor/shell plates.
- E. For concrete tanks, the support shall be anchored to the concrete floor with stud type expansion anchors, the pull-out rating of the combined anchors shall be a minimum of 10 times greater than the static weight of the vertical pipe section.
- F. Plastic insulating sleeve/washers shall be utilized to isolate dissimilar metals where required.

2.07 Coatings

- A. Following installation of the manifold system, all carbon steel and ductile iron pipe, fittings, bolted connections, pipe supports, and appurtenances shall be coated according to the interior tank paint specification as specified by the Engineer.
- B. Surface preparation and coating procedures shall be provided by the Engineer and the coating supplier.
- C. **Check Valves shall not be coated.** The valves shall either be masked or be mounted after coating of the tank and piping. Contractor to ensure masking materials are removed after coating.

2.08 Design Calculations

- A. All Design Calculations, curves, and reference information listed below must originate and be submitted by the duckbill valve manufacturer. **Calculations, curves, and reference information provided by contractors relating to the HMS are not allowed.** The duckbill valve manufacturer MUST include within the submittal package the following design calculations, curves, and reference information:
1. Calculations showing the fill time required, under isothermal conditions, for the HMS system to achieve complete mix of the reservoir volume at minimum, average and peak fill rates. Complete mixing defined as 95% homogenous solution. The theory and equations used in calculating the mixing times must be from a published AWWA reference manual or paper. The reference document(s) must be submitted with the equations and calculations.
 2. Calculations showing the water level drawdown required to achieve complete mixing on the fill cycles at minimum, average, and peak flow rates.
 3. Calculations of average storage tank water age for both fill-then-draw, and simultaneous fill and draw scenarios. Theory used in calculating water age must be submitted with the calculations.
 4. A representative Computational Fluid Dynamics (CFD) model evaluation of the proposed HMS system configuration applied within a reservoir of similar geometry. Model output documentation shall include all design variables applied for the simulation, plot of the 3-D geometry showing the mesh definition, velocity magnitude vector and contour plots at different cross-sections throughout the water volume, simulated tracer animations showing the spatial and temporal distribution of inlet water in real time during the fill cycle.
 5. Hydraulic calculations showing the resulting jet velocities of each inlet nozzle at minimum, average, and peak fill rates.
 6. Hydraulic calculations showing the flow distribution among all inlet ports at minimum, average, and peak fill rates.
 7. Manifold hydraulic calculations showing the total headloss of the HMS at minimum, average, and peak fill and draw rates. Headloss shall include all minor losses and headloss of nozzles and outlet check valves.
 8. Hydraulic curves showing thrust vs. flow for the inlet nozzles.
 9. Hydraulic curves for each outlet check valves showing headloss vs. flow.
 10. Calculations showing the terminal rise height of the jets that discharge at an angle above horizontal. The terminal rise height shall be calculated assuming 10°F and 20°F colder inlet water and calculated at minimum, average and peak fill rates. The theory and equations used to calculate the terminal rise height shall be included.
 11. Hydraulic curves for each inlet nozzle of Densimetric Froude number vs. flow
 12. If the calculations and supporting data provided do not show compliance with the hydrodynamic requirements of the system as interpreted by the Engineer or Owner then the submittal shall be rejected.

2.09 Installation, Operation and Maintenance Manuals

RESERVOIR HYDRODYNAMIC MIXING SYSTEM (HMS)

464123/8

- A. After final approval of the submittals by the Engineer, the HMS valve manufacturer shall provide one (1) Digital copy of the Installation, Operation and Maintenance (IOM) Manual for the mixing system. Hard copies of the IOM manual can be requested and will be made available at a fee.
- B. The IOM manual shall include the following information as a minimum:
1. A Cover page listing project specifics
 2. Table of contents
 3. Completed sections for the following: equipment list, shipment and storage instructions, assembly and installation instructions, safety notice, operating instructions, troubleshooting guide, and spare parts list.
 4. Copy of hydraulic, mixing, and water age design calculations for the mixing system and all associates supporting curves and calculations.
 5. Copy of complete set of the installation plans.
 6. Copies of valve IOMs, NSF61 Certification listing, chlorine/chloramine exposure test report.
 7. All validation documentation.
 8. Component specification sheets for any specialized items supplied with the system.

3.00 EXECUTION

3.01 Installation

- A. Installation of the manifold system shall be in accordance with the installation plans and guidelines provided by the HMS manufacturer, and as specified in the installation section of the IOM manual, and the requirements defined in these specifications.

3.02 Installation Inspection and Start-Up Testing Procedures

- A. The HMS manufacturer's authorized representative shall provide one (1) day inspection to verify that the system has been installed in accordance with the design specifications and installation drawings. It is recommended the flow testing described below is conducted the same day once the representative confirms proper installation of the system.
- B. The inspection representative shall provide signed inspection documents confirming the date of the inspection and approval of the installation.
- C. Start-Up Flow Testing
1. Following installation of the complete manifold piping system, the contractor shall open the upstream isolation valve to allow flow into the tank through the manifold system. The isolation valve must be opened slowly to prevent surge or over-pressurization of the manifold system. The isolation valve must be fully opened to inspect the flow characteristics of the manifold system.
 2. The contractor shall take videos and photos during the filling operation and submit them to the HMS manufacturer. Videos and photos are to confirm:
 - a) There is no leakage in the piping system.
 - b) That all of the duckbill inlet nozzles are discharging flow into the tank. The only exception is for a system where the duckbill nozzles are at different elevations. If the water level is not at the elevation of higher duckbill nozzles, those may not discharge flow until the water level approaches those nozzles.

3.03 Warranty

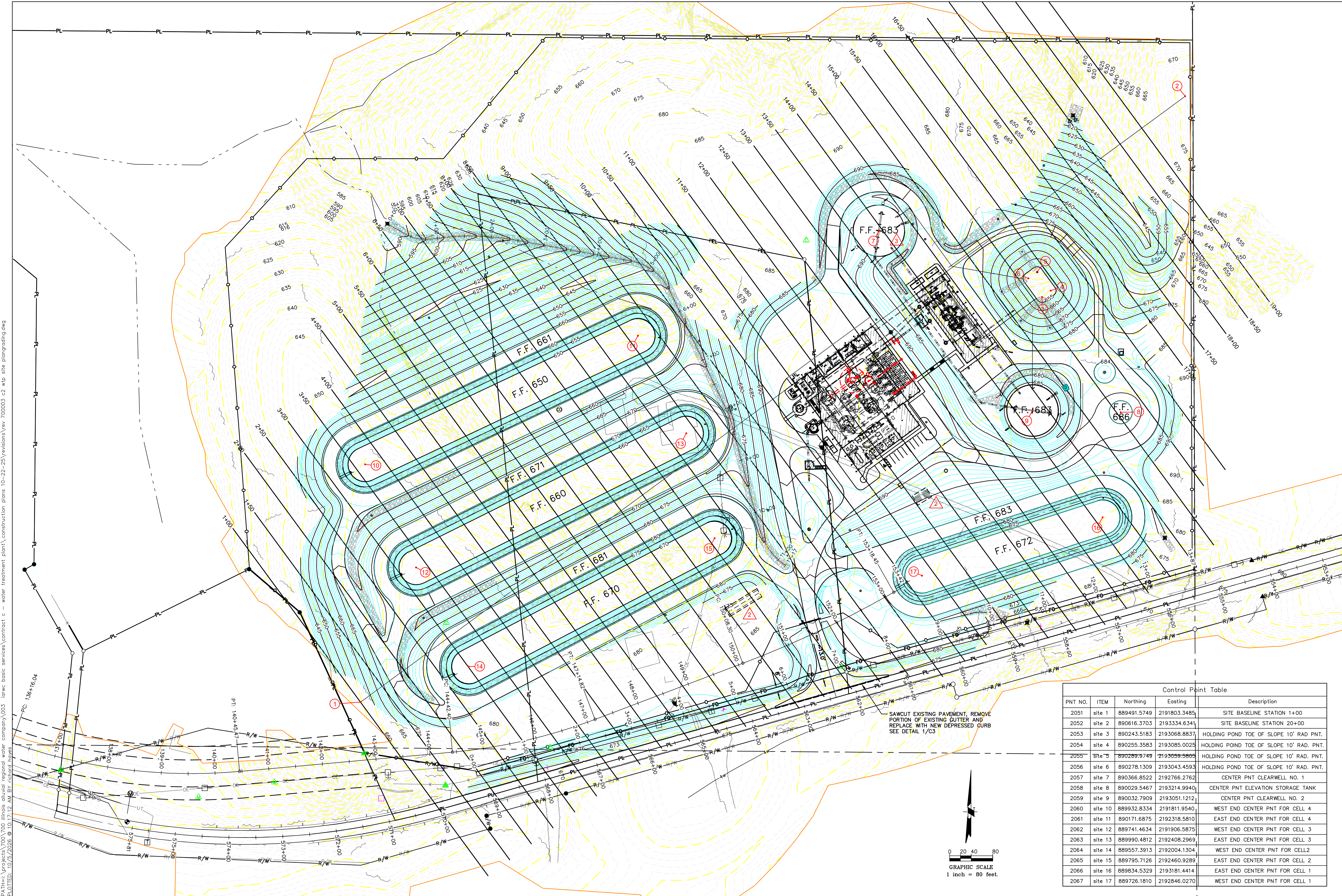
RESERVOIR HYDRODYNAMIC MIXING SYSTEM (HMS)

464123/9

- A. All piping, pipe supports, expansion joints, and anchors shall be warranted by the HMS manufacturer against failure under design conditions for a period of one (1) year from the date of final installation certification.
- B. Duckbill inlet nozzles and perforated disc/elastomeric membrane outlet check valves shall be warranted by the manufacturer against failure under design operating conditions for a period of one (1) year from the date of final installation certification. Elastomer components damaged as a result of maintenance activities, foreign debris, or excessive exposure to direct ultraviolet and thermal radiation shall be excluded warranted coverage.

End of Section 464123

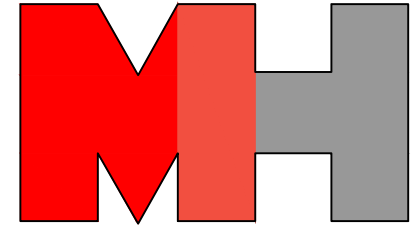
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PLOTED: 10/5/2026 @ 10:17:12 AM BY richard.hayes



SAW CUT EXISTING PAVEMENT, REMOVE PORTION OF EXISTING GUTTER AND REPLACE WITH NEW DEPRESSED CURB SEE DETAIL 1/C3

Control Point Table				
PNT NO.	ITEM	Northing	Easting	Description
2051	site 1	889491.5749	2191803.3485	SITE BASELINE STATION 1+00
2052	site 2	890616.3703	2193334.6341	SITE BASELINE STATION 20+00
2053	site 3	890243.5183	2193068.8837	HOLDING POND TOE OF SLOPE 10' RAD. PNT.
2054	site 4	890255.3583	2193085.0025	HOLDING POND TOE OF SLOPE 10' RAD. PNT.
2055	site 5	890289.9749	2193059.5805	HOLDING POND TOE OF SLOPE 10' RAD. PNT.
2056	site 6	890278.1309	2193043.4593	HOLDING POND TOE OF SLOPE 10' RAD. PNT.
2057	site 7	890366.8522	2192766.2762	CENTER PNT CLEARWELL NO. 1
2058	site 8	890029.5467	2193214.9940	CENTER PNT ELEVATION STORAGE TANK
2059	site 9	890032.7909	2193051.1212	CENTER PNT CLEARWELL NO. 2
2060	site 10	889932.8334	2191811.9540	WEST END CENTER PNT FOR CELL 4
2061	site 11	890171.6875	2192318.5810	EAST END CENTER PNT FOR CELL 4
2062	site 12	889741.4634	2191906.5875	WEST END CENTER PNT FOR CELL 3
2063	site 13	889990.4812	2192408.2969	EAST END CENTER PNT FOR CELL 3
2064	site 14	889557.3913	2192004.1304	WEST END CENTER PNT FOR CELL 2
2065	site 15	889795.7126	2192460.9289	EAST END CENTER PNT FOR CELL 2
2066	site 16	889834.5329	2193181.4414	EAST END CENTER PNT FOR CELL 1
2067	site 17	889726.1810	2192846.0270	WEST END CENTER PNT FOR CELL 1

MECO-HENEGHAN
ENGINEERS, LLC



www.meco-heneghan.com

DESIGN FIRM NUMBERS:
IL: 184.007845-0010
035.003949
EXPIRES: APRIL 30, 2025
MO: 2018004041
EXPIRES: DECEMBER 31, 2026

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

REVISIONS

RELOCATED FENCE AND FIBER OPTIC
CABLE ALONG HIGHWAY

REPLACED MICROFAST SANITARY SYSTEM WITH
SAND FILTER AND LEACH FIELD SYSTEM

MODIFIED GRADING AROUND CLEARWELL NO. 1
FOR MIN. FOUNDATION COVERAGE

DATE

04/23/26

05-06-26

10-05-26

NO.

1

2

3

REVISION NO. 3

CONTRACT "C"
SITE GRADING PLAN

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
JERSEY & MACOUPIN COUNTIES, ILLINOIS

DRAWN BY: R. HAYES
CHECKED BY: K. GARNETT
APPROVED BY: M. MIDDENDORF

HORIZONTAL SCALE:
1" = 80'

VERTICAL SCALE:
N/A

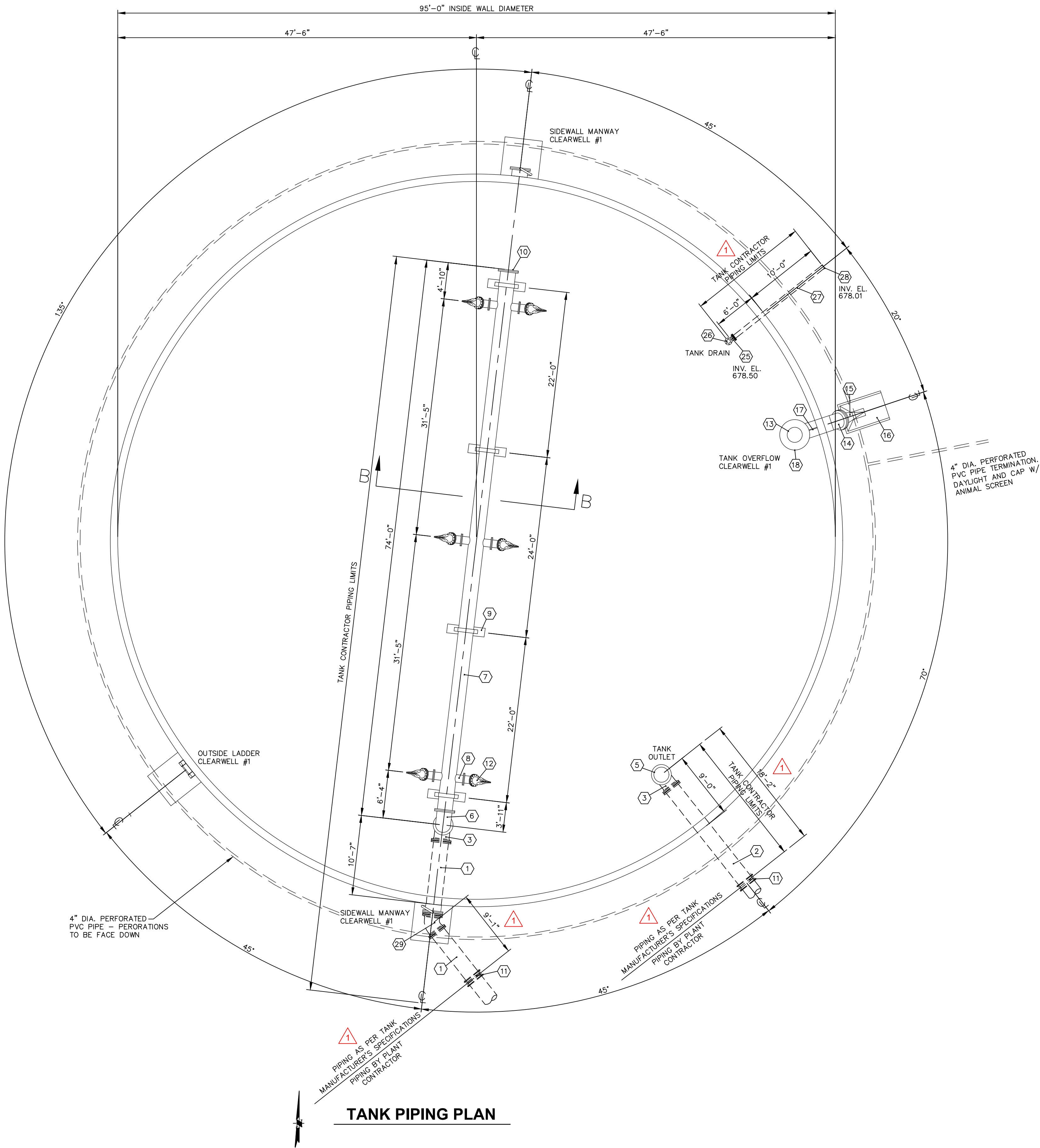
PROJECT NO.
700-003

DATE:
03/14/25

SHEET NO.
C2

3 OF 43 SHEETS

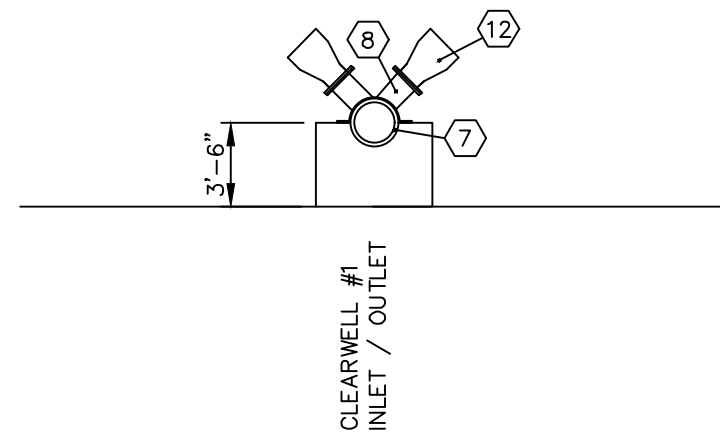
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PLOTTER: 10/5/2026 @ 11:30:45 AM BY: richard hayes



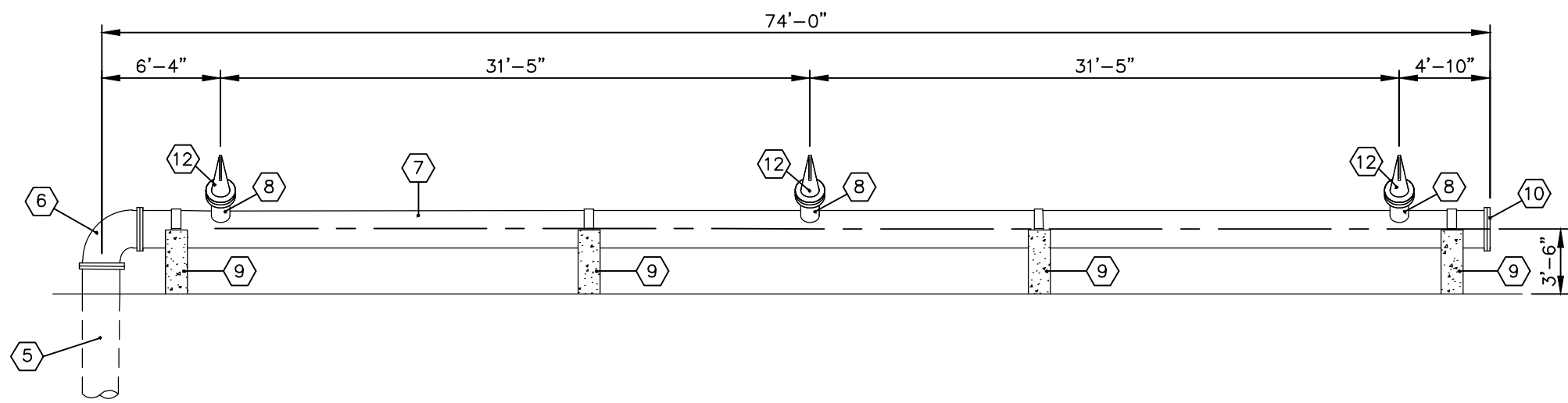
TANK PIPING PLAN

KEY NOTES

1. SIZE 24.00 INCH DUCTILE IRON INLET PIPE - P.E. x P.E.
2. SIZE 24.00 INCH DUCTILE IRON OUTLET PIPE - P.E. x P.E.
3. (2) SIZE 24.00 INCH DUCTILE IRON 90 DEGREE ELBOW - M.J. x M.J.
4. SIZE 24.00 INCH SCH 10 316L S.S. - P.E. x FLG.
5. SIZE 24.00 INCH SCH 10 316L S.S. - P.E. x P.E.
6. (1) SIZE 24.00 INCH SCH 10 316L S.S. 90 DEGREE ELBOW - FLG. x FLG.
7. SIZE 24.00 INCH SCH 10 316L S.S. MANIFOLD - FLG. x FLG.
8. (6) WELDED 16.00 INCH BRANCH REDUCING SCH 10 316 S.S. - FLG.
9. (8) CONCRETE PIPE SUPPORT PIERS WITH S.S. PIPE STRAPS
10. (1) SIZE 24.00 INCH SCH 10 316L S.S. BLIND FLANGE
11. (2) 24.00 INCH COUPLING
12. (6) SIZE 12.00 INCH RUBBER CHECK VALVE INLET MIXING NOZZEL, TIDFLEX TECHNOLOGIES SERIES 35 (OR EQUAL) - FLANGED
13. SIZE 24.00 INCH SCH 10 316L S.S. TANK OVERFLOW PIPE
14. SIZE 24.00 INCH SCH 10 316L S.S. 45 DEGREE ELBOW - FLG. x FLG.
15. SIZE 24 INCH RUBBER CHECK VALVE, TIDFLEX TECHNOLOGIES SERIES 35 (OR EQUAL) - FLANGED
16. SIZE 48.00 INCH W. X 72.00 INCH L. X 6.00 INCH T. REINFORCED CONCRETE SPLASH PAD
17. (3) 316L S.S. RISER PIPE SUPPORT BRACKETS - SEE SHEET T3 / DETAIL D
18. TANK OVERFLOW WEIR ASSEMBLY - SEE SHEET T3 / DETAIL 4
19. SIZE 16.00 INCH SCH 10 316L S.S. RISER PIPE - FLG. x P.E.
20. SIZE 16.00 INCH SCH 10 316L S.S. RISER PIPE - FLG. x FLG.
21. (2) SIZE 16.00 INCH SCH 10 316L S.S. 90 DEGREE ELBOW - FLG. x FLG.
22. SIZE 16.00 INCH DUCTILE IRON SURGE RELIEF OUTLET PIPE - P.E. x P.E.
23. SIZE 16.00 INCH DUCTILE IRON 90 DEGREE ELBOW - M.J. x M.J. WITH RETAINER GLANDS
24. (1) 16.00 INCH COUPLING
25. (1) SIZE 6.00 INCH DUCTILE IRON 90 DEGREE ELBOW - M.J. x M.J. SEE SHEET T3 / DETAIL 1
26. SIZE 6.00 INCH SCH. 10 316L S.S. - M.J. x P.E. SEE SHEET T3 / DETAIL 2
27. SIZE 6.00 INCH DUCTILE IRON DRAIN PIPE - P.E. x P.E. SEE SHEET T3 / DETAIL 2
28. (1) 6.00 INCH TEMPORARY CAP
29. (1) SIZE 24.00 INCH DUCTILE IRON 45 DEGREE ELBOW - M.J. x M.J.

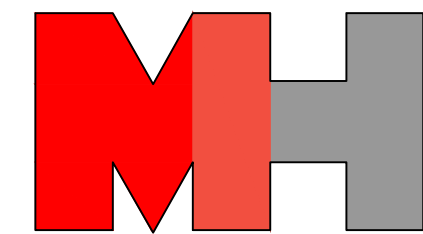


TANK MIXING MANIFOLD
SECTION B-B



TANK MIXING MANIFOLD
SECTION A-A

MECO-HENEGHAN
ENGINEERS, LLC



www.meco-heneghan.com

DESIGN FIRM NUMBERS:
IL: 164.007845-0010
035.003949
EXPIRES: APRIL 30, 2025
MO: 2018004041
EXPIRES: DECEMBER 31, 2026

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

REVISIONS		ADDED INFORMATION ABOUT LIMITS OF TANK SUPPLIER PIPING			
NO.	DATE	DESCRIPTION	DATE	DESCRIPTION	DATE
1	10/05/26	ADDED INFORMATION ABOUT LIMITS OF TANK SUPPLIER PIPING			

REVISION NO. 1

CONTRACT "C" (PHASE 2)
PRECAST CONCRETE
CLEARWELL # 1 PIPING
PLAN AND SECTIONS

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
JERSEY & MACOUPIN COUNTIES, ILLINOIS

DRAWN BY: R. HAYES
CHECKED BY: K. GARNETT
APPROVED BY: M. MIDDENDORF
HORIZONTAL SCALE:

1/8" = 1'-0"

VERTICAL SCALE:
N/A

PROJECT NO.
700-003

DATE:
03/14/25

SHEET NO.
T6

6 OF 7 SHEETS