

No further changes.

Please acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may constitute grounds for the rejection of your Bid.

A handwritten signature in blue ink, appearing to read "David S. Wolf", is written over a faint, light blue rectangular box.

HIGHFILL INFRASTRUCTURE ENGINEERING, P.C.

David S. Wolf, PE

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Temporary Utilities.
 - 2. Temporary Controls.
 - 3. Removal of Utilities, Facilities, and Controls.

1.2 TEMPORARY UTILITIES

- A. Provide the following as required for completion of the Work and protection of stored and installed products:
 - 1. Electricity.
 - 2. Lighting.
 - 3. Heating.
 - 4. Cooling.
 - 5. Ventilation.
 - 6. Communication Services.
 - 7. Water.
- B. TEMPORARY SANITARY FACILITIES
 - 1. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.3 FIELD OFFICES – Not Used

1.4 VEHICULAR ACCESS

- A. Provide unimpeded access for emergency vehicles.
- B. Provide and maintain access to fire hydrants and control valves free of obstructions.

1.5 PARKING

- A. Park in designated spots as approved by Engineer or Owner.
- B. Use caution when allowing heavy vehicles or construction equipment in parking areas.
- C. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.

2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies to maintain paving and drainage in original condition.

1.6 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.
- C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from Site weekly and dispose of off-Site. Comply with Construction Specification Section 01 74 00, Cleaning and Waste Management.

1.7 PROJECT IDENTIFICATION – Not Used

1.8 TRAFFIC REGULATION – Not Used

1.9 FIRE-PREVENTION FACILITIES – Not Used

1.10 BARRIERS – Not Used

1.11 ENCLOSURES AND FENCING – Not Used

1.12 SECURITY

- A. Security Program:
 1. Protect Work on existing premises from theft, vandalism, and unauthorized entry.
- B. Entry Control:
 1. Restrict entrance of persons and vehicles to Project Site.
 2. Allow entrance only to authorized persons with proper identification.
 3. Maintain log of workers and visitors and make available to Owner on request.
- C. Personnel Identification:
 1. Each person shall have an official photo ID with them when working on the site.

1.13 WATER CONTROL – Not Used

1.14 DUST CONTROL – Not Used

1.15 NOISE CONTROL – Not Used

1.16 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

- B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.17 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials before substantial completion inspection.
- B. Clean and repair damage caused by installation or use of temporary Work.
- C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

TABLE 09 90 00 - A (PAINTING SCHEDULE)

| SURFACE | NO. COATS & SYSTEM | PRODUCT REFERENCE (TABLE 09900-B) | TOTAL DRY MILS (per coat) |
|---|----------------------------|-----------------------------------|---------------------------|
| A. CONCRETE BLOCK – INTERIOR WALLS | 1 – Coat Sealer (for new) | A | 75-85 sf/gal |
| | 2 – Acrylic Epoxy | O | 4-6 |
| B. METAL – NON-SUBMERGED INTERIOR AND EXTERIOR (EXCEPT STEEL TANKS) | 1 – Epoxy Polyamide Primer | D | 4-6 |
| | 1 – Epoxy Polyamide | B | 4-6 |
| | 1 – Aliphatic Polyurethane | N | 3-5 |
| C. METAL – SUBMERGED AND VAPOR ZONE FOR NON-POTABLE WATER CONTACT | 3 – Epoxy Polyamide | B | 6-8 |
| D. CONCRETE FLOOR AND EQUIPMENT PADS | 1 – Epoxy | W | 5 |
| | 2 – Novolac Epoxy | X | 20 |

TABLE 09 90 00-B (PRODUCT CROSS REFERENCE)

| REF | SYSTEM | PURPOSE | Tnemec Series | CARBOLINE | Sherwin-Williams |
|------------|-------------------------|---------------------------------|----------------------|---------------------------|-----------------------------|
| A | Epoxy filler | Primer-sealer | 130-6601 | Sanitile 100 Block Filler | Cement-Plex 875 |
| B | Epoxy polyamide | Finish coat semi-gloss or gloss | 66 | Carboguard 893SG | Macropoxy 646 |
| D | Epoxy Polyamide – metal | Primer | 66 | Carboguard 890 | Macropoxy 646 |
| N | Aliphatic Polyurethane | Finish coat | 1095 Endura-Shield | Carbothane 134HS | Acrolon 218HS |
| O | Acrylic epoxy | Finish coat | 113 or 114 | Sanitile 255 | Water-Based Catalyzed Epoxy |
| W | Epoxy | Primer | 205 Terra-Tread | Carboxane | Corobond 100 Epoxy |
| X | Novolac Epoxy | Intermediate and Finish Coat | 282 ChemTread | | Dura-Plate 8200 |

END OF SECTION

SECTION 46 05 40
CARBON STEEL CHEMICAL STORAGE TANKS

PART 1 – GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish, install, adjust, and place in satisfactory operation carbon steel storage tanks, complete with all necessary accessories, at the locations shown on the Drawings, and as specified herein.

1.2 CONDITIONS OF SERVICE/STORAGE TANK SCHEDULE

- A. Sodium Hydroxide Bulk Tanks

| Sodium Hydroxide Bulk Tanks | |
|--|-----------------------|
| Number of Tanks | Two (2) |
| Solution Concentration | 50% |
| Specific Gravity | 1.52-1.54 |
| Viscosity | Not Available |
| Freezing Point | 54° F @50% |
| Design Temperature | 60-200° F |
| pH | 14 |
| Tank Design | Vertical, Cylindrical |
| Bottom Configuration | Flat |
| Top Configuration | Dome |
| Useable Capacity (to invert of overflow) | 16,000 GAL |
| Maximum Diameter | 12 feet |
| Maximum Straight Shell Height | Refer to Drawings |
| Connection Openings* | Refer to Drawings |
| Fill | Refer to Drawings |
| Outlet | Refer to Drawings |
| Water Fill | Refer to Drawings |
| Overflow | Refer to Drawings |
| Vent | Refer to Drawings |
| Top Manway Diameter | Refer to Drawings |
| Pressure Transducer Outlet | Refer to Drawings |
| Heating Panels and Insulation | NA |
| Materials of Construction Metal Fasteners Exposed to Chemical Feed Process | 316 Stainless Steel |
| Materials of Construction of Metal Fasteners in Containment Area | 316 Stainless Steel |
| Materials of Construction of Metal Fasteners above Containment Area | 316 Stainless Steel |

| | |
|---|-------------------|
| Materials of Construction of Elastomers | EPDM |
| Containment Wall Height | Refer to Drawings |

*Refer to Drawings for Size, Location, Orientation, and Elevation of Connections

1.3 REFERENCE SPECIFICATIONS, CODE, AND STANDARDS

- A. Occupational Safety and Health Act of 1970
- B. API 650, Appendix J
- C. Manufacturing Chemists' Association, Inc., and the Chlorine Institute for Storing and Handling of Sodium Hydroxide recommended practices.
- D. All other applicable Federal, State, and local regulations.

1.4 SUBMITTALS

- A. The following items shall be submitted with the Shop Drawings in accordance with, or in addition to, the submittal requirements specified in Section 01 33 00, Submittal Procedures:
 - a. List of at least five similar installations of the tank type, size, chemical service, and locations conditions being proposed, including date installed, contact name, address and phone number.
 - b. Warranty
 - c. Dimensions of tank and dimensions, location, and orientation of openings, fittings, accessories, attachments, restraints, and supports, anchor bolts, manways, and flexible connections.
 - d. Weight of tanks
 - e. Detailed instructions for pipe connections and bolt torque values.
 - f. Design calculations signed by registered Professional Engineer for tanks and tank restraint systems to withstand seismic, wind, and buoyancy conditions as required, including details for anchorage, lateral restraint, foundation requirements, and anchor bolt sizes, depth of embedment, shear, and pullout strength.
 - g. Drawing details for ladder as recommended by Manufacturer and conforming with OSHA standards for fall protection.
 - h. Statement that materials and fittings used are suitable for intended service.
 - i. Statement that fabrication is in accordance with these Specifications.
 - j. Instructions for handling, storage, loading, and unloading, and installation of tanks.
 - k. Inspection and testing reports as specified in Part 3- Execution.
 - l. Spare parts and special tools list.

- m. Operations and maintenance manuals.

1.5 WARRANTY AND GUARANTEE

- A. Warranty and Guarantee shall be for five (5) years.

PART 2– PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. The carbon steel storage tanks shall be a manufactured by General Industries, Modern Welding Company, Palmer, or approved equal.
- B. The carbon steel tank manufacturer shall specialize in manufacture, assembly, and field service of steel chemical storage tanks with a minimum of ten years of experience.

2.2 GENERAL

- A. The tank manufacturer is responsible for the coordination and selection of corrosion resistant materials for the chemical specified. The chemical storage tank manufacturer shall become familiar with the characteristics of the specified chemical and guarantee the suitability of the materials used in manufacturing of the equipment. The Contractor and manufacturer shall include all features as necessary for satisfactory operation of the tank system for all specified chemical solution concentrations and temperatures. Tanks will be used to store 50% sodium hydroxide solution but shall be designed to store 50% sodium hydroxide solution diluted to 25% concentration and withstand specified temperature rise.
- B. Tank capacities (volumes) specified shall include only that volume in the straight shell below the overflow pipe invert elevation and above the pump suction connection. At least 6 inches of freeboard shall be provided between the invert elevation of the overflow pipe and the top of the straight shell.
- C. The tank manufacturer shall be fully responsible for the structural design and integrity and watertightness of all tanks including all anchorage and connections.

2.3 MATERIALS AND CONSTRUCTION

A. General

- 1. All materials shall be new and both workmanship and material shall be of the very best quality, entirely suitable for the service to which they are to be subjected.

B. Fabrication

- 1. The tank shall be fabricated of carbon steel. The minimum plate thickness shall be 3/8-inch for tank shell and heads. Plate materials shall be flange quality steel conforming to ASTM A516 Grade 70. All joints shall be of double butt weld construction. Tank shall be fabricated in three-ring courses. Tank shall be stress-relieved.
 - b. The design of the tank shall be the responsibility of the tank manufacturer. The tank shall be fabricated in accordance with API-650 Appendix J and comply with all state and local regulations.
 - c. The tank orientation shall be as indicated on the Drawings with openings and connections as shown on the Drawings and as specified herein. The bulk tank top shall be able to support a 250-lb load on a 4-inch by 4-inch area.

- d. All welds shall be ground smooth, and all interior corner welds shall be ground to a minimum 1/4-inch radius. All corners and sharp edges shall be rounded and ground smooth.
- e. Pipe connections shall be flanged ASME B16.5 Class 150, Schedule 40 carbon steel pipe conforming to ASA Specification B36.10. Gaskets shall be as specified in Section 1.02. Fittings shall conform to ASTM A120, seamless Schedule 40.
- f. All tank pressure boundary welds shall be beveled and full penetration butt welded. Nozzle to tank welds shall be full penetration welded.
- g. All fabricated work shall be shop fitted together as much as practicable, and delivered to the field, complete and ready for erection. All miscellaneous items such as stiffeners, fillets, connections, brackets, and other details necessary for a complete installation shall be provided.
- h. All work shall be fabricated and installed in a manner that will provide for expansion and contraction, prevent shearing of bolts, screws, and other fastenings, ensure rigidity, and provide a close fit of sections.
- i. Finished members shall be free from distortions of any kind.
- j. All shearings shall be neat and accurate, with parts exposed to view neatly finished. Flame cutting is allowed only when performed utilizing a machine.
- k. All shop connections shall be welded.
- l. All measurements and dimensions shall be based on field conditions and shall be verified by the Contractor prior to fabrication to ensure the tanks can be installed per the manufacturer's recommendations. Tanks shall be permanently installed without interferences. Such verification shall include coordination with adjoining work.

C. Surface Preparation and Painting

- a. The tank interior and exterior shall be cleaned of all oil, grease, dirt, rust, loose and tight mill scale, by cleaning in accordance SSPC-SP-5, Blast Cleaning for the interior and SSPC_6 Commercial Blast Cleaning for the exterior.
- b. Interior and exterior tank painting system shall be as specified in Section 09 90 00, Painting.
- c. The exterior bottom of the tank shall be coated with 16mils coal tar epoxy.
- d. The Contractor shall repair damaged tank coatings on site to match manufacturer's coating system as specified in Section 09 90 00, Painting.

2.4 CONNECTIONS AND ACCESSORIES

- A. All connections/openings shall be flanged in accordance with ANSI B16.5 150 pounds and provided with flanged gasket. Flanged connections, nozzles, and openings shall be steel gusseted and flat face. Weld necks shall be provided as required. All pipe supports, hardware, accessories, etc., shall be provided. Anchor bolts and bolts shall conform to ASTM A 193, Grade B8M, and nuts shall conform to ASTM B 194, Grade 8M. Materials of fasteners shall be as specified in Section 1.02. Provide washer for each nut of the same material as the nut. Contractor shall coordinate concrete tank pad installation with the tank connections and accessories to ensure no interferences.

- B. Tank outlet connections shall be siphon drain connections. Each tank drain line shall be provided with an isolation valve as indicated on the Drawings.
- C. Vent lines shall be top-mounted. Each vent shall be extended to the atmosphere and shall have a 180 degree return and a fiberglass vent insect screen. Vent lines shall be supplied and furnished by the Contractor as required or as directed by the Engineer.
- D. Each storage tank fill line shall be provided with a camlock type quick connect coupling with downstream ball valve as shown on the Drawings for connection to the delivery vehicle. The dry quick connections shall be resistant to corrosion by the specified chemicals and shall be provided with fittings, quick lock coupling and dust cap and chain. Quick connect couplings shall be as specified in Section 15000. The Contractor shall furnish and install a sign at each chemical fill station to identify the chemical filled. The signage shall be as specified in Section 10400. Tank fill shall be provided with internal drop pipe.
- E. Each tank shall be provided with an overflow pipe as specified and indicated on the Drawings.
- F. Each tank shall be provided with a hinged manway equipped with a tack weld chain and hardware that is chemically resistant as shown in Section 1.02.
- G. Each storage tank shall be equipped with an exterior access ladder for access to the manway. The ladder shall be constructed of aluminum. Ladder shall meet OSHA requirements, including allowable distance from the concrete floor or grating to the first rung. Ladder shall provide 18 inches between side rails and 12 inches between rungs. Angle clips shall be furnished for mounting the bottom of the ladder to the concrete pad or grating. Ladders shall be furnished with gooseneck handrails at the top. The tank top shall be equipped with ladder clips to bolt ladder handrails thereto. Each ladder shall be equipped with a cable-type fall arrest system.
- H. Each tank shall be provided with a minimum of four lifting lugs. Lifting lugs shall be capable of withstanding weight of an empty tank with a safety factor of 3 to 1.
- I. Each tank shall be provided with a minimum of six tie-down lugs and all necessary anchor bolts. The tank shall withstand seismic load calculated in accordance with the applicable building code. Tie-down lugs shall be capable of withstanding buoyancy of empty tank in a containment area flooded to the containment height. Refer to Drawings for containment wall height. The anchor bolts, nuts, washers, shims and related hardware shall be sized by the tank manufacturer and provided by the Contractor. The tank manufacturer shall size the anchor bolt anchoring depth and edge distance for the tank pad. The tank manufacturer shall submit calculations, sealed by a Professional Engineer, to verify that tie-down lugs can withstand buoyance and seismic activity.
- J. The tank shall be provided with a permanently attached label providing the following information:
 - 1. Type of material stored
 - 2. Concentration of material stored
 - 3. Specific gravity
 - 4. Maximum temperature
 - 5. Tank materials of construction

- 6. Tank capacity
 - 7. Manufacturer
 - 8. Date of manufacture
- K. All metallic parts, fasteners, brackets, mounting hardware, and accessories provided by the tank manufacturer shall be constructed of corrosion resistant metals.

2.5 PIPING SUPPORT

- A. All horizontal sections of piping inside the containment area shall be supported by thermoplastic pads at maximum 5-foot intervals as shown in the Drawings to prevent the piping from resting directly on concrete.
- B. For vertical piping exterior and interior to the tank, all pipe supports, hardware, accessories, etc., shall be provided for connections as shown in the Tank Schedule. Vertical piping into the tanks shall be supported every five feet and shall be parallel to the tank wall. External vertical piping shall be not less than 6 inches from the tank wall. Support locations for piping installed within the tank shall be coordinated with equipment to be installed within the tank and shall be as shown in the Drawings. All piping into the tanks shall be supported such that no weight is placed on the tank or its connections.

PART 3- EXECUTION

3.1 MANUFACTURER'S FIELD SERVICES

- A. The services of a qualified manufacturer's technical representative shall be provided in accordance with Section 01 40 00, Quality Requirements and shall include the following site visits for each series of tanks:

| Service | Number of Trips | Number of Days/Trips |
|---------------------------------------|-------------------------|----------------------|
| Installation, Inspection, and Testing | 1 per tank installation | 1 |
| Final Inspection/Startup and Training | 1 | 1 |

3.2 INSTALLATION

- A. The Contractor shall furnish and install the steel storage tank and related items in accordance with the manufacturers' recommendations and in accordance with Section 01 60 00, Product Requirements.
- B. A manufacturer's field representative shall be on site when each tank is installed to observe installation and verify that each tank has been installed per manufacturer's recommendations. That manufacturer shall provide a report certifying that each tank has been installed properly.
- C. All piping, valves, fittings, conduit, wiring, etc., required to interconnect system components shall be furnished and installed by the Contractor.
- D. All metallic fasteners, brackets, mounting hardware, and accessories located in chemical storage and feed areas shall be constructed of corrosion-resistant metals as specified in Section 1.02.

- E. The Contractor shall install a 3/8" Neoprene mat between each concrete pad and storage tank. The tanks shall be installed on level pads.

3.3 FIELD TESTING

- A. Field testing shall be performed in accordance with Section 01 75 00, Starting and Adjusting.
- B. Upon completion of installation of the tanks and prior to connecting piping, Contractor shall provide blind flanges or other suitable plugs for all openings in the tanks and conduct a leakage test using water. The tank shall be filled with potable water provided by the Contractor from a source approved by the Engineer up to top of flanged manway on top of tank and left to sit over a 2-day test period. There shall be no leakage over the test period. Upon satisfactory completion of leakage test, Contractor shall drain the tank and dispose of water in a suitable manner.

3.4 CHEMICAL FILL

- A. Coordinate the first shipment of chemicals with the City. The City will order the chemicals.

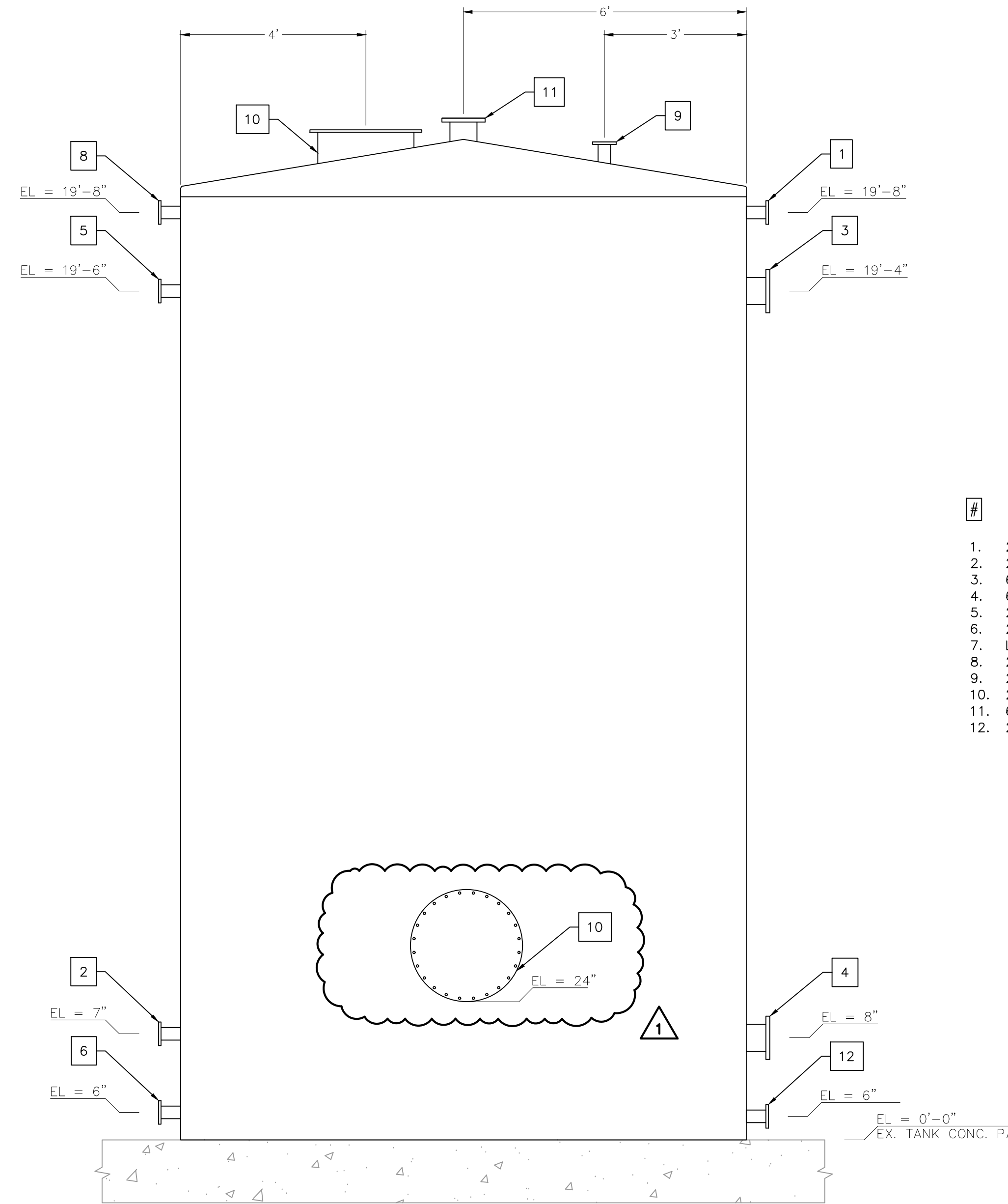
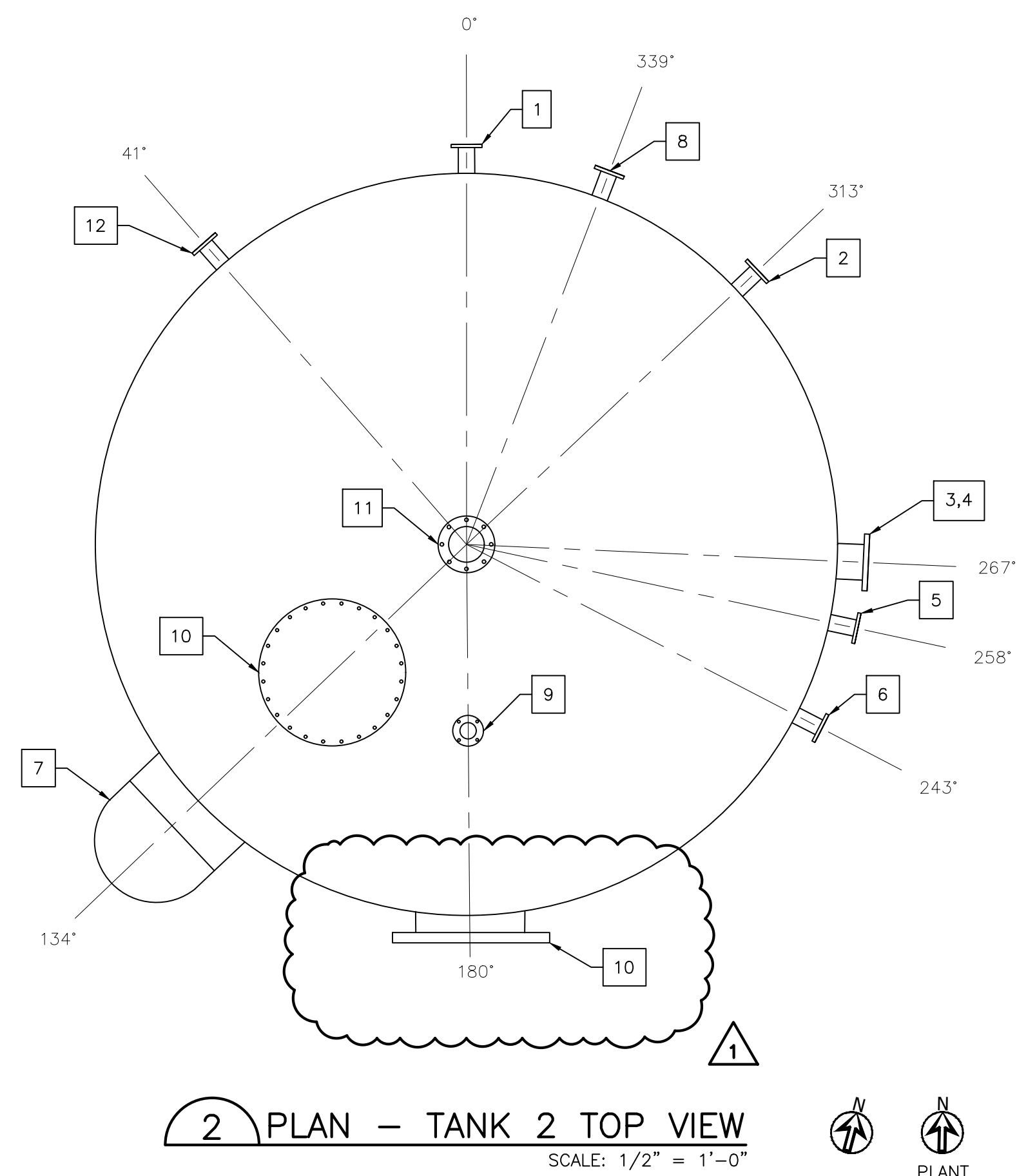
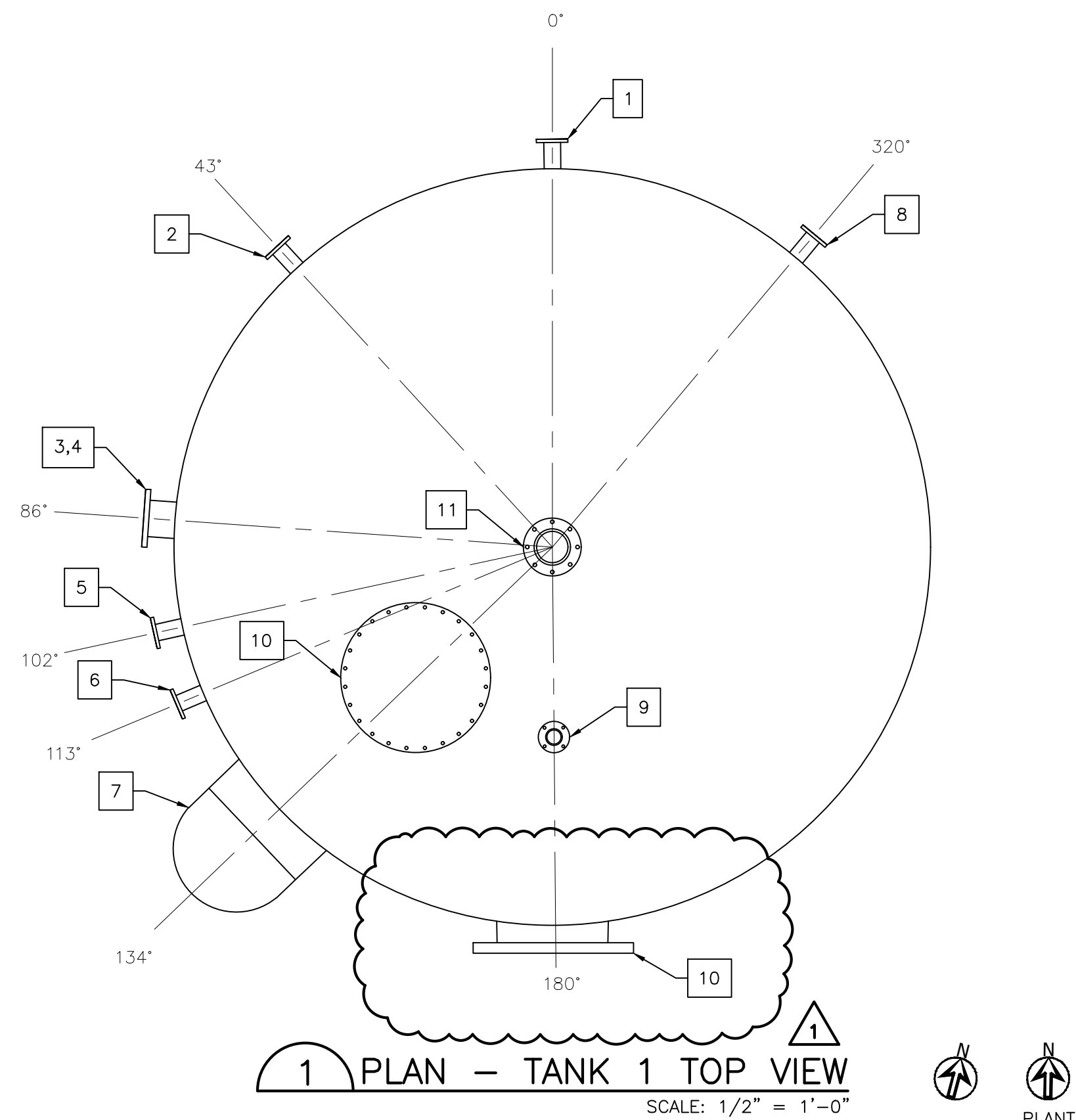
3.5 MANUFACTURER'S SERVICE

- A. The Contractor shall arrange for the equipment manufacturer to furnish the service of qualified service persons with at least three years of experience who are regularly involved in the inspection, handling installation, start-up, troubleshooting, testing, maintenance, and operation of chemical storage tanks. The service persons shall:
 - 1. Witness and check installation of the chemical storage tanks.
 - 2. Assist the Contractor in conducting field tests tank passivation and preparing a written report.
 - 3. Correct any problems with the storage tanks and accessories noted during the installation, tests, and start-up.
 - 4. Submit dated written report certifying that the storage tanks have been properly installed, tested, and adjusted.
 - 5. Investigate and supervise correction of any operating problems which may arise up to the end of the guarantee period of the equipment.
 - 6. Instruct Owner personnel in the operation and maintenance of the equipment.
- B. Such service shall be furnished at no additional cost to the Owner and shall entail a minimum of two site visits of one-day duration (per treatment plant) excluding any travel time to and from each facility.

3.6 FIELD PAINTING

- A. In accordance with the requirements in Section 09 90 00, Painting and Coating.

END OF SECTION

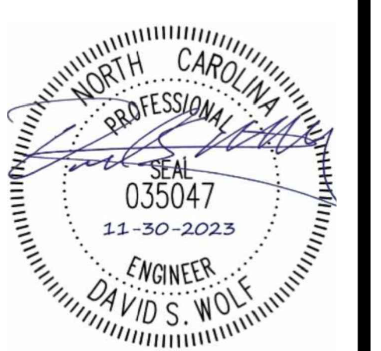


- NOTES:
- CONFIRM SIZE, MATERIAL AND VERTICAL AND HORIZONTAL LOCATION OF ALL TIE-IN POINTS PRIOR TO ORDERING MATERIALS.
 - ANGLES SHOWN ARE AROUND THE CIRCUMFERENCE OF THE TANK WITH THE FILL LINE AS ZERO REFERENCE IN A COUNTERCLOCKWISE DIRECTION.
 - ANGLES SHOWN ARE FOR A 12 FT DIA. TANK. ANGLES MAY VARY BY TANK DIA.
 - COORDINATE TANK FITTING LOCATION WITH PIPE FIT UP PLAN.
 - IN 3/C-1.1 THE TANK NOZZLES ARE ROTATED OUT OF POSITION AND SHIFTED VERTICALLY FOR CLARITY. SEE 1/C-1.1 AND 2/C-1.1 FOR ORIENTATION OF NOZZLES ON EACH TANK.

KEYNOTES FOR TANK:

- 2" 150# RFSO FLANGE (FILL)
- 2" 150# RFSO FLANGE (TRANSFER PUMP SUCTION)
- 6" 150# RFSO FLANGE (OVERFLOW)
- 6" 150# RFSO FLANGE (DRAIN)
- 2" 150# RFSO FLANGE (RECIRCULATION PUMP DISCHARGE)
- 2" 150# RFSO FLANGE (RECIRCULATION PUMP SUCTION)
- LADDER WITH FALL PROTECTION AND CAGE (SEE MD-1.0)
- 2" 150# RFSO FLANGE (DILUTION WATER)
- 2" 150# RFSO FLANGE (LEVEL INDICATOR)
- 24" BOLTED MANWAY
- 6" 150# RFSO FLANGE (VENT)
- 2" 150# RFSO FLANGE (BLIND FLANGE)

| YO | B/F | DRM | DRM | B/F | BY |
|------------|-------------|--------------------------------|-------------------------------|-------------------------------|----------|
| 2/21/2024 | 100% DESIGN | 100% DRAWINGS FOR OWNER REVIEW | 80% DRAWINGS FOR OWNER REVIEW | 30% DRAWINGS FOR OWNER REVIEW | REVISION |
| 11/30/2023 | | | | | |
| 10/27/2023 | | | | | |
| 10/6/2023 | | | | | |
| 9/6/2023 | | | | | |
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C-1.1