TETRA TECH
ARCHITECTS & ENGINEERS

Cornell Business + Technology Park
10 Brown Road
Ithaca, New York 14850
Tel. (607) 277-7100
Fax (607) 277-1410

Addendum

Mahopac Central School District
Mahopac, New York

SED NO. 48-01-01-06-0-004-020
48-01-01-06-0-006-013
48-01-01-06-0-003-008
48-01-01-06-5-010-009
48-01-01-06-7-026-001

Reconstruction at
Mahopac High School
Mahopac Middle School
Mahopac Falls Schools
Bus Garage
New Pump House

Tt Project No. 121111-19002

BID Addendum No. 2
to
Drawings and Project Manual

February 16, 2021

To: BIDDERS

This ADDENDUM forms a part of the BIDDING AND CONTRACT DOCUMENTS and modifies the following documents:
Original DRAWINGS dated August 21, 2020.
PROJECT MANUAL dated August 21, 2020 and BID ADDENDUM NO. 1, dated February 12, 2021

Acknowledge receipt of the ADDENDUM in the space provided on the FORM OF PROPOSAL

This ADDENDUM consists of (4) pages and the following:

ATTACHMENTS

PRE-BID REQUEST FOR INFORMATION QUESTIONS/ANSWERS

NEW PROJECT MANUAL SECTIONS

SECTION 03 48 10 - PRECAST CONCRETE LIGHTING POLE BASES

REISSUED PROJECT MANUAL SECTIONS

SECTION 22 12 19 - FACILITY GROUND MOUNTED, POTABLE WATER STORAGE TANKS

REISSUED DRAWINGS (30 x 42)

AE700 Single Line Diagram

PROJECT MANUAL MODIFICATIONS

ITEM 2-C-1: Refer to SECTION 00 01 10 – TABLE OF CONTENTS – VOLUME 1

1. Division 3, ADD the following:

   "03 48 10 Precast Concrete Lighting Pole Bases"

ITEM 2-C-2: Refer to SECTION 00 11 13 – NOTICE TO BIDDERS

1. Fourth Paragraph, AMEND to read as follows:

   "Sealed Bids will be received by the Owner until Thursday, March 4, 2021 at 3:00 PM, local time . . ."

ITEM 2-C-3: Refer to SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

1. Article 1, Item 3, a., AMEND to read as follows:

   "a. Bid Opening Date and Time: Thursday, March 4, 2021 at 3:00 PM, local time."

ITEM 2-C-4: Refer to SECTION 01 12 00 – SUMMARY OF PROJECT

1. Paragraph 1.5, A., ADD the following:

   "9. STATE CONTRACT – SYNTHETIC TURF (for coordination purposes).
   10. STATE CONTRACT – SECURITY (for coordination purposes)."

2. Paragraph 1.12, A., 5., c., and d., AMEND to read as follows:

   "c. Music and Band Storage cabinets, ADA sink cabinets, Lab casework, , epoxy countertops and ***integral sinks with outlet tailpiece and stopper***, solid surface countertops, drawer and cabinet door hardware, all fixtures and mounted lab equipment above countertop, ***fume hoods and related enclosures***, and ***safety service centers as specified*** on the design documents. Fume hoods to include all water, lab gas, electrical service fittings and to have piping and wiring within fume hoods for service fittings, light fixtures, fan switches and all other devices with the fume hood.

   d. Coordinate for installation of water fixtures, gas fixtures, emergency shutoffs, etc.. Provide laboratory controls as specified. Coordinate with Mechanical, Plumbing, and Electrical Contractors as required."

PROJECT MANUAL MODIFICATIONS – ARCHITECTURAL

ITEM 2-C-5: Refer to SECTION 08 71 00 – DOOR HARDWARE

1. Paragraph 1.2, C., 1., DELETE in its entirety.

2. Paragraph 2.5, D., AMEND to read as follows:

   "D. Permanent Cores: Salvaged cores from demolished doors as well as owner provided cores shall be installed by the contractor. Installation to be included under Division 08 "Door Hardware" base bid package."

PROJECT MANUAL MODIFICATIONS - PLUMBING

ITEM 2-C-6: Refer to SECTION 22 11 23.13 - DOMESTIC WATER PACKAGED BOOSTER PUMPS

1. Paragraph 2.1, A., 9., ADD the following:

   "a. BP-1 (HS): 150 GPM at 40 PSI boost.
   b. BP-2 (MS): 100 GPM at 43 PSI boost.
   c. BP-3 (ES): 75 GPM at 20 PSI boost."

2. Paragraph 2.1, B., 9., ADD the following:

   "a. BP-4 (PUMP): 250 GPM at 56 PSI boost."

ITEM 2-C-7: Refer to SECTION 22 12 19 - FACILITY GROUND MOUNTED, POTABLE WATER STORAGE TANKS

1. DELETE section in its entirety and, ADD new section attached to this addendum.

ITEM 2-C-8: Refer to SECTION 22 31 00 - DOMESTIC WATER SOFTENERS

1. Paragraph 1.6, A.,1., ADD the following:

   "b. Salt to be USDA food grade and/or NSF-60 certified."

ITEM 2-C-9: Refer to SECTION 22 32 00 - DOMESTIC WATER FILTRATION EQUIPMENT

1. Paragraph 1.3, A., 5., DELETE in its entirety.

2. Paragraph 2.1, K., 4., AMEND to read as follows:

   "4. Chemical Solution Tanks: Pulsafeeder Part No. 42406, double wall polyethylene rigid tank, 62 gallon capacity…"

3. Paragraph 2.1, K., 9., DELETE in its entirety.

4. Paragraph 3.5, B., ADD the following:

   "2. Water sample testing: At the completion of the installation of the water filtration system, submit water sample to New York State Certified laboratory for testing. Test to include, but not be limited to, iron, manganese, color, turbidity and total coliform. Submit test results to engineer for review."

DRAWING MODIFICATIONS - ARCHITECTURAL

ITEM 2-C-10: Refer to DRAWING AA100 and AA101

1. Demolition Key Note 8B, AMEND to read as follows:

   "8B. REMOVE DOOR AND FRAME COMPLETELY. REMOVE, SALVAGE AND INVENTORY DOOR CORES. TURN INVENTORIED DOOR CORES OVER TO OWNER FOR THEIR REUSE. PATCH EXPOSED SURFACES TO MATCH ADJACENT FINISHES / SURFACES."

ITEM 2-C-11: Refer to DRAWING AA100

1. Detail 3/AA100, AMEND the demolition key note pointing to the small circle adjacent to the main vestibule doors to read as follows:

   "12H".

DRAWING MODIFICATIONS - PLUMBING

ITEM 2-C-12: Refer to DRAWING HP051

1. Detail 2 at all 5 sample tap locations, AMEND note to read as follows:

   "SMOOTH NOSE/NON-THREADED SAMPLE TAP."

2. On potassium permanganate and sodium hypochlorite feed system tanks; DELETE spill containment basin and, ADD the following note:

   "FEED SYSTEM CHEMICAL TANKS TO BE DOUBLE WALL TANKS."

DRAWING MODIFICATIONS – ELECTRIC

ITEM 2-C-13: Refer to DRAWING AE700

1. DELETE drawing in its entirety and, ADD new drawing attached to this addendum.

END OF ADDENDUM

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INSTRUCTIONS TO BIDDERS
ATTACHMENT #1:
PRE-BID REQUEST FOR INTERPRETATION FORM

SUBMIT FORM BY EMAIL TO INE.Mahopac@tetratech.com

Project No.: 121111-19002 **Date:** 2-15-2021

Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

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Bidder Contact Person: Chris Fracassa
Bidder Company Name: Gianfia Corp.
Bidder Phone: (914) 358-4601
Bidder Email Address: cfracassa@gianfiacorp.com

Question Pertains to: Alternate #1

Drawing Number: BC110
Plan Area: Alternate #1
Room Number: N/A
Drawing Detail Number: N/A
Specification Section: 01 23 00

Question: (Please be specific)

#1. Could a detailed description of Alternate #1 scope of work be provided(in addition to what is listed in the Schedule of Alternates SECTION 01 23 00). For this Please confirm if the supply & installation of the synthetic turf is to be included as well as the other categories of work.

Review by Architect/Engineers: **Responded By:** C Glaubitz **Date:** 2/15/21

Refer to drawings and description of Alternate #1.
Refer to 01 12 00 for scoping, including 1.13, A, 5, g, 1 for synthetic turf.

Submit requests not less than 5 working days prior to the specified Bid Opening date and time. In the event that this question requires clarification or modification of the Bidding Documents, such written information can only be provided by formal Addendum, distributed to all plan holders.

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Bidder Contact Person: Chris Fracassa
Bidder Company Name: Gianfia Corp.
Bidder Phone: (914) 358-4601
Bidder Email Address: cfracassa@gianfiacorp.com

Question Pertains to: Water Tank & Foundation

Drawing Number: AC140, Detail 2 on ZC504
Plan Area: See Plan
Room Number: N/A
Drawing Detail Number: N/A
Specification Section: See Below

Question: (Please be specific)

#1. Please confirm that construction of new water tank(including any associated foundation work) is to be excluded from the Site Contract scope.

Review by Architect/Engineers: **Responded By:** C Glaubitz **Date:** 2/15/21

Refer to 01 12 00 for scoping, including 1.8 plumbing scope, and section 22 12 19.

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INSTRUCTIONS TO BIDDERS
ATTACHMENT #1:
PRE-BID REQUEST FOR INTERPRETATION FORM EC-009

SUBMIT FORM BY EMAIL TO INE.Mahopac@tetratech.com

Project No.: 121111-19002 **Date:** 2/15/2021

Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

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Bidder Contact Person: Raymond Collins
Bidder Company Name: Hudson Valley ECM, Inc.
Bidder Phone: 845-795-1135
Bidder Email Address: ray@hudsonvalleyecm.com

Question Pertains to: Electrical Panel Schedule

Drawing Number: AE 601
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question: (Please be specific)

On AE601 the new panel SP2 in classroom 239, is fed from where?
What is the feeder size, cable and conduit?

Review by Architect/Engineers: **Responded By:** CREGA **Date:** 2/15/21

REFER TO BID ADDENDUM NO 2

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INSTRUCTIONS TO BIDDERS
ATTACHMENT #1:
PRE-BID REQUEST FOR INTERPRETATION FORM EC-010

SUBMIT FORM BY EMAIL TO INE.Mahopac@tetratech.com

Project No.: 121111-19002 **Date:** 2/15/2021

Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

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Bidder Contact Person: Raymond Collins
Bidder Company Name: Hudson Valley ECM, Inc.
Bidder Phone: 845-795-1135
Bidder Email Address: ray@hudsonvalleyecm.com

Question Pertains to: Electrical Panel Schedule

Drawing Number: AE 700
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question: (Please be specific)

On AE700 the new feeders all say that the panels are 3 phase 4 wire, yet you describe (3) conductors' and a Ground, Should all of these state (4) wires of the feeder sizes and a Ground?

Review by Architect/Engineers: **Responded By:** CREGA **Date:** 2/15/21

REFER TO BID ADDENDUM NO 2

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INSTRUCTIONS TO BIDDERS
ATTACHMENT #1:
PRE-BID REQUEST FOR INTERPRETATION FORM SC-001

SUBMIT FORM BY EMAIL TO INE.Mahopac@tetratech.com

Project No.: 121111-19002 **Date:** 02/15/2021

Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

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Bidder Contact Person: Stephen Vieira
Bidder Company Name: Landscape Unlimited, Inc.
Bidder Phone: 914-232-5623
Bidder Email Address: mzlui3@gmail.com

Question Pertains to:

Drawing Number:
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question: (Please be specific)

1. Guard House - please provide details for footings to re-install the building.

Review by Architect/Engineers: **Responded By:** D. Beal **Date:** 02/15/2021

See detail 8/ZC506.

Submit requests not less than 5 working days prior to the specified Bid Opening date and time. In the event that this question requires clarification or modification of the Bidding Documents, such written information can only be provided by formal Addendum, distributed to all plan holders.

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INSTRUCTIONS TO BIDDERS
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PRE-BID REQUEST FOR INTERPRETATION FORM

SUBMIT FORM BY EMAIL TO INE.Mahopac@tetratech.com

Project No.: 121111-19002 **Date:**

Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

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Bidder Contact Person: Carlos Flores
Bidder Company Name: Mehl Electric
Bidder Phone: 845 735 4004
Bidder Email Address: carlos@mehlnet.com

Question Pertains to:

Drawing Number:
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question: (Please be specific) **1. Who is the School Fire Alarm vendor at each building, the specs show notifier and edwards, but these are manufacturers, please provide FA vendor name at each building so we can request pricing? 2. Who is responsible to furnish an set sit lighting pole bases? 3. Scorebard scope of work, can you confirm that the E.C will only be bringing power and terminatin at scoreboard F/I by others.**

Review by Architect/Engineers: **Responded By:** CR/LR **Date:** 02/16/2021

1. Refer to AE200 per Bid Addendum No 1 which states Honeywell 404 and notifier.
2. Site Contractor is responsible for furnishing and setting light pole bases.
3. The Electrical Contractor is responsible for furnishing / Installing the scoreboard and bringing power to the scoreboard.

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Project No.: 121111-19002 **Date:**

Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

---

Bidder Contact Person: Carlos Flores
Bidder Company Name: Mehl Electric
Bidder Phone: 845 735 4004
Bidder Email Address: carlos@mehlnet.com

Question Pertains to:

Drawing Number:
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question:
(Please be specific) **4. who can we contact to schedule a site visit at the schools for this project?**
5. will the schools be occupied this summer or empty?
6. will the GC be responsible for Trenching/excavation and backfill

Review by Architect/Engineers: **Responded By:** LR/TPG **Date:** 02/16/2021

4. Contractors can contact Heather Milne Ross who will coordinate walkthroughs with TPG site superintendent and Mahopac facilities director.
5. The HS school will be partially occupied by district staff. There will be no students in the HS building. The rest of the schools may have students and / or staff during the summer.
6. The Site Contractor is responsible for trenching / excavation and backfill for all site work and up to 5' outside of the pumphouse building. The General Contractor is responsible for excavation and backfill within the pumphouse building footprint to 5' outside of the building.

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ATTACHMENT #1:
PRE-BID REQUEST FOR INTERPRETATION FORM

SUBMIT FORM BY EMAIL TO INE.Mahopac@tetratech.com

Project No.: 121111-19002 **Date:** 2/9/21

Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

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Bidder Contact Person: MIKE DEMARTINO
Bidder Company Name: NICKERSON CORP.
Bidder Phone: 631-666-0200 X235
Bidder Email Address: demartino@nickersoncorp.com

Question Pertains to:

Drawing Number: AP600
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section: 123213, 224216.16, 224500

Question: (Please be specific)

- Summary of project Contract 6 Casework and Lab Equipment Contract Note 1.12.5.c indicates integral sinks, eye wash stations and Note 1.12.5.d indicates gas fixtures, eye wash/shower, however Section 224216.16 includes sinks, sink faucets, supply fittings, waste fittings and Section 224500 includes eyewash equipment. Plumbing Schedule on AP600 notes epoxy resin sinks, safety station, emergency eyewash and gas cocks. Please clarify if the sinks, faucets, supply fittings, waste fittings, safety station, emergency eyewash and gas cocks are part of Contract 6 Casework and Lab Equipment Contract or Contract 2 Plumbing Work Contract.

Review by Architect/Engineers: **Responded By:** LR/TPG **Date:** 02/16/2021

Refer to forthcoming Bid Addendum No. 2

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Project No.: 121111-19002 **Date:**

Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

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Bidder Contact Person: Joseph Piazza
Bidder Company Name: Piazza Inc
Bidder Phone: (914) 830-1344
Bidder Email Address: jd@piazzabrothers.com

Question Pertains to:

Drawing Number:
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section: 011200-04,E,5 & 015000-6, C, 1 & 5

Question: (Please be specific)

Currently the 3 notes in listed above in the spec book contradict each other. Two of the notes say each contractor is responsible for their own temporary heating and (1) says the GC is responsible. Please advise.

Review by Architect/Engineers: **Responded By:** LR / TPG **Date:** 02-12-2021

RESPONSE : GC is responsible for Temporary Heat if needed. Milestone schedule does not show any work occurring during the winter.

Submit requests not less than 5 working days prior to the specified Bid Opening date and time. In the event that this question requires clarification or modification of the Bidding Documents, such written information can only be provided by formal Addendum, distributed to all plan holders.

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---

Bidder Contact Person: Joseph Piazza
Bidder Company Name: Piazza Inc
Bidder Phone: (914) 830-1344
Bidder Email Address: jd@piazzabrothers.com

Question Pertains to:

Drawing Number:
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question: (Please be specific)

Could you please direct me to the drawings and details for the new metal building?

Review by Architect/Engineers: **Responded By:** _____ **Date:** _____

The metal pump house is included in drawing volume 2 and are comprised of the H-series

Timothy Stevens 2/15/21

Submit requests not less than 5 working days prior to the specified Bid Opening date and time. In the event that this question requires clarification or modification of the Bidding Documents, such written information can only be provided by formal Addendum, distributed to all plan holders.

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Project No.: 121111-19002 **Date: 2/11/21**

Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

---

Bidder Contact Person:
Adam J Weiss
Bidder Company Name:
S&L Plumbing and
Heating Corp
Bidder Phone: 914-269-
2932 ext: 112
Bidder Email Address:Aweiss@slplumbing.net

Question Pertains to:

Drawing Number:
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question: (Please be specific)

Is asbestos contract responsible to demo+remove 1500 gallon + 4000 gallon water storage tanks?

Please clarify

Review by Architect/Engineers: **Responded By:** LR/TPG **Date:** 02/16/2021

The Hazardous Materials contract is responsible to abate, demo and remove the 1500 gallon and 4000 gallon water storage tanks. This is phased to be completed in the Summer of 2022.

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Project Name: Reconstruction to Mahopac High School, Mahopac Middle School, Mahopac Falls School, Bus Garage, and New Pump House

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Bidder Contact Person:
Adam J Weiss
Bidder Company Name:
S&L Plumbing and
Heating Corp
Bidder Phone: 914-269-
2932 ext: 112
Bidder Email Address:Aweiss@slplumbing.net

Question Pertains to:

Drawing Number:
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question: (Please be specific)

Who is responsible for site water mains?

Please clarify

Review by Architect/Engineers: **Responded By:** LR/TPG **Date:** 02/16/2021

The Site Contractor is responsible for the site water mains to 5' of the pump house and 5' of each of the existing buildings pump rooms.

Submit requests not less than 5 working days prior to the specified Bid Opening date and time. In the event that this question requires clarification or modification of the Bidding Documents, such written information can only be provided by formal Addendum, distributed to all plan holders.

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Bidder Contact Person:
Adam J Weiss
Bidder Company Name:
S&L Plumbing and
Heating Corp
Bidder Phone: 914-269-
2932 ext: 112
Bidder Email Address:Aweiss@slplumbing.net

Question Pertains to:

Drawing Number:
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question: (Please be specific)

In Contract summary:

GC tasks include according to

Paragraph U - A,B+C: Cutting removal + holes for all trades. Each trade to provide layout.

Plumbing Summary states that plumbing contractor to provide cut patch core boring debris removal and sawcutting.

Please clarify.

Review by Architect/Engineers: **Responded By:** LR/TPG **Date:** 02/16/2021

Under Summary of work, Section 1.7.A.5.e: The General Construction Work Contract shall perform all necessary trenching and excavation, backfilling, and compaction and field required concrete for all trades within the building AND within the footprint of the New Pump House. Section "U" under the General Construction Work Contract as referenced is specific to roof penetration work.

Submit requests not less than 5 working days prior to the specified Bid Opening date and time. In the event that this question requires clarification or modification of the Bidding Documents, such written information can only be provided by formal Addendum, distributed to all plan holders.

SECTION 03 48 10 - PRECAST CONCRETE LIGHTING POLE BASES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Precast concrete bases for site lighting poles.
2. Concrete with commercial architectural finish.

1.3 SUBMITTALS

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

B. Action submittals

1. Product Data: For each type of product indicated.

   a. Mold materials,
   b. Mold-release agent.
   c. Admixtures.

2. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests. Include all ingredient certifications and product data concurrently.

3. Shop Drawings: Include pole base locations, plans, elevations, dimensions, shapes and sections, openings, and reinforcement. Detail fabrication and installation of pole bases.

   a. Indicate joints, reveals, and extent and location of each surface finish.
   b. Detail loose and cast-in hardware, lifting and erection inserts, anchor bolts, and grounding rod.
   c. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
   d. Include and locate openings, including for conduit.
   e. Indicate location of each pole base by same identification mark placed on panel.

4. Samples:

   a. For each type of finish indicated on exposed surfaces of pole bases with architectural finish, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.

C. Informational submittals

1. Qualification Data: For fabricator.

2. Material Certificates: For the following, from manufacturer:

a. Reinforcing materials.
b. Cementitious materials.

3. Material Test Reports: For aggregates.

4. Source quality-control reports.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications

1. Participates in PCI's Plant Certification program at time of bidding and is designated a PCI-certified plant as follows:

a. Group CA, Category C1A - Precast Concrete Products (no prestressed reinforcement).

B. Design Standards: Comply with ACI 318 and design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," and in PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."

C. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."

D. Sample Panels: After sample approval and before fabricating precast structural concrete units with architectural finish, produce a minimum of 2 sample panels approximately 12 by 12 by 2 inches for review by Architect. Incorporate full-scale details of architectural features, finishes, textures, and transitions in sample panels.

1. Damage part of an exposed-face surface for each finish, color, and texture, and demonstrate adequacy of corrective work techniques proposed for correction of surface blemishes.

2. After approval of corrective work technique, maintain one sample panel at fabricator's plant and one at Project site in an undisturbed condition as a standard for judging the completed Work.

3. Demolish and remove sample panels when directed.

E. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Support units during shipment on nonstaining shock-absorbing material in same position as during storage.

B. Store units with adequate bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

1. Store units with dunnage across full width of each bearing point unless otherwise indicated.
2. Place adequate dunnage of even thickness between each unit.
3. Place stored units so identification marks are clearly visible, and units can be observed.

C. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses that would cause cracking or damage.

D. Lift and support units only at designated points shown on Shop Drawings.

1.6 COORDINATION

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MOLD MATERIALS

A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.

1. Mold-Release Agent: Commercially produced liquid-release agent that will not bond with, stain or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated.

1. For surfaces exposed to view in finished structure, mix gray with white cement, of same type, brand, and mill source.

B. Supplementary Cementitious Materials:

1. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

1. Water-Reducing Admixtures: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
7. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M.

2.4 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

1. Limit use of granulated blast-furnace slag to 40 percent of portland cement by weight.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at pole base fabricator's option.

C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C 1218/C 1218M.

D. Normal-Weight Concrete Mixtures: Proportion full-depth mixture by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi.
2. Maximum Water-Cementitious Materials Ratio: 0.45.

E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 116.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.

G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

H. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed by fabricator if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.5 MOLD FABRICATION

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement by release agent.

B. Maintain molds to provide completed pole bases of shapes, lines, and dimensions indicated, within fabrication tolerances specified.

1. Form joints are not permitted on faces exposed to view in the finished work.
2. Edge and Corner Treatment: Uniformly chamfered or radiused as detailed on Drawings.

2.6 FABRICATION

A. Set anchor bolts according to anchor-bolt templates furnished by light pole manufacturer.

B. Cast-in reglets, slots, holes, and other accessories in pole bases as indicated on the Contract Drawings.

C. Cast-in openings larger than 10 inches in any dimension. Do not drill or cut openings or reinforcing bars without Architect's approval. Coordinate size and locations of openings required for conduit or other equipment.

D. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.

2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.

3. Place reinforcing steel to maintain at least 1 1/2-inch minimum concrete cover. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.

E. Reinforce pole bases to resist handling, transportation, and erection stresses.

F. Comply with requirements in PCI MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

G. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.

H. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 116.

1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

I. Comply with ACI 306.1 procedures for cold-weather concrete placement.

J. Comply with PCI MNL 116 procedures for hot-weather concrete placement.

K. Identify pickup points of pole bases and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each pole base on a surface that will not show in finished structure.

L. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

M. Discard and replace pole base that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless corrective work meets requirements in PCI MNL 116 and meet Architect's approval.

2.7 FABRICATION TOLERANCES

A. Fabricate pole bases straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL 116 product dimension tolerances.

2.8 COMMERCIAL FINISHES

A. Commercial Grade: Remove fins and large protrusions and fill large holes. Rub or grind ragged edges. Faces must have true, well-defined surfaces. Air holes, water marks, and color variations are permitted. Limit form joint offsets to 3/16 inch. This finish applies to sections of pole base that is hidden from public view.

B. Smooth, steel trowel finish unformed surfaces (i.e.: top of pole base.) Consolidate concrete, bring to proper level with straightedge, float, and trowel to a smooth, uniform finish.

2.9 COMMERCIAL ARCHITECTURAL FINISHES

A. Manufacture member faces free of joint marks, grain, and other obvious defects with corners, including false joints, uniform, straight, and sharp. Finish exposed-face surfaces of precast concrete units to match Drawings and as follows:

1. Smooth-Surface Finish: Provide surfaces free of excessive air voids, sand streaks, and honeycombs, with uniform color and texture.

2.10 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to evaluate pole base fabricator's quality-control and testing methods.

1. Allow testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with testing agency and provide samples of materials and concrete mixtures as may be requested for additional testing and evaluation.

B. Testing: Test and inspect pole bases according to PCI MNL 116 requirements.

1. Test and inspect self-consolidating concrete according to PCI TR-6.

C. Strength of pole bases will be considered deficient if units fail to comply with ACI 318 requirements for concrete strength.

D. If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, employ a qualified testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M.

1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.

2. Cores will be tested in an air-dry condition or, if units will be wet under service conditions, test cores after immersion in water in a wet condition.

3. Strength of concrete for each series of 3 cores will be considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.

4. Test results will be made in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:

a. Project identification name and number.

b. Date when tests were performed.

c. Name of precast concrete fabricator.

d. Name of concrete testing agency.

e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.

E. Patching: If core test results are satisfactory and pole base comply with requirements, clean and dampen core holes and solidly fill with same precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.

F. Defective Units: Discard and replace pole bases that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be corrected, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, or sample panels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine subgrade conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance of the Work. Owner’s Geotechnical Engineer or Owner’s Testing Agency shall inspect subgrade prior to installing pole bases.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Erect pole bases level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until backfill and compaction is complete.

1. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.

B. Field cutting of pole bases is not permitted without approval of the Architect.

C. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units.

D. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

3.3 ERECTION TOLERANCES

A. Erect pole base level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 135.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Erection of pole bases.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Correct or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

F. Testing agency will prepare test and inspection reports.

3.5 CORRECTIVE WORK

A. Correct pole bases if permitted by Architect.

1. Corrective work may be permitted if structural adequacy, serviceability, durability, and appearance of units has not been impaired.

B. Mix patching materials and correct units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and corrected work, when viewed in typical daylight illumination from a distance of 20 feet.

C. Prepare and correct damaged galvanized coatings with galvanizing corrective paint according to ASTM A 780.

D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

E. Remove and replace damaged pole bases that cannot be corrected or when corrective work does not comply with requirements as determined by Architect.

3.6 CLEANING

A. Clean grout, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.

2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 03 48 10

SECTION 22 12 19 - FACILITY GROUND-MOUNTED, POTABLE-WATER STORAGE TANKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes glass-fused-to-bolted-steel tank for storage of domestic water.

1.3 DEFINITIONS

A. Bottom Capacity Level (BCL): Water level above which the specified capacity is provided. In a ground-supported tank (reservoir or standpipe), the BCL is the water level in the tank shell when the tank is emptied through the specified discharge fittings, unless otherwise specified.

B. Capacity: Net volume, in gallons, that may be removed from a tank filled to TCL and emptied to BCL.

C. CR: Chlorosulfonated polyethylene synthetic rubber.

D. Minimum Capacity within Operating Range: Capacity when water level is at BCL.

E. NR: Natural rubber.

F. Range of Head: Vertical distance between TCL and BCL.

G. Reservoir: Flat-bottomed, cylindrical, steel ground-mounted water-storage tank with shell height equal to or less than its diameter.

H. SDWA: Safe Drinking Water Act.

I. Standpipe: Flat-bottomed, cylindrical, ground-mounted water-storage tank with shell height greater than its diameter.

J. Top Capacity Level (TCL): Water level defined by the lip of the overflow elevation.

K. MATD: Manufacturers authorized tank dealer.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design tank system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of facility ground-mounted, potable-water storage tank, include rated capacities, accessories, appurtenances, and furnished specialties.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details for each facility ground-mounted, potable-water storage tank, including the following:

1. Tank, roof, and shell openings.
2. Tank foundation plans and details
3. Safety railings and ladders.
4. Plans, elevations, sections, and attachment details.
5. Structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
6. Diagram power, signal, and control wiring.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.
B. Welding certificates.
C. Bacteriological test results.
D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For the following to include in emergency, operation, and maintenance manuals:

1. Obstruction lighting.
2. Lightning protection.
3. Cathodic protection.
4. Tank mixer.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: Employ a qualified structural engineer to prepare calculations, Shop Drawings, and other structural data for fabrication and erection of ground-mounted, potable-water storage tanks.

1. Engineering Responsibility: Preparation of data for ground-mounted, potable-water tanks, accessories, specified appurtenances, and concrete supports and foundations, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
3. AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."

1.9 PACKAGING, DELIVERY AND HANDLING

A. Protect sheets that pass factory inspection and quality control checks from damage prior to packaging for shipment.

B. Place heavy paper or plastic foam sheets between each panel to eliminate sheet-to-sheet abrasion during shipment.

C. Wrap individual stacks of panels in heavy waterproof cover and steel banded to special wood pallets built to the roll-radius of the tank panels. Minimize contact or movement of finished panels during shipment.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of glass lined bolted steel tank that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including storage tank and supports.
b. Faulty operation of controls.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Periods: From date of Substantial Completion.

a. Tank structure or any part thereof: One (1) year from date of completion (or 14 months after delivery).

b. Manufacturer supplied Cathodic Protection system: 60 months after liquid is first introduced into the tank or 62 months after shipment from the factory. The glass coated product zone surfaces, that portion of the tank interior below the normal high elevation of the contained liquid will not corrode under normal and proper use, maintenance and operation during the warranty period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Ground-mounted, potable-water tank, including structural reinforcement and foundation, shall withstand the effects of dead and live gravity loads and winds of 100 mph.

B. Thermal Movements: Ground-mounted, potable-water tank, including structural reinforcement and foundation, shall allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with NSF 61 and NSF 372.

E. Comply with 29 CFR 1910.

2.2 BOLTED-STEEL, GROUND-MOUNTED, POTABLE-WATER STANDPIPES

A. Description: Manufactured tank with glass fused to bolted-steel plates, bolts, rods, and reinforcing steel. Design make is based on CST Industries, as represented by Statewide Aquastore, Inc, 6010, Drott Drive, East Syracuse, NY 13057. Attention Michael Parker: (315) 433-2782.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CST Industries.
2. American Tank Company, Inc.
3. Pittsburg Tank & Tower Co., Inc.
4. Superior Tank Co., Inc.

C. Standard: Designed and fabricated according to AWWA D103 and AWWA M42.

D. Design Requirements:

1. Vertical, cylindrical, flat bottom, glass coated, bolt together steel construction. Epoxy, powder coated, galvanized or stainless steel are not considered equal and will not be considered.

2. Loads to be considered in the tank and roof design shall include basic live, seismic and snow loads.

3. Specific Gravity: Minimum design shall be 1.0.

4. Net allowable soil bearing capacity 4,000 PSF (per Geotechnical report)

E. Snow Load:

1. Ground Snow Load: 30 PSF.
2. Importance Factor 1.1 (Is)
3. Thermal Factor 1.0 (Ct)
4. Exposure Factor 1.0 (Ce)

F. Wind Load (AWWA D103-09/ASCE 7-10):

1. Basic Wind Speed: 120 mph
2. Risk Category III
3. Exposure Category B

G. Frost Depth: 3’-0”

H. Load cases (include the self-weight of the structure in all of the following load combinations) shall be analyzed to determine the controlling stresses, as follows:

1. Normal operating conditions (full tank) with a full snow load.
2. Empty tank, no snow.
3. Wind, or earthquake, on empty tank, full snow.
4. Wind, or earthquake, on empty tank, snow on leeward side of dome.
5. Wind, or earthquake, on empty tank, no snow

I. Glass Fused to Steel Floor:

1. The tank floor bottom to be constructed of glass-coated steel panels. The glass floor to be installed on top of a compacted sand base and ringwall or concrete floor slab.

2. If a concrete floor slab is used its to be constructed of reinforced concrete as specified in the contract documents. If fill is used, the fill under the floor to be compacted and tested to a minimum of 95% of proctor.

3. Glass-coated steel floor panels to have the same milled glass, formulated with titanium dioxide, as the tank sidewalls to produce a finish interior surface with optimum toughness and resistance to conditions normally found in potable water storage tanks. The finished tank interior floor glass coating to be white.

J. Glass Fused to Steel Knuckle Roof:

1. Constructed of glass coated steel panels. Roofs to be clear span and self-supporting. Center post supports are not permitted.

2. Roof live loads and dead loads to be carried by tank sidewalls, without additional support. A roof hatch, with a hinged gasket cover and locking hasp, shall be provided near the outside tank ladder.

3. Roof to be fabricated of radially sectioned, glass coated bolt together steel panels. Roof panel fabrication to be similar to that for sidewall panels, employing the same sealing and bolting techniques to ensure a weather tight assembly.

4. Roof to be a rolled knuckle design, with no rolled angle connection between sidewall and panels.

5. The roof manway opening to have a clear dimension of at least 24” in one direction and 18” in the other direction. The opening to have a curb of at least 4” in height, and the cover to have a downward overlap of at least 2”, or a gasket weather-tight cover in lieu of the 4” curb and 2” overlap. Roof exterior color to be “Cobalt Blue”.

6. The walkway and handrail to be constructed of Hot Dipped Galvanized steel.

K. Shell Roof: Comply with AWWA D103.

L. Capacity and Characteristics:

1. Capacity: 64,000 gallons at 35 feet liquid depth.

2. Nominal diameter: 18 feet
3. Sidewall height: 35 feet from top of foundation to overflow level.

M. Pipe Connection: Comply with AWWA D103. Match size of water-distribution pipe.

N. Overflow Piping: ASTM A53/A53M, Grade B, Schedule 40, welded-steel pipe with ASTM A234/A234M, Grade W.B., Schedule 40, carbon-steel butt-weld fittings.

O. Roof Opening Hatch above TCL: Comply with AWWA D103. Steel, hinged cover, 24 by 15 inches minimum or as required by OSHA, with 4-inch curb and 2-inch downward overlap with hasp and lock, and adjacent to exterior ladder.

P. Roof Center Opening: Comply with AWWA D103. steel, removable, 20-inch minimum-diameter cover with 4-inch-minimum-height neck and minimum 2-inch downward overlap with hasp and lock. Construct opening with capability of supporting ventilation fan.

Q. Shell Sidewall Manholes: Comply with AWWA D103. Provide two steel manholes, circular, minimum 24 inches in diameter

R. Tank Vent: Steel pipe with stainless-steel screen, constructed to prevent entrance of rain, insects**,** birds, and animals.

2.3 MANUFACTURING PROCESS

A. Glass coating: The glass coating system to be in full accordance with the requirements of AWWA D103, latest revision. Individually test coating frits in accordance with PE1 Test T-2. (Citric acid at room temperature). Employ coating process equipment that evenly coats the sheet surface and all four exposed sheet edges.

B. Surface Preparation: Following the de-coiling and shearing process, steel grit blast on both sides to the equivalent of SSPC PC 10 (near white metal blast cleaning). Sandblasting and chemical pickling of steel sheets is not acceptable. The surface anchor pattern shall be not be less than 1.0 mils. (.0001inches). Evenly oil sheets on both sides to protect them from corrosion during fabrication.

C. Cleaning: After fabrication and prior to application of the coating system, thoroughly clean sheets with Coral COR Clene 16 caustic wash with 140°F hot water, then a two-stage rinse followed immediately by hot air drying. Inspect sheets for traces of foreign matter, soil particles, grease or rust. Re-cleaned or grit-blasted sheets to an acceptable level of quality.

D. Coating Application:

1. Manufacturer to maintain and use supplementary directional spray nozzles using an automated machine process to consistently coat the sheet edge profiles per PE 101 standard. The sheet edges shall be coated with the same vitreous enamel glass coating as the panel surface.

2. All sidewall sheets to receive one coat of a catalytic nickel oxide glass pre-coat to both sides, followed by air-drying.

3. A second coat of milled cobalt blue glass to be made to both sides of the sheets and then dried.

4. A third cover coat of milled titanium dioxide white glass to be applied to the inside of the sheet. This milled glass to be formulated with 18% to 22% titanium dioxide to produce a finish interior surface with optimum toughness and resistance to conditions normally found in potable water storage tanks. This specific coating shall be Aquastore Vitrium. Any alternate three coat system must be submitted for approval and acceptance prior to bid.

5. The sheets to then be fired at a minimum temperature of 1500 °F in strict accordance with ISO 9001 quality process control procedures, including firing time, furnace humidity, temperature control, etc.

6. The 4 continuous sheet edge enamel thickness to be 5 mils.

7. The dry film interior coating thickness to be 10-18 mils min. The dry film exterior coating thickness to be 7-15 mils min. This is a three-coating process.

8. The finished tank inside sidewall glass coating to be white. The standard tank sidewall finished outside color to be Cobalt Blue. (Munsell standard 7.5 PB 2/4.) Finished outside colors to not vary noticeably among tank panels. Off color panels will be rejected; replacement panels of matching color to be supplied by the tank manufacturer.

E. Sheet Edge Coating

1. Prior to sheet glassing all four (4) exposed rectangular continuous sheet edges, including starter sheets, for each specific sheet radii to be mechanically rounded in profile resulting in an optimized radius and adhere to The Porcelain Enameling Institute's Technical Manual PEI-101.

2. The sheet surface next to the edge must remain flat, post process, to prevent 'bulging' to less than 0.030 inches (0.79mm) relative to the flat, while being rolled. All (4) exposed sheet edges will then be directionally sprayed by nozzles, using an automated machine process, and coated with the same vitreous enamel glass coating as the sheet surface.

3. Sheet edge encapsulation will have an enamel coating minimum DFT (dry film thickness) of 5 mils (127 microns). Coating adhesion shall be tested in accordance with ISO 28765 Class 2 or better. Sheet face and sheet edge must meet the same glass quality test. Rounded sheet edge encapsulation will not have exposed uncoated steel.

4. The process to be equal in all respects to Edge Coat II by CST Industries. Sealer or glass overspray as edge coating will not be an acceptable alternative and nozzle spray must be directionally oriented toward the edges to ensure consistency of coverage. The coating to have a tensile strength of 1500 psi.

F. Source Quality Control

1. The manufacturers quality system to be ISO 9001 certified and refer to ISO (International Organization of Standardization) for the following testing and procedures.

2. Inspect coated sheets for mil thickness using a calibrated magnetic induction type electronic dry film thickness gage with a valid calibration record. Test frequency shall be a minimum of every gage change and/or a minimum of every half hour.

3. Measure coated sheets for color using an electronic colorimeter with a valid calibration record. Test frequency shall be a minimum of every gage change and/or a minimum of every half hour. The color must fall within the specified tolerance or it will be rejected.

4. Perform an electrical leak detection test on the interior and exterior surface of each panel after fabrication. Inspect inside wet sheet surfaces using a low voltage wet sponge holiday tester in accordance with ASTM D5162-91 Method A. Use the tester at a voltage of 67.5 volts (+/- 10 %) and set so the alarm is sounded if the electrical resistance of the glass coating falls below 125,000. The tester to have a valid calibration record. Use a low-suds testing solution at a ratio of not more than 1/2 fluid oz. per gallon of water to wet the sponge. Test every sheet for holidays in the factory and reject any sheet with a discontinuity.

5. Test adherence of the glass coating to the tank steel in accordance with ISO standards. Any sheet that has poor adherence will be rejected. Test coating adhesion in accordance with ISO 28765 Class 2 or better. Sheet face and sheet edge must meet the same glass quality test.

6. Test glass coating for fishscale by placing the full size production sheets in an oven 400°F for one hour. The sheets will then be examined for signs of fishscale. Reject any sheet exhibiting fishscale and all sheets from that gage lot will be similarly tested. The minimum frequency of testing for this shall be five times per month.

7. The tank manufacturer shall provide documentation upon request (prior to tank fabrication), of the above tests including mill reports and traceable documents to demonstrate the source of steel used in the manufacture of this project specific tank

2.4 MATERIALS

A. Plates and Sheets:

1. Plates and sheets used in the construction of the tank shell, floor, or roof to comply with the minimum standards of AWWA D103, latest edition and AWWA D103a-14 addendum. All steel shall be smelted and produced in the United States of America.

2. The annealing effect created from the glass coated firing process to be considered in determining ultimate steel strength and yield strength of the steel used for calculations detailed in AWWA D103, Equations 5-4 and 5-5 and in accordance with the AWWA D103a-14 Addenda such that Fu and Fy shall be reduced by a factor of 0.7 from the published steel values. In no event shall a yield strength greater than 50,000 psi be utilized for such calculations detailed in AWWA D103 unless the tank manufacturer can substantiate the use of higher values because of a documented testing program.

3. The tank manufacturer to have and provide for the Engineer's review, upon request, published ultimate tensile and yield strength values for the proposed steel. In addition, per AWWA D103a-14 the tank manufacturer shall have test results for the most recent two (2) year period to substantiate the use of Fu and Fy values used in the tank manufacturer's design calculations if the values exceed 70 percent of the published values.

4. Design requirements for mild strength steel shall be ASTM A-1011 Grade 30 with a maximum allowable tensile stress of 12,135 psi. High strength steel shall be ASTM A-1011 Grade 50 with a maximum allowable tensile stress of 21,167 psi.

5. When multiple vertical bolt line sheets and plates of ASTM A-1011 Grade 50 are used, the effective net section area shall not be taken as greater than 85% of the gross area. Manufacture multiple vertical bolt line sheets and plates 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.

6. When Rolled Structural Shapes are used, the material to conform to minimum standards of ASTM A36 or ASTM A992.

B. State chemical compositions for mild steel and high strength steel in the submitted mill certifications. Raw steel for plates and sheets to conform to the following composition requirements. These specifications refer to the design tensile strength after firing. The steel to have the following chemical composition

1.	Carbon (Mild):	0.06%	maximum
2.	Carbon (HSS):	0.10%	maximum
3.	Manganese:	1.50%	maximum
4.	Phosphorus:	0.04%	maximum
5.	Sulfur:	0.05%	maximum
6.	Aluminum:	0.08%	maximum

C. Offset vertical tank seams. Straight seam 4 corner joints are not acceptable.

D. Horizontal Web Stiffeners

1. Stiffeners to be of the "web truss" design, with extended tail to create multiple layers of stiffener, permitting wind loads to be distributed around the tank. Fabricate stiffeners of steel with hot dipped galvanized or epoxy coating. Rolled angle stiffeners are not be permitted for intermediate horizontal wind stiffeners.

E. Bolt Fasteners:

1. Bolts used in tank lap joints shall be 1/2 13 UNC 2A rolled thread and to meet the minimum requirements of AWWA D103. Bolt material shall be SAE J429 Grade 5 (1" bolt length) with a tensile strength of 74,000-psi minimum, and a proof load of 55,000-psi min. and an allowable shear stress with threads excluded from the shear plane of 18,163-psi min.

2. SAE J429 Grade 5/ASTM A325 (1-1/4” bolt length) and heat treated to a tensile strength of 120,000 psi min and a proof load of 85,000 psi min. and having an allowable shear stress with threads excluded from the shear plane of 29,454 psi min.

3. SAE J429 Grade 8/ASTM A490 (bolts greater than 1-1/4”) and heat treated to a tensile strength of 150,000 psi min and a proof load of 120,000 psi min. and having an allowable shear stress with threads excluded from the shear plane of 36,818 psi min.

4. The bolt finish shall be zinc coated, mechanically deposited 2.0 mils minimum per ASTM B695.

5. The entire bolt head shall be encapsulated up to the splines on the shank with high impact polypropylene copolymer. Resin to be stabilized with an ultraviolet light resistant material such that the color shall appear black. The bolt head encapsulation to be certified to meet the ANSI/NSF Standard 61 for indirect additives.

6. All lap joint bolts to be properly selected such that threaded portions will not be exposed in the "shear plane" between the sheets. In addition, bolt lengths shall be sized as to achieve a neat and uniform appearance. Excessive threads extending beyond the nut will not be permitted.

7. All lap joint bolts to include a minimum of four (4) splines, .002 inches minimum on the underside of the bolt head at the shank in order to resist rotation during torque wrench application.

F. Sealants

1. The lap joint sealant to be a one component, moisture cured, polyurethane compound. The sealant to be manufactured by a United States supplier as well as be suitable for contact with potable water and shall be certified to meet ANSI/NSF Additives Standard No. 61.

2. The sealant to be used to seal lap joints, bolt connections and for sheet edge fillets. The sealant should have a curing rate at 73°F and 50% RH and be tack free in 6 to 8 hours. Final cure time should be 10 to 12 days. Sealer to be resistant up to 100-ppm chlorine concentration during disinfection. Neoprene gaskets and tape type sealer shall not be used.

3. The sealant to cure to a rubber like consistency, have excellent adhesion to the glass coating, low shrinkage and be suitable for interior and exterior use.

4. Due to poor compatibility with chlorine, the sealant Sika 1A to not be used on potable water storage tanks.

G. Roof Vent:

1. Provide a properly sized aluminum vent assembly in accordance with AWWA D103, installed above the maximum water level. Provide a curbed opening at the apex of the dome. Size vent to not exceed 0.5-inch water column interior pressure or vacuum at maximum possible rate of water fill or withdrawal.

2. Provide protection against birds and protection against ice plugging. Provide an insect screen designed to open should the screen become plugged by ice formation.

3. Construct the vent of aluminum such that the hood can be unbolted and used as a secondary roof access.

H. Pipe Connections

1. Where pipe connections are shown to pass through tank panels, field locate, saw cut, (acetylene torch cutting or welding is not permitted), and utilize an interior and exterior flange assembly. Comply with AWWA D103 latest edition for tank shell reinforcing. Apply sealer on any cut panel edges or bolt connections.

2. Overflow piping shall be irrigation grade seamless aluminum tubing with twenty-four mesh non corrodible screen installed within the pipe.

I. Ladder Assemblies

1. Provide an AWWA D103 and OSHA 1910 compliant external aluminum tank ladder utilizing grooved, skid-resistant rungs.

2. Fabricate personal fall arrest system, safety cage and step-off platforms (as required by OSHA 1910 or customer submittal drawings) of galvanized steel. Equip ladders with a hinged lockable entry device at the bottom of the ladder. Provide step off platforms at maximum intervals of every 30’.

J. Access Doors

1. Provide tank with one (1) 24-inch diameter bottom access door per AWWA D103. The manhole opening shall be a minimum of 24 inches in diameter. The access door and tank shell reinforcing shall comply with AWWA D103 latest edition.

2. Provide a davit to hold the cover plate.

K. Identification Plate: Manufacturer’s nameplate to list the tank serial number, tank diameter and height, maximum design capacity, intended storage use, and date of installation. The nameplate to be affixed to the tank exterior sidewall at a location approximately 5' from grade elevation in a position of unobstructed view.

L. Cathodic Protection System

1. Provide a passive cathodic protection system designed by the tank manufacturer specifically for the project tank, consisting of sacrificial anodes which provide protection for the portion of the structure immersed in liquid. The anodes are attached to the floor and bolted through existing shell sheet bolt holes. Lead wires and buss bars are used to ensure continuity between anodes and all structure shell sheets.

2. The cathodic protection system to be designed by a licensed professional engineer employed by the tank manufacturer. The system to be designed to protect the entire tank.

3. The resistivity of the water to be stored in the tank will determine the type and number of anodes.

M. Plastic Encapsulated Cap: Use high density polyethylene co-polymer caps and sealant to cover the bolts, nuts and washers exposed on the exterior sidewall of the tank.

2.5 GROUND-MOUNTED, POTABLE-WATER STORAGE TANK APPURTENANCES

A. Water-Level Controls: Automatic controls for maintaining water level in tank, with valves, piping, and audible and visual alarms to indicate the following:

1. High- and low-water levels.
2. Tank overflowing or tank not filling.

B. Lightning Protection: Comply with requirements in Section 26 41 13 "Lightning Protection for Structures."

C. Tank circulator:

1. Continuous Operation Equipment: The mixer shall operate continuously, all day and all night, using 120 VAC as the power source.

2. Specified Equipment: The mixer shall be manufactured by Ixom Watercare, Inc. of Dickinson, ND,

3. Complete Water Circulation Required: To meet the project objectives, the tank or reservoir circulation shall be achieved by a single submerged units within the reservoir capable of providing long distance circulation of water. The mixer to have a direct measurable flow rate where suction shall enter specified mixer's intake positioned within 2 inches of reservoir floor and discharging water vertically in a sheet flow pattern to induce a large volume, low velocity flow to reach the tank or reservoir water surface. The mixer must be placement flexible in design to allow best hydraulic positioning for tank or reservoir conditions to prevent hydraulic short circuiting within tank or reservoir. Suction not within 2 inches of tank or reservoir floor is not allowed.

4. Complete Mix: The mixer manufacturer guarantees that the subject tank will be completely mixed by the mixer. In continuous operation of the mixer:

   a. At least once per 24 hours all water temperatures within the tank shall converge to within 0.8 degrees C.
   b. At least once per 72 hours all chlorine concentrations within the tank shall converge to within 0.18 mg/l.

5. Stainless Steel Construction: The mixer to be constructed primarily of Type 316 stainless steel metal for strength and superior corrosion resistance.

6. Motor: The mixer to be mechanically operated by a submersible motor that meets the following criteria.

7. Direct Drive, with no gearbox and no lubrication maintenance required.

8. Designed for submersible operation: Mixer design to include flow sleeve or housing around motor to provide water flow past motor per submersible motor design criteria to lower the total motor temperature and increase winding life.

9. SCADA and Controls: The mixer to have the option to add an Electric Control Box including a motor current indicator in a 4-20mA analog output and remote on/off control via 24VDC relay.

10. Accessories: 75 feet cable and chain, roof junction box, chain grab tools

11. Equipment Support: The mixer manufacturer to offer full factory support with the manufactures staff and support services.

PART 3 - PRODUCTS

3.1 STEEL, GROUND-MOUNTED, POTABLE-WATER STORAGE TANK INSTALLATION

A. Bolted-Steel Tanks:

1. Erect tank shell, accessories, and appurtenances according to AWWA D103 and AWWA M42.
2. Fabricate tank sections and drill or punch bolt holes in the shop. Install bolts during field erection of tank.

B. Set top of reinforced-concrete foundation at least 6 inches above finish grade.

C. Install roof hatch near exterior ladder.

D. Install roof center opening near center of roof.

E. Install tank vent at center of roof.

F. Install manholes in tank wall near grade.

G. Employees of the MATD to be experienced in the construction of the specified glass fused to steel tank and should be trained in a factory training program receiving builder certification by the tank manufacturer and shall be employed full time by the authorized dealer.

H. Tank Foundation: Build in accordance with the approved shop drawings, designed by the manufacturers licensed engineer and built by the MATD to safely sustain the structure and its live loads. Floor rebar shall be epoxy coated.

I. Glass Fused to Steel Floor

1. Glass-coated bolted steel floor panels assembled over a 3 inch compacted sand base contained by a concrete ring wall. Alternatively, if the panels are to be set on a concrete slab, a non-extruding and resilient bituminous type of filler may be used, meeting the requirements of ASTM D1751.

2. Tank footing design base on the soil bearing capacity indicated on the plans and/or geotechnical report.

3. NSF 61 compliant plastic encapsulated nuts to cover bolt threads exposed on the inside of the floor.

J. Tank Structure

1. Field erection of the glass-coated, bolted-steel structures and components to be in strict accordance with the procedures established by the manufacturer and performed by MATD who is regularly engaged in erection of the manufacturers glass fused to steel tanks, using experienced factory-trained certified erectors fully employed by the Dealer.

2. Only specialized erection jacks and building equipment developed and supplied by the tank manufacturer shall be used to erect the tanks. Every sheet to be 100% tested for interior holidays in the field.

3. Take particular care in handling and bolting of the glass-coated steel tank panels, appurtenances and members to avoid abrasion of the coating system. Prior to liquid test, visually inspect all surface areas. Repair chips or scrapes in the glass coating per the tank manufacturer's recommended procedure.

4. Perform an electrical coating leak test during erection using a wet sponge nine-volt leak detection device. Repair electrical leak points found on the inside surface in accordance with manufacturers published touch-up procedures.

3.2 FIELD TESTING

A. Following completion of erection and cleaning of the tank, test the structure for liquid tightness by filling to its overflow elevation.

B. Correct any leaks disclosed by this test in accordance with the manufacturer's recommendations.

C. Water required for testing following completion of tank erection will be furnished by the owner. Disposal of water, if required, following testing is by the Owner. Labor and equipment necessary for hydrostatic tank testing to be included in the contract price of the tank.

3.3 DISINFECTION

A. The tank structure to be disinfected at the time of testing by chlorination in accordance with AWWA C652 11, or latest revision, "Disinfection of Water Storage Facilities".
B. Acceptable method of disinfection: Chlorination Method 1, 2 or 3 per AWWA C652-11.
C. Acceptable form of chlorine for disinfection: Sodium Hypochlorite, as specified in AWWA C652-11.
D. Disinfection shall not take place until the tank sealant is fully cured (10 to 12 days at 73°F and 50% relative humidity or equivalent).

3.4 FIRST YEAR INSPECTION

A. On or near the (1) year anniversary date of initial tank use (but not more than (14) months from date of delivery of tank materials to job site), the MATD to make a visual inspection of the tank interior coating and appurtenances, tank exterior coating and appurtenances, and the immediate area surrounding the tank for evidence of leakage. A written summary of the inspection report will be filed with the tank owner and the tank manufacturer.

B. Water required for the inspection process will be furnished and disposed of by the Owner.

3.5 PIPING CONNECTIONS

A. Connect tanks to water-distribution piping.
B. Connect drains to storm-drainage piping.

3.6 ELECTRICAL CONNECTIONS

A. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted.

D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 26 05 53 "Identification for Electrical Systems."

3.7 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.
B. Connect control wiring according to Section 26 05 23 "Control-Voltage Electrical Power Cables."

3.8 SURFACE WATER-STORAGE TANK APPURTENANCE INSTALLATION

A. Install and adjust water-level control valves, piping, and alarms.
B. Install lightning protection according Section 26 41 13 "Lightning Protection for Structures."
C. Install cathodic protection according to Section 13 47 13 "Cathodic Protection" and AWWA D104.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Tank Weld Test: Use radiographic method according to AWWA D100. Repair failures and retest.

2. Leak Test: Comply with AWWA D100. Fill tanks with potable water and test for leaks after installation. Repair leaks and retest until no leaks exist.

a. Water will be furnished by Owner.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Unit will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.10 CLEANING

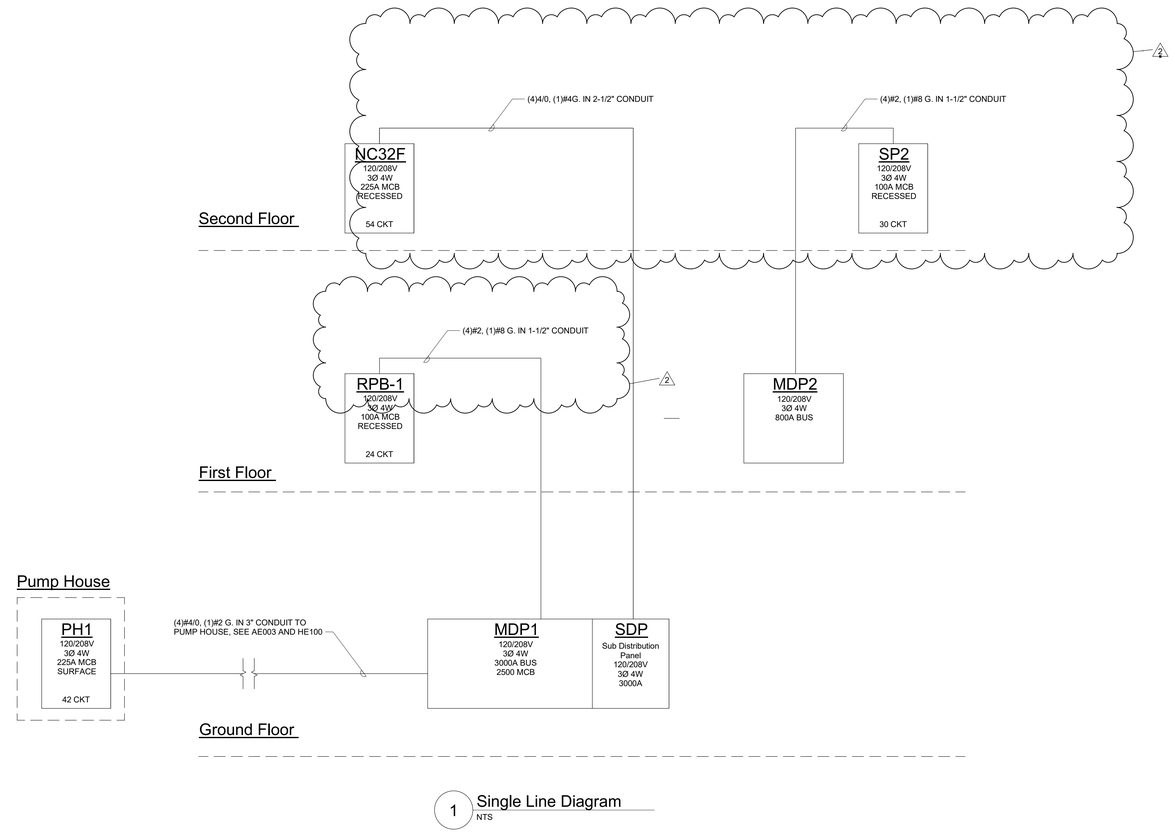
A. Clean interior and exterior of ground-mounted, potable-water storage tanks.
B. Disinfect surface water-storage tanks according to AWWA C652.

3.11 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the following:

1. Obstruction lighting.
2. Water-level controls.
3. Tank circulator.

END OF SECTION 22 12 19



1 Single Line Diagram
NTS

General Notes

A. REFER TO DRAWING AE050 FOR GENERAL AND DEMOLITION NOTES.

DRAWING RE-ISSUED BY BID ADDENDUM NO 2

S.E.D. Control No. 48-01-01-06-0-004-020

Rev. No.:	Date:	Description:
2	2/16/21	BID Addendum No 2

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Mahopac, NY

Reconstruction To:
Mahopac High School

Single Line Diagram

Drawn By:	Date:	Drawing Number:
CR	8/21/20	AE700

Project No.: 121111-19002