



COMPLEX PROJECTS  
REQUIRE RESOLVE  
**THRASHER'S GOT IT**

**TUSCARAWAS COUNTY COMMISSIONERS  
TUSCARAWAS COUNTY, OHIO**

**CONTRACT 2 – WILKSHIRE HILLS WATER SYSTEM IMPROVEMENTS**

**ADDENDUM #3**

**March 3, 2023**

**THRASHER PROJECT #101-010-01120**

TO WHOM IT MAY CONCERN:

The following are clarifications and responses to questions posed by contractors for the above-referenced project.

1. **GENERAL**  
**REPLACE** page 5 of the Index with the attached. Revised the name of spec. 331613.
2. **SPECIFICATIONS**  
**REPLACE** Specification 331613 Above Ground Water Utility Storage Tanks with attached Specification for Glass-Coated, Bolted-Steel Potable Water Tank AWWA Design.
3. **DRAWINGS**  
**REPLACE** Sheets 9 and 9A with the attached Sheets 9 and 9A.
4. **QUESTIONS & RESPONSES**

**QUESTION 1**

On Page 5A, Note 9 there is no detail for the stairs on the Plan Sheet. Are there really supposed to be stairs, and where?

**RESPONSE**

The stairs were removed from the project. There are no stairs. Please ignore Note 9 on Sheet 5A.

## **QUESTION 2**

On Page 10A, the drain goes under the sidewalk. Can we put the drain either behind or in front of the sidewalk?

## **RESPONSE**

The County Engineer is required the new drain to be a minimum of 5' away from the edge of the pavement.

## **QUESTION 3**

Spec section 432513 calls for submersible pumps, but it looks like on drawing 6B it is a dry pit submersible. I would like to see if Flygt can added in an addendum as a submersible pump manufacturer to be used as the backwash pump.

## **RESPONSE**

Please note that sheet 6B, Note 18 references a back wash pump. Please note that we are naming Flygt (850 gpm@ 60tdh) as an approved manufacturer for the backwash pump. Flygt is also named as a manufacturer for the sump pumps.

## **QUESTION 4**

My previous question on C900 DR rating you indicated 150 psi rated. I did see a note at Well 4 calling for DR14, which is PC 305. DR18 is PC 235 and DR21 is PC165. Can you confirm is DR21 acceptable for 8" through 30" C900?

## **RESPONSE**

The well pipe for Well # 4 is DR14. The C-900 pipe for the 12" and 30" DR25 (with a pressure rating of 165 psi). This would exceed the 150psi as previously addressed.

## **QUESTION 5**

Is there a Fire Hydrant Spec.?

## **RESPONSE**

All hydrants are to be Mueller.

## **QUESTION 6**

Drawing 6 on the 12" effluent branch - is there a 12" wye with valve and sleeve going back to the building, like on drawing 6, or is it a 45 with plug like on drawing 2?

## **RESPONSE**

Please follow Sheet 6.

## **QUESTION 7**

For the HDPE lines, can you confirm if they are IPS or DPS?

## **RESPONSE**

DPS

**QUESTION 8**

Is there a Yard Hydrant spec, also?

**RESPONSE**

The yard hydrant is a standard Mueller hydrant.

**QUESTION 9**

Is there a spec for perimeter fdn drain pipe? 4" SDR35 or 4" HDPE corrugated?

**RESPONSE**

HDPE Corrugated

**QUESTION 10**

Is there a spec on the 8" Strainer?

**RESPONSE**

The basket strainer shall be Ductile Iron Blind Flanged in accordance with ASME B16.5. Perforated 304 stainless steel screens are to be welded along the seam for maximum strength. All items shall be lead free.

**QUESTION 11**

Is there a spec on the 8" BFP?

**RESPONSE**

The backflow preventer shall be a Zurn (Model 375ASTDA) or approved equal.

**QUESTION 12**

Please clarify the fence detail. Does the fence have barbed wire? Does the fence have top rail?

**RESPONSE**

Yes, the fence will need a top rail and barbed wire.

If you have any questions or comments, please feel free to contact me at your earliest convenience at [shamit@thethrashergroup.com](mailto:shamit@thethrashergroup.com). As a reminder, bids will be received until 9:45 a.m. on Wednesday, March 8, 2023, at the Office of the Clerk of the Board of the Tuscarawas County Commissioners located at 125 E High Ave, New Philadelphia, OH 44663. Good luck to everyone, and thank you for your interest in the project.

Sincerely,

THE THRASHER GROUP, INC.



Steve Hamit, PE  
Project Manager



Transfer Switches	263200
Packaged Engine Generators	263213
LED Interior Lighting	265101
LED Exterior Lighting	265619
Soils for Earthwork	310513
Excavation	312316
Trenching	312316.13
Erosion and Sedimentation Controls	312500
Chain Link Fences and Gates	323113
Disinfection of Water Utility Piping Systems	330110.58
Disinfection of Water Utility Storage Tanks	330110.59
Hydrostatic Testing	330505.31
Utility Horizontal Directional Drilling	330523.13
Concrete Vaults and Chambers	330563
<b>Glass-Coated, Bolted-Steel Potable Water Tank</b>	331613
Hangers and Supports for Process Piping	400507
Ductile Iron Process Pipe	400519
Thermoplastic Process Pipe	400531
Identification for Process Piping	400551
Process Valves and Appurtenances	400553
Magnetic Flow Meters	407113
Ultrasonic Level Transmitter	407169
Process Liquid Measurement Analyzers	407500
Process Control Descriptions	409300
Submersible Centrifugal Pumps	432513

## SECTION 331613 – GLASS-COATED, BOLTED-STEEL POTABLE WATER TANK

**SPECIFICATIONS**Glass-Coated, Bolted-Steel Potable Water Tank  
AWWA Design

- 1.0 GENERAL
- 1.1 Scope of Work
- 1.1.1 Furnish and erect a glass-coated, bolted-steel water storage tank, including foundation, tank structure and tank appurtenances as shown on the contract drawings and described herein.
- 1.1.2 All required labor, materials and equipment shall be included.
- 1.2 Qualifications of Tank Supplier
- 1.2.1 The Engineer's selection of factory applied glass-fused-to-steel bolt together tank construction for this facility has been predicated upon the design criteria, construction methods specified, and optimum coating for resistance to internal and external tank surface corrosion. Deviations from the specified design, construction or coating details, will not be permitted.
- 1.2.2 The bidder shall offer a new tank structure as supplied from a **U.S.A.** manufacturer specializing in the design, fabrication and erection of factory applied glass-fused-to-steel, bolt together tank systems. The manufacturer shall own and operate its production plant, fabricate and glass coat the tank at one U.S.A. location. **Steel used for the tanks shall be smelted and produced in the U.S.A.**
- 1.2.3 The tank shown on the contract drawings and specified herein is a Model **1719 SSWT** Aquastore Tank System as manufactured by CST Storage of DeKalb, Illinois.
- 1.2.4 Alternate glass-fused-to-steel tank products, as provided by other manufacturers, will be considered for prior approval by the Engineer. Manufacturers lacking the experience requirement will not be considered. The Owner's decision or judgment on these matters will be final, conclusive and binding.
- 1.2.5 Strict adherence to the standards of design; fabrication; erection; product quality; and long term performance, established in this Specification will be required by the Owner and Engineer.
- 1.2.5.1 Tank or Dome substitutions which cause engineering and contract changes - the tank installation as shown on the plans and specified herein, is based on the equipment furnished by one manufacturer. A tank which is offered as a substitute to the specific requirements of these Specifications and which differs in detail and arrangement from that shown may require changes in design and construction. All costs which result from such changes in design and construction are to be borne entirely and unconditionally by the Contractor; said costs to included but not be limited to structural, piping, mechanical and electrical changes and all engineering costs incurred as a result of the substitution, in the revision of Plans and Specifications, review of design changes by others, preparation of change orders, and any other costs directly resulting from said substitution.
- 1.2.6 Tank suppliers/manufacturers wishing to pre-qualify shall submit the following to the Engineer/Owner for consideration 14 days prior to bid date.
- 1.2.6.1 Typical structure and foundation drawing(s).
- 1.2.6.2 List of tank materials, appurtenances and tank coating specs.
- 1.2.6.3 List of ten (10) tanks presently in **U.S.A.** potable water service, of size and character specified herein, operating satisfactorily for a minimum of ten (10) years, including the name and telephone number of Owner and Engineer. The tanks listed shall have been manufactured in the present production facility; not by a predecessor company in a different facility. The tank provider/builder shall have built, on its own, at least 30 tanks of similar type that are equal or greater in size than the specified tank, operating satisfactorily for a minimum of (15) fifteen years and shall provide with bid the reference name, location, application and year of supply/operation of the tank. Tank manufacturer and tank

Tuscarawas County Commissioners  
Contract 2 - Wilkshire Hills Water System Improvements

101-010-01120

- provider/builder shall each provide the reference name, address and telephone number of the responsible representative, application and year of supply/operation of the above referenced liquid tanks installed in the United States. List should indicate the specific application.
- 1.2.6.4 Certification from tank manufacturer that the tank meets all of tank design standards listed in Section 2.0.
- 1.2.7 Only bids from **U.S.A.** manufactured tank suppliers who have successfully pre-qualified will be considered.
- 1.2.8 Bidding Qualifications
- 1.2.8.1 Manufacturer: Company specializing in manufacturing products specified in this Section with minimum fifteen (15) years' documented experience.
- 1.2.8.2 Fabricator: Company specializing in fabricating products specified in this Section with minimum fifteen (15) years' documented experience.
- 1.2.8.3 Erector: Company specializing in performing Work of this Section with minimum fifteen (15) years' documented experience and approved by manufacturer. Tank erector must be a factory-trained authorized dealer of the tank manufacturer.
- 1.2.8.4 Bidder: Tank bidder must have a minimum fifteen (15) years documented experience bidding and building bolted tanks.
- 1.2.8.5 Licensed Professional: Professional engineer experienced in design of specified Work and actively licensed in the state where the tank is located. The licensed professional shall furnish a copy of the Certificate of Authorization (or equivalent) for his/her company to practice engineering in the state of licensure.
- 1.2.9 The Engineer reserves the right to evaluate all bids based on long term, 30 year minimum operation, coating, and maintenance costs. Values to be used in this evaluation will be at the discretion of the Engineer, as detailed in this specification and bid tabulation form. The Engineer will add such costs, dependent upon the type of tank offered, to the bidder's bid price to determine the effective low bid for purposes of making the award.
- 1.3 Submittal Drawings and Specifications
- 1.3.1 Construction shall be governed by the Owner's drawings and specifications showing general dimensions and construction details, after written approval by the Engineer of detailed erection drawings prepared by the tank bidder. There shall be no deviation from the drawings and specifications, except upon written order from the Engineer.
- 1.3.2 The bidder is required to follow spec. section 013300 Submittal Procedures to furnish, for the approval of the Engineer and at no increase in contract price
- 1.3.3 When approved, two sets of such prints and submittal information will be returned to the bidder marked "APPROVED FOR CONSTRUCTION" and these drawings will then govern for the work detailed thereon. The approval by the Engineer of the tank supplier's drawings shall be an approval relating only to their general conformity with the bidding drawings and specifications and shall not guarantee detail dimensions and quantities, which remains the bidder's responsibility.
- 1.4 Warranty
- 1.4.1 The tank manufacturer shall include a warranty on tank materials and workmanship for a specified period. As a minimum, the warranty shall provide assurance against defects in material, coatings, workmanship, and tank interior lining for a period of five (5) years, starting at the date of Substantial Completion.
- 2.0 DESIGN CRITERIA
- 2.1 Tank Size
- 2.1.1 The factory coated glass-fused-to-steel, bolt together tank shall have a nominal diameter of 16.78 feet, with a nominal sidewall height (to roof eave) of 19.26 feet.
- 2.2 Tank Capacity
- 2.2.1 Tank capacity shall be 30,000 gallons (nominal, U.S. gallons) w/ 12" freeboard.
- 2.3 Floor Elevation
- 2.3.1 Finished floor elevation shall be set at Elevation 962.02'.
- 2.4 Tank Design Standards

Tuscarawas County Commissioners  
Contract 2 - Wilkshire Hills Water System Improvements

101-010-01120

- 2.4.1 The materials, design, fabrication and erection of the bolt together tank shall conform to the AWWA Standard for "Factory Coated Bolted Steel Tanks For Water Storage" - ANSI/AWWA D103.
- 2.4.2 The tank coating system shall conform solely to Section 12.4 of ANSI/AWWA D103. **NOTE:** Baked-on powder epoxy painted, galvanized, or stainless steel bolt-together tanks are not considered equal.
- 2.4.3 The vitreous coating on the tank, bolt head encapsulation material, and joint sealant shall have been approved for listing under ANSI/NSF Standard 61 for Indirect Additives.
- 2.4.4 The tank manufacturer shall be ISO-9001 certified to assure product quality.
- 2.4.5 The tank manufacturer shall undergo an annual **FM** (Factory Mutual) inspection of their glass-coated, bolted-steel tank factory & provide written proof thereof to assure quality.
- 2.5 Design Loads (**Design Engineer to Complete the blanks**)
- 2.5.1 Specific Gravity: 1.0
- 2.5.2 Design Freeboard: 12 inches
- 2.5.3 Wind velocity: 120 mph per AWWA D103
- 2.5.4 Risk Category: III
- 2.5.5 Allowable Soil Bearing: 2,000 psf min. (refer to geotechnical report)
- 2.5.6 Roof Snow Load: 20 psf
- 2.5.7 Earthquake Seismic, AWWA D103
- 2.5.7.1 Site Class \_\_\_\_\_
- 2.5.7.2 Importance factor \_\_\_\_\_
- 2.5.7.3 Ss \_\_\_\_\_
- 2.5.7.4 S1 \_\_\_\_\_
- 3.0 MATERIALS SPECIFICATIONS
- 3.1 Plates and Sheets **Note: All steel shall be smelted and produced in the U.S.A.**
- 3.1.1 Plates and sheets used in the construction of the tank shell, tank floor (optional) or tank roof (optional), shall comply with the minimum standards of AWWA D103, Section 4.4.
- 3.1.2 Design requirements for mild strength steel shall be ASTM A1011 Grade 30 with a maximum allowable tensile stress of 14,566 psi per AWWA D103.
- 3.1.3 Design requirements for high strength steel shall be ASTM A1011 Grade 50 with a maximum allowable tensile stress of 26,000 psi per AWWA D103.
- 3.1.4 The annealing effect created from the glass coated firing process shall be considered in determining ultimate steel strength detailed in AWWA D103, Sections 5.3.
- 3.1.5 Multiple vertical bolt line sheets and plates of ASTM A1011 Grade 50 only shall be manufactured such that holes are staggered in the vertical bolt lines and that no two adjoining holes are in-line horizontally, except at the center of the sheet or plate.
1. Bolt seam design shall generally be in accordance with the requirements of AWWA D103 section 5.5.2; bolt spacing may be adjusted in the vertical bolt lines to increase the net section and improve joint efficiency to a maximum of 85%.
  2. Double sheeting of tank panels shall not be permitted to achieve structural sidewall thickness requirements.
- 3.2 Rolled Structural Shapes
- 3.2.1 Material shall conform to minimum standards of ASTM A36 or ASTM A992
- 3.3 Horizontal Wind Stiffeners
- 3.3.1 Design requirements for intermediate horizontal wind stiffeners shall be of the "web truss" design with extended tail to create multiple layers of stiffener, permitting wind load to transfer around tank.
- 3.3.2 Web truss stiffeners shall be of steel with hot dipped galvanized coating.
- 3.3.3 Rolled steel angle stiffeners are not permitted for intermediate stiffeners.
- 3.4 Bolt Fasteners
- 3.4.1 Bolts used in tank lap joints shall be 1/2" - 13 UNC- 2A rolled thread, and shall meet the minimum requirements of AWWA D103, Section 4.2.

Tuscarawas County Commissioners  
Contract 2 - Wilkshire Hills Water System Improvements

101-010-01120

- 3.4.2 Bolt Material
- 3.4.2.1 SAE J429 (1" and 1-1/4" bolt length) heat treated to:
  - 3.4.2.1.1 Tensile Strength - 120,000 psi Min.
  - 3.4.2.1.2 Proof Load - 85,000 psi Min.
  - 3.4.2.1.3 Allowable shear stress – 29,454 psi.
- 3.4.2.2 SAE J429 (>1-1/4" bolt length) heat treated to:
  - 3.4.2.2.1 Tensile Strength - 150,000 psi Min.
  - 3.4.2.2.2 Proof Load - 120,000 psi Min.
  - 3.4.2.2.3 Allowable shear stress - 36,818 psi.
- 3.4.3 Bolt Finish - Zinc, mechanically deposited.
  - 3.4.3.1 2.0 mils minimum - under bolt head, on shank and threads
- 3.4.4 Bolt Head Encapsulation
  - 3.4.4.1 High impact polypropylene co-polymer encapsulation of entire bolt head up to the splines on the shank.
  - 3.4.4.2 Natural resin with UV (ultraviolet) light inhibitor. Color to be black.
- 3.4.5 All tank shell bolts shall be installed such that the head portion is located inside the tank, and the washer and nut are on the exterior.
- 3.4.6 All lap joint bolts shall be properly selected such that threaded portions will not be exposed in the "shear plane" between tank sheets. Also, bolt lengths shall be sized as to achieve a neat and uniform appearance. Excessive threads extending beyond the nut after torquing will not be permitted.
- 3.4.7 All lap joint bolts shall include a minimum of four (4) splines on the underside of the bolt head at the shank in order to resist rotation during torquing.
- 3.4.8 All exterior nuts, washers, and bolt threads will be covered with a sealer-filled protective plastic cover. Color to match tank shell.
- 3.5 Sealants
  - 3.5.1 The lap joint sealant shall be a one component, moisture cured, polyurethane compound. The sealant shall be suitable for contact with potable water and meet applicable FDA Title 21 regulations, as well as, ANSI/NSF Additives Standard 61.
  - 3.5.2 The sealant shall be used to seal lap joints, bolt connections and sheet edges. The sealant shall cure to a rubber like consistency, have excellent adhesion to the glass coating, have low shrinkage, and be suitable for interior and exterior exposure.
  - 3.5.3 Sealant curing rate at 73° F and 50% RH
    - 3.5.3.1 Tack-free time: 6 to 8 hours.
    - 3.5.3.2 Final cure time: 10 to 12 days.
  - 3.5.4 The sealant shall be ESPC System Sealer No. 98.
  - 3.5.5 Neoprene gaskets and tape type sealer shall not be used.
- 4.0 GLASS COATING SPECIFICATION
  - 4.1 Surface Preparation
    - 4.1.1 Following the decoiling and shearing process, sheets shall be steel grit-blasted on both sides to the equivalent of SSPC-10. Sand blasting and chemical pickling of steel sheets is not acceptable.
    - 4.1.2 The surface anchor pattern shall be not less than 1.0 mil.
    - 4.1.3 These sheets shall be evenly oiled on both sides to protect them from corrosion during fabrication.
  - 4.2 Cleaning
    - 4.2.1 Prior to initial preparation all four (4) exposed rectangular continuous sheet edges, including starter sheets, for each specific sheet radii shall be mechanically rounded in profile and adhere to The Porcelain Enameling Institute's Technical Manual PEI-101. All four (4) exposed sheet edges will then be coated with the same vitreous enamel as the glass coating of the sheets. Sheet edge encapsulation will have a minimum 5 mils thickness enamel coating. Rounded sheet edge encapsulation will have zero exposed uncoated steel. The process shall be equal to Edgecoat II by CST Storage. **Sealer or glass overspray as edge coating shall not be acceptable.**



Tuscarawas County Commissioners  
Contract 2 - Wilkshire Hills Water System Improvements

101-010-01120

- 4.2.2 After edgecoating and prior to application of the coating system, all sheets shall be thoroughly cleaned by a caustic wash and hot rinse process followed immediately by hot air drying.
- 4.2.3 Inspection of the sheets shall be made for traces of foreign matter or rust. Any such sheets shall be re-cleaned or grit-blasted to an acceptable level of quality.
- 4.3 Coating
- 4.3.1 All sheets shall receive one coat of a catalytic nickel-oxide glass precoat to both sides and then air dried.
- 4.3.2 Another coat of milled cobalt blue glass shall be applied to both sides of the sheets and then dried.
- 4.3.3 A third coat of milled titanium dioxide white glass shall be applied to all wetted surfaces which must be an 18 to 22 percent titanium dioxide reinforced mixture. The specified coating shall be Aquastore Vitrium. An acceptable alternate three coat two fire system must be submitted for approval prior to the bid.
- 4.3.4 The sheets shall then be fired at a minimum temperature of 1500° F in strict accordance with the manufacturer's ISO 9001 quality process control procedures, including firing time, furnace humidity, temperature control, etc.
- 4.3.5 The dry film interior coating thickness shall be 10.0 to 18.0 mils minimum. The finished inside color shall be white.
- 4.3.6 The dry film exterior coating thickness shall be 7.0 to 15.0 mils minimum. The finished exterior color shall be cobalt blue.
- 4.3.7 The same glass coating as applied to the sheet surfaces shall be applied to the exposed edges.
- 4.4 Factory Inspection
- 4.4.1 The manufacturer's quality system shall be ISO 9001 certified.
- 4.4.2 Chemical Resistance of Glass Coating
- 4.4.2.1 Every batch of component frits shall be individually tested in accordance with PEI Test T-21 (Citric Acid at Room Temperature).
- 4.4.3 Factory Holiday Test
- 4.4.3.1 A dry volt test using a minimum of 1100 volts is required.
- 4.4.3.3 Frequency of the test shall be every sheet. Any sheet registering a discontinuity shall be rejected
- 4.4.3.4 All inside sheet surfaces shall be holiday free.
- 4.4.4 Measurement of Glass Thickness
- 4.4.4.1 Glass thickness shall be measured using an electronic dry film thickness gage (magnetic induction type) approved by CST Storage. The thickness gage shall have a valid calibration record.
- 4.4.4.2 Frequency of the test shall be every tenth sheet. The thickness of the glass shall be between 10.0 and 18.0 mils.
- 4.4.5 Measurement of Color
- 4.4.5.1 The exterior color of the sheets shall be measured using a colorimeter approved by CST Storage. The colorimeter shall have a valid calibration record.
- 4.4.5.2 Frequency of the test shall be every tenth sheet. The color must fall within the tolerance specified by CST Storage, else the panel shall be rejected.
- 4.4.6 Impact Adherence Test
- 4.4.6.1 The adherence of the glass coating to the steel shall be tested in accordance with ASTM B916-01. Any sheet that has poor adherence shall be rejected.
- 4.4.6.2 Frequency of this test shall be one sheet per gage lot run minimum.
- 4.4.7 Fishscale Test
- 4.4.7.1 The glass coating shall be tested for fishscale by placing the full size production sheets in an oven at 400° F for one hour. The sheets will then be examined for signs of fishscale. Any sheet exhibiting fishscale shall be rejected and all sheets from that gage lot will be similarly tested.
- 4.4.7.2 Frequency of this test shall be one sheet per gage lot run minimum.
- 4.5 Packaging

Tuscarawas County Commissioners  
Contract 2 - Wilkshire Hills Water System Improvements

101-010-01120

- 4.5.1 All approved sheets shall be protected from damage prior to packing for shipment.
- 4.5.2 Heavy paper or plastic foam sheets shall be placed between each panel to eliminate sheet-to-sheet abrasion during shipment.
- 4.5.3 Individual stacks of panels will be wrapped in heavy mil black plastic and steel banded to special wood pallets built to the roll-radius of the tank panels. This procedure eliminates contact or movement of finished panels during shipment.
- 4.5.4 Shipment from the factory to the job site will be by truck, hauling the tank components exclusively. No common carrier, drop, or transfer shipments.
- 5.0 ERECTION
- 5.1 Foundation
- 5.1.1 The tank foundation is a part of this contract.
- 5.1.2 The tank foundation shall be designed by the manufacturer to safely sustain the structure and its live loads.
- 5.1.3 Tank footing design shall be based on 2,000 min. psf soil bearing capacity or greater as determined by geotechnical analysis performed by a licensed soils engineer. The cost of this investigation and analysis is not to be included in the bid price. Copies of the soils report are to be provided to the bidder prior to bid date by the Owner or Engineer.
- 5.1.4 Footing designs for soil bearing strengths less than that specified, and those designs deviating from tank manufacturers standard shall be the responsibility of the Owner and his Engineer based on tank live and dead loading data provided by the tank manufacturer.
- 5.2 Tank Floor
- 5.2.1 Concrete Floor
- 5.2.1.1 The floor design is of reinforced concrete with an embedded glass coated steel starter sheet per AWWA D103 section 13.4.6 and the manufacturer's design, and is an integral element of the tank assembly; therefore the tank foundation and floor slab (performed in two separate pours) with embedded starter sheet shall be constructed by the tank supplier using manufacturer trained personnel regularly engaged in this type of tank construction.
- 5.2.1.2 Leveling of the starter ring shall be required and the maximum differential elevation within the ring shall not exceed one-eighth (1/8) inch, nor exceed one-sixteenth (1/16) inch within any ten (10) feet of length.
- 5.2.1.3 A leveling plate assembly (per Harvestore Products, Inc. - U.S. Patent No. 4,483,607), consisting of two 18" anchor rods (3/4" dia.) and a slotted plate (3 1/2" X 11" X 3/8" thk) shall be used to secure the starter ring, prior to encasement in concrete. Installation of the starter ring on concrete blocks or bricks, using shims for adjustment, is not permitted. The foundation with anchor bolts/leveling plates shall be a separate pour from the concrete floor.
- 5.2.1.4 Two water stop seals made of a butyl rubber elastomer special for this application shall be placed on the inside surface of the starter ring below the concrete floor line. These materials shall be installed as specified by the tank manufacturer.
- 5.3 Sidewall Structure
- 5.3.1 Field erection of the glass-coated, bolted-steel tank shall be in strict accordance with the procedures outlined in the manufacturer's erection manual, and performed by an authorized dealer of the tank manufacturer, regularly engaged in erection of these tanks.
- 5.3.2 Specialized erection jacks and building equipment developed and manufactured by the tank manufacturer shall be used to erect the tanks.
- 5.3.3 Particular care shall be taken in handling and bolting of the tank panels and members to avoid abrasion of the coating system. Prior to liquid test, all surface areas shall be visually inspected by the Engineer.
- 5.3.4 An electrical holiday test shall be performed during erection using a nine (9) volt leak detection device. All electrical leak points found on the inside surface shall be repaired in accordance with manufacturer's published touch up procedure using urethane sealer.
- 5.3.5 The placement of sealant on each panel may be inspected prior to placement of adjacent panels. However, the Engineer's inspection shall not relieve the bidder from his responsibility for liquid tightness.

Tuscarawas County Commissioners  
Contract 2 - Wilkshire Hills Water System Improvements

101-010-01120

- 5.3.6 No backfill shall be placed against the tank sidewall without prior written approval and design review of the tank manufacturer. Any backfill shall be placed according to the strict instructions of the tank manufacturer.
- 5.4 Roof
- 5.4.1 The tank roof shall include a radially sectioned roof fabricated from glass-coated, bolted steel panels, as produced by the tank manufacturer, and shall be assembled in a similar manner as the sidewall panels utilizing the same sealant and bolting techniques, so as to assure a water/air tight assembly. The roof shall be clear span and self-supporting. Both live and dead loads shall be carried by the tank walls. The exterior coating finish shall be cobalt blue glass. The manufacturer shall furnish a roof opening which shall be placed near the outside tank ladder and which shall be provided with a hinged cover and a hasp for locking. The opening shall have a clear dimension of at least twenty-four (24") inches in one direction and eighteen (18") inches in the other direction. The opening shall have a gasketed weather-tight cover.
- 5.5 Appurtenances (per AWWA D103, Section 7)
- 5.5.1 Pipe Connections
- 5.5.1.1 Where pipe connections are shown to pass through tank panels, they shall be field located, saw cut, (acetylene torch cutting or welding is not permitted), and utilize an interior and exterior flange assembly. ESPC Sealer No. 98 shall be applied on any cut panel edges or bolt connections.
- 5.5.1.2 Overflow piping shall be 8 inch diameter sch 10 aluminum.
- 5.5.2 Outside Tank Ladder
- 5.5.2.1 An outside tank ladder shall be furnished and installed as shown on the contract drawings.
- 5.5.2.2 Ladders shall be fabricated of aluminum and utilize grooved, skid-resistant rungs.
- 5.5.2.3 The exterior ladder will be equipped w/ an OSHA approved safety rail/cable.
- 5.5.3 Sidewall Access Manway
- 5.5.3.1 One sidewall access manway shall be provided as shown on the contract drawings in accordance with AWWA D-103.
- 5.5.3.2 Such manway shall be a minimum of 24 inches in diameter and shall include a properly designed reinforcing frame and cover plate. A davit to hold the cover plate, when opened, is required for tanks in excess of 38' tall.
- 5.5.4 Identification Plate A manufacturer's nameplate shall list the tank serial number, tank diameter and height, and maximum design capacity. The nameplate shall be affixed to the tank exterior sidewall at a location approximately five (5') feet from grade elevation in a position of unobstructed view.
- 5.5.5 Cathodic Protection
- 5.5.5.1 The Manufacturer will provide a cathodic protection system consisting of sacrificial magnesium anodes which provide corrosion protection for the portions of the structure immersed in liquid. The anodes are equally spaced (to the nearest vertical bolt line) around the structure, attached to the floor, and bolted through existing shell sheet bolt holes. In special cases where anodes may be spaced differently, a layout plan will be provided as part of the submittal package. Lead wires and buss bars are used to ensure continuity between anodes and structure shell sheets.
- 5.5.5.2 Electrical continuity between all tank sidewall panels shall be the responsibility of the tank manufacturer.
- 5.5.5.3 The design life shall be calculated at 10 years. The cathodic protection system shall be designed for protection of uncoated steel surfaces in the product zone, including rebar within an uncoated concrete tank floor.
- 6.0 FIELD TESTING
- 6.1 Hydrostatic
- 6.1.1 Following completion of erection and cleaning of the tank, the structure shall be tested for liquid tightness by filling tank to its overflow elevation.
- 6.1.2 Any leaks disclosed by this test shall be corrected by the erector in accordance with the manufacturer's recommendations.

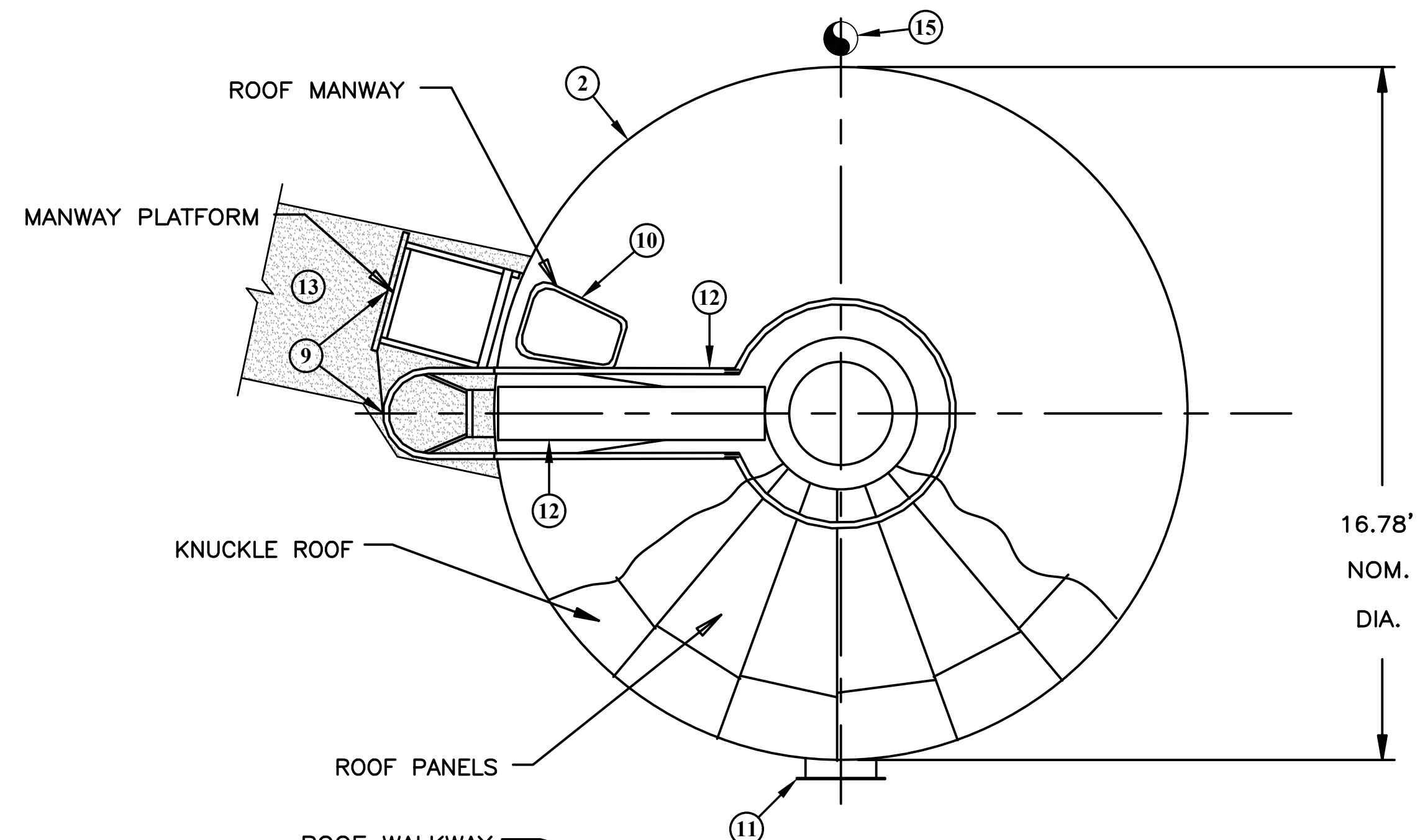
Tuscarawas County Commissioners  
Contract 2 - Wilkshire Hills Water System Improvements

101-010-01120

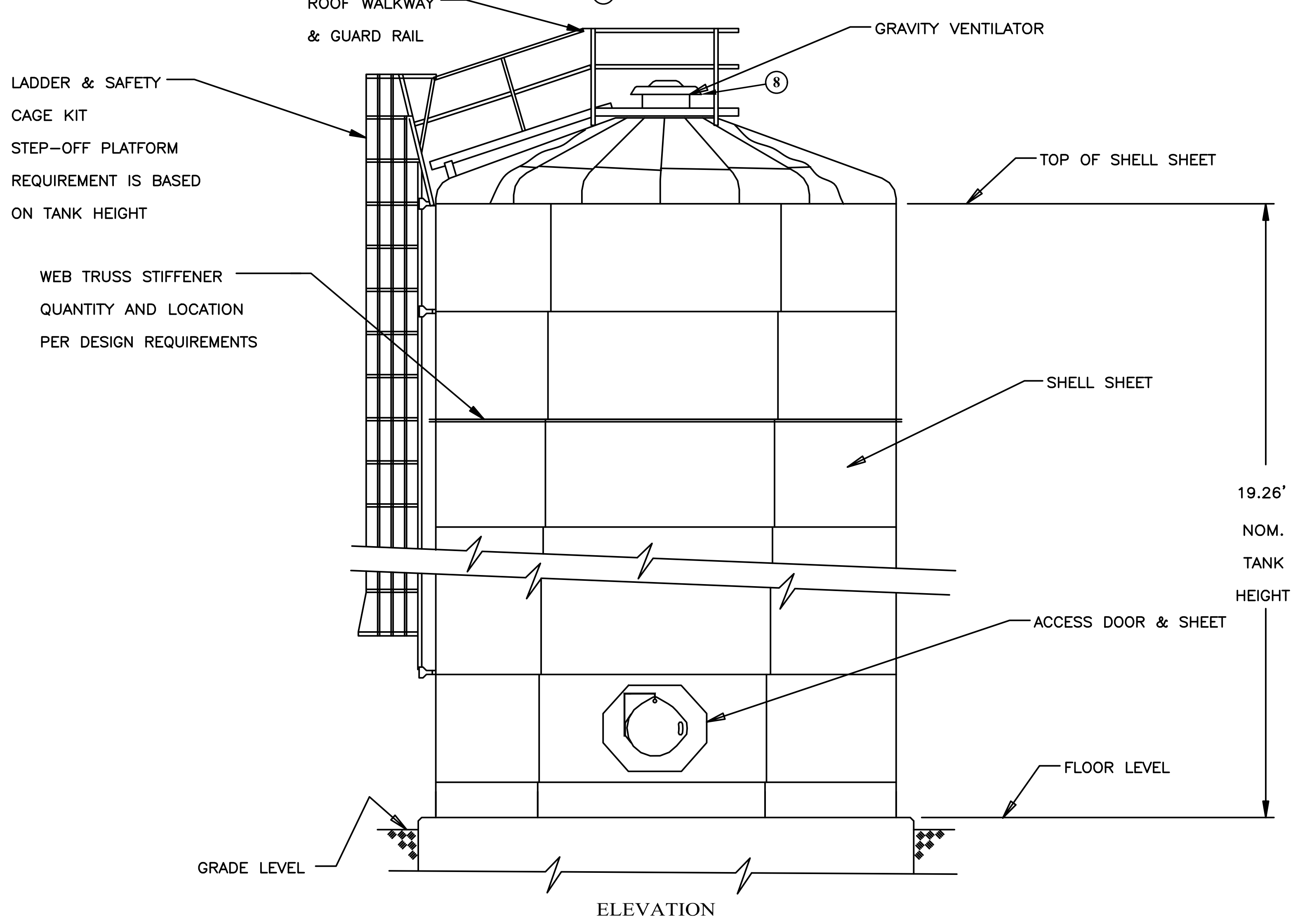
- 6.1.3 Water required for testing shall be furnished by the owner at the time of tank erection completion, and at no charge to the tank erector. Disposal of test water shall be the responsibility of the owner.
- 6.1.4 Labor and equipment necessary for tank testing is to be included in the price of the tank.
- 7.0 DISINFECTION
- 7.1 Standards
- 7.1.1 The tank structure shall be disinfected at the time of testing by chlorination in accordance with AWWA Specification C652 "Disinfection of Water Storage Facilities" as modified by the tank manufacturer.
- 7.1.2 Disinfection shall not take place until tank sealant is fully cured (10 to 12 days at 73° F/50% relative humidity).
- 7.1.3 Acceptable forms of chlorine for disinfection shall be:
  - 7.1.3.1 Liquid chlorine as specified in AWWA C652.
  - 7.1.3.2 Sodium hypochlorite as specified in AWWA C652.
  - 7.1.3.3 Calcium hypochlorite (HTH) is not acceptable.
- 7.1.4 Acceptable methods of chlorination per AWWA C652:
  - 7.1.4.1 Section 4.1.1.
  - 7.1.4.2 Section 4.1.2 - chemical feed pump only (4.1.2.1).
  - 7.1.4.3 Section 4.3.
  - 7.1.5 Section 4.2 is not acceptable.

END OF SECTION 331613

CAD FILE: R:\010\010-1120 - Wilshire Hills Water System Improvements Preliminary Report - Tuscarawas County Sanitary Engineer - Canton\Drawing\010-Backwash Tank.dwg  
 USER: scott.m.dobson  
 LAYOUT: Sheet 9  
 PLOT DATE/TIME: 3/5/2023 9:31 AM



16.78'  
 NOM.  
 DIA.



19.26'  
 NOM.  
 TANK  
 HEIGHT

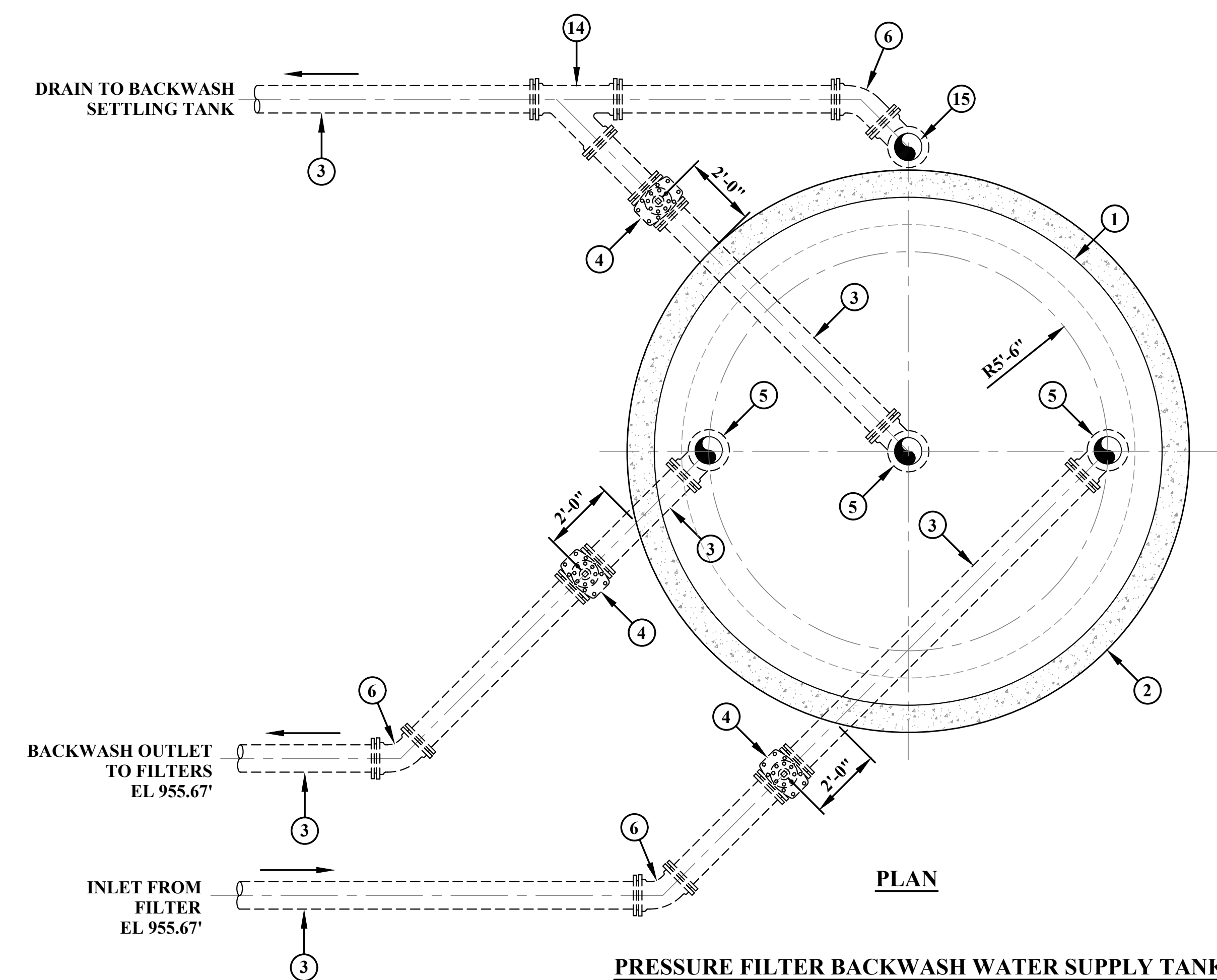
**WATER TANK WITH CONCRETE FLOOR 17' DIA**  
 NOT TO SCALE

**GENERAL NOTES:**

A. CONTRACTOR SHALL PROVIDE COATING SYSTEM AS REQUIRED BY SPECIFICATIONS.

**KEY NOTES:**

- ① 17' DIAMETER, 19.26' TALL BOLTED STEEL TANK. (SEE SPECIFICATION)
- ② CONCRETE FOUNDATION. (SEE DETAIL SHEET 9A)
- ③ 8" DIP.
- ④ 8" D.I. GATE VALVE, MJ W/ VALVE BOX AND LID.
- ⑤ 8" D.I. 90° FITTING, MJ.
- ⑥ 8" D.I. 45° FITTING, MJ.
- ⑦ GLASS FUSE TO STEEL KNUCKLE ROOF.
- ⑧ ROOF VENT.
- ⑨ LADDER AND SAFETY CAGE.
- ⑩ 24" X 24" ROOF HATCH.
- ⑪ MANWAY.
- ⑫ HANDRAIL.
- ⑬ CONCRETE SIDEWALK.
- ⑭ 8" D.I. WYE FITTING, MJ.
- ⑮ TANK OVERFLOW.



**PRESSURE FILTER BACKWASH WATER SUPPLY TANK**  
 NOT TO SCALE

NO.	BY	DATE	QA/QC REVIEW	DESCRIPTION
3	SMD	1MAR2023		REVISED TANK DESIGN & SPECS
2	SMD	11JAN2023		TUSC. COUNTY REVIEW
1	SMD	8DEC2022		QA/QC REVIEW

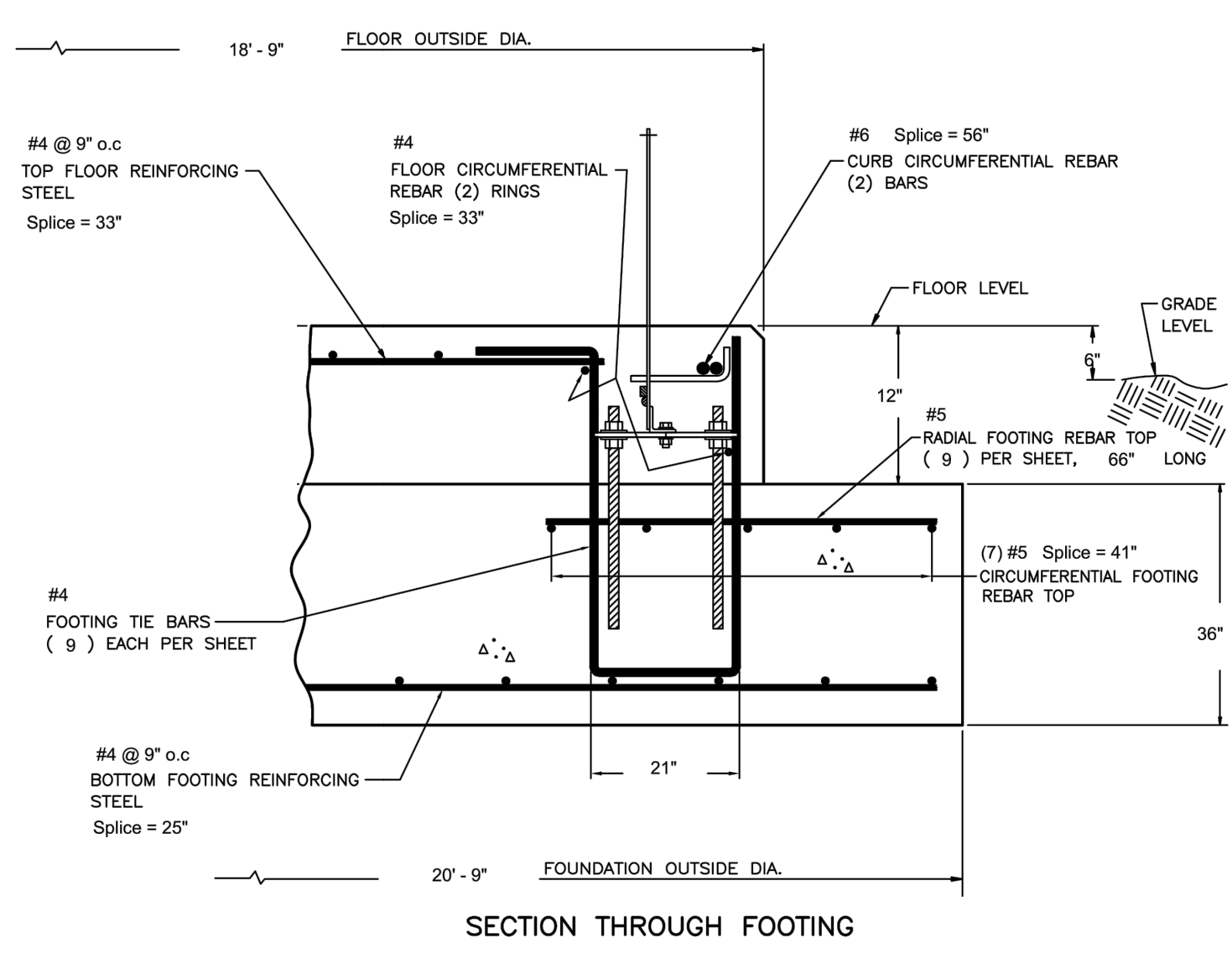
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DRAWN: RRS	DATE: APRIL 2020
CHECKED: RSS	DATE: APRIL 2020
APPROVED: JCC	DATE: MAY 2020
SURVEY DATE:	
SURVEY BY:	
FIELD BOOK No.:	

**THRASHER**  
 400 3rd STREET SE, SUITE 309  
 CANTON, OHIO 44702  
 www.thrashergroup.com  
 PHONE (330)-451-2042 FAX (330)-451-2043

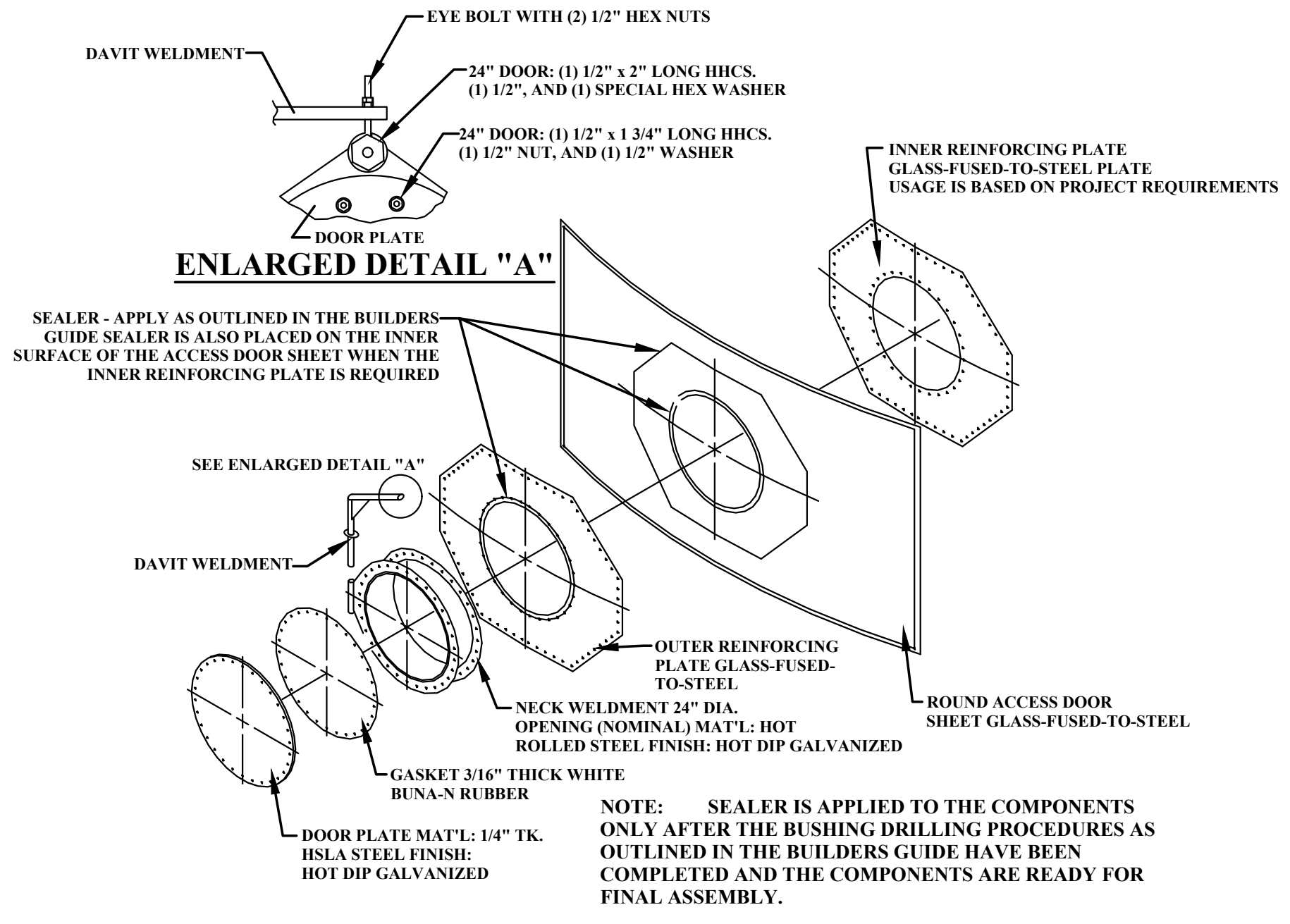
PHASE No.	
CONTRACT No.	
PROJECT No.	<b>010-01120</b>

TUSCARAWAS COUNTY  
 METROPOLITAN SEWER DISTRICT  
 WILSHIRE HILLS WATER SYSTEM IMPROVEMENTS  
 PROPOSED PRESSURE FILTER BACKWASH TANK  
 PLAN AND ELEVATION

CAD FILE: R:\010\010-1120 - Wilshire Hills Water System Improvements Preliminary Report - Tuscarawas County Sanitary Engineer - Canton\Drawing\010-1120-Backwash Tank.dwg  
 USER: scott m. dotson  
 LAYOUT: Sheet 9A  
 PLOT DATE/TIME: 3/5/2023 9:31 AM



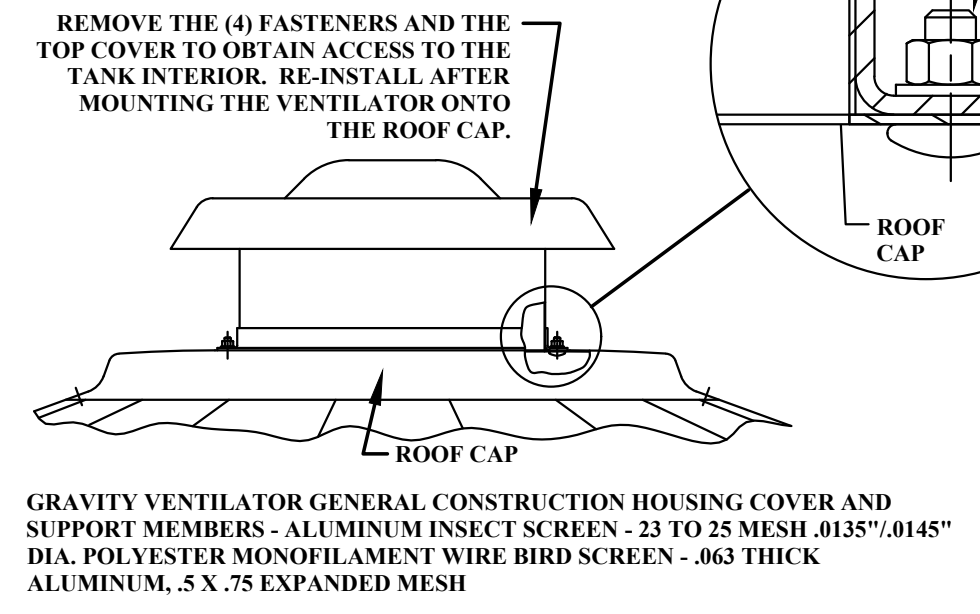
**TANK FOUNDATION DETAIL**  
 NOT TO SCALE



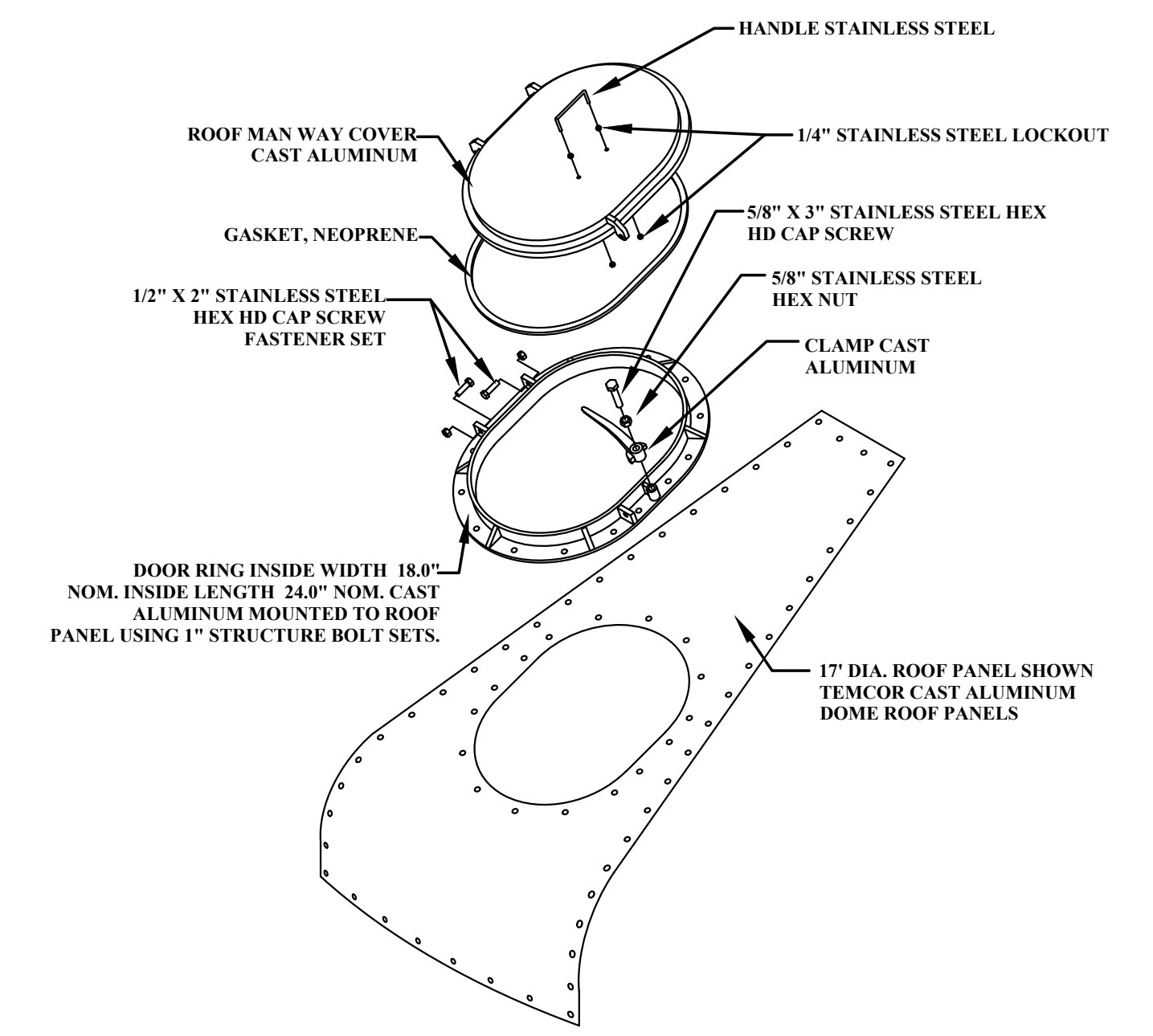
**ACCESS DOOR DETAIL**  
 NOT TO SCALE

**VENT CAPACITY CHART**

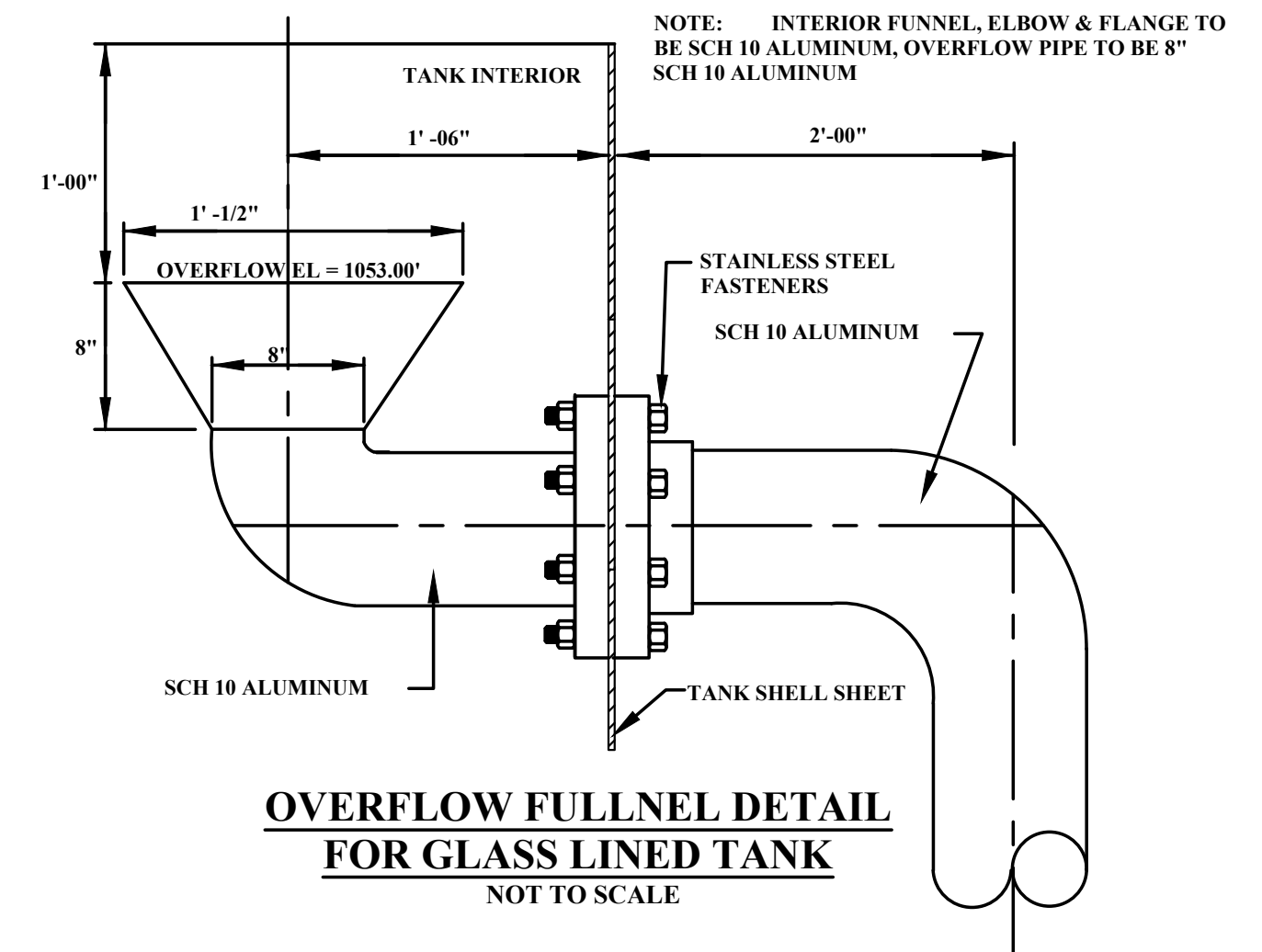
VENT THROAT DIAMETER	3.14 SQUARE FEET						
VELOCITY FPM	400	500	600	700	800	900	1000
EXHAUST PRESSURE DROP	.025	.035	.050	.070	.090	.120	.155
SUPPLY PRESSURE DROP	.060	.090	.130	.180	.240	.300	.380
CFM	1258	1511	1885	2200	2515	2830	3140



**VENT DETAIL**  
 NOT TO SCALE



**ROOF MAN WAY DETAIL**  
 NOT TO SCALE



**OVERFLOW FULLNEL DETAIL FOR GLASS LINED TANK**  
 NOT TO SCALE

NO.	BY	DATE	DESCRIPTION
2	SMD	1MAR2023	REVISED TANK DESIGN & SPECS
1	SMD	8DEC2022	QA/QC REVIEW

SCALE: NOT TO SCALE  
 DRAWN: RRS DATE: APRIL 2020  
 CHECKED: RSS DATE: APRIL 2020  
 APPROVED: JCC DATE: MAY 2020  
 SURVEY DATE:  
 SURVEY BY:  
 FIELD BOOK No.:

**THRASHER**  
 400 3rd STREET SE, SUITE 309  
 CANTON, OHIO 44702  
 www.thrashergroup.com  
 PHONE (330)-451-2042  
 FAX (330)-451-2043

PHASE No.  
 CONTRACT No.  
 PROJECT No.  
**010-01120**

TUSCARAWAS COUNTY  
 METROPOLITAN SEWER DISTRICT  
 WILKSHIRE HILLS WATER SYSTEM IMPROVEMENTS  
 PROPOSED PRESSURE FILTER BACKWASH TANK  
 DETAILS

SHEET No.  
**9A**