THE SCHOOL DISTRICT OF PHILADELPHIA  
SCHOOL REFORM COMMISSION  
Office of Capital Programs  
440 North Broad Street, 3rd Floor – Suite 371  
Philadelphia, PA 19130  
TELEPHONE: (215) 400-4730

Addendum No. 001 (CORRECTED)

Subject: Boiler Plant Replacement Bid Package  
General, Mechanical, & Electrical  
SDP Contract No. B-108c/109c/110c of 2017/18

Location: Mastbaum High School  
3116 Frankford Avenue  
Philadelphia, Pennsylvania 19134

This Addendum, dated May 09, 2019, shall modify and become part of the Contract Documents for the work of this project. Any items not mentioned herein, or affected by, shall be performed strictly in accordance with the original documents.

Revise as indicated below or by attachment

1.1 Specifications

1.1.1 List of Drawings
ADD Drawing P-102 Plumbing Fuel Oil Tank Demolition and New Work.

1.1.2 Table of Contents
ADD Section 02 6500 Underground Storage Tank Removal.

1.1.3 Section 01000 Summary of Work
ADD section 1.03.A.3.j:
“j. Remove 15,000 gallon underground fuel oil storage tank and associated piping. Provide new 15,000 gallon underground fuel oil storage tank and fuel oil piping.”

1.1.4 Section 01 9113 General Commissioning Requirements, 1.01.A
CHANGE the section to read: “The MECHANICAL Contractor will procure a Commissioning Authority (CA). The CA must be:
1. An employee or subcontractor of the MECHANICAL Contractor
2. Independent and a disinterested party from the Electrical Contractor, the General Contractor….”

1.1.5 ADD section 02 6500 Underground Storage Tank Removal. [See Attached]

1.1.6 REPLACE section 23 1113 Facility Fuel-Oil Piping with Addendum 001 Version. [See Attached]

2.1 Drawings

2.1.1 Drawing G-001: ADD Sheet P-102, Plumbing Fuel Oil Tank Demolition and New Work to the Drawing Index as Sheet 19A.
2.1.2 Drawing A-101, Architectural Demolition Plan: DELETE keynote 4 from equipment pad currently supporting the natural gas booster pump. This pad will be reused. Refer to P-101.

2.1.3 Drawing A-101, Architectural New work Plan: ADD an equipment pad for NGBP-2. Tag with new work keynote #3. ADD the existing to remain equipment pad for NGBP-1. Refer to P-101.

2.1.4 Drawing M-101: ADD General Note #6: “Coordinate the phasing of all demolition with the SDP Construction Manager. Certain aspects of the existing boiler plant must remain in operation to support the temporary boilers until the new boilers are functional. This includes- but is not limited to – the condensate pumps, boiler feed tank, and boiler feed pumps.”

2.1.5 Drawing M-403: DELETE “EX” from the pipe tags of the plan south 10” LPS connections to the boilers.

2.1.6 Drawing M-403: ADD 6” Combustion air intake and 6” vent from GUH-1 and GUH-2 to plan north wall and concentric vent kit at plan north wall. ADD the following to keynote #3: “Core drill exterior wall. Provide combustion air intake and vent ductwork from gas fired unit heater to exterior wall penetration. Provide concentric vent kit and seal annular space around penetration.”

2.1.7 Drawing M-601: REVISE Gravity Intake Hood Schedule MODEL column for GIH-1 and GIH-2:

From “WIH-48x60” to “WIH-60x60”

2.1.8 Drawing M-601: ADD Note #2 to Motor Operated Damper Schedule and indicate that this note applies to MOD-3 and MOD-4 in the REMARKS column.

“Mount the actuator for the motor operated damper vertically upward from the damper. Maintenance access to actuator will be through the louvered penthouse from above.”

2.1.9 Drawing M-701: Delete “Wiring By” columns of “Steam and Condensate Control Diagram”, “Hot Water Heat Exchanger and Pumps Control Diagram”, and “Natural Gas Booster Pump Control Diagram”. Control and low-voltage (less than 120V) wiring and conduit is to be provided by the mechanical contractor. Power wiring (120V and greater) and conduit is to be provided by the electrical contractor.

2.1.10 REPLACE P-101 with Addendum 001 Version. [See attached]

2.1.11 ADD Drawing P-102, Plumbing Fuel Oil Tank demolition and New Work [See attached]

2.1.12 Drawing E-401: ADD 120V wiring and conduit circuit from the remote overfill alarm panel to Panel PPBA. Refer to P-102.

2.1.13 Drawing E-401: ADD 120V wiring and conduit circuit from the level control system and secondary containment leak detection panel to PPBA. Refer to P-101.

2.1.14 Drawing E-501: ADD the remote overfill alarm panel and the level control system and secondary containment leak detection panel to PPBA panel schedule.
3.1 Contractor questions:

3.1.1 What contractor is hiring the commissioning agent?

RESPONSE: The mechanical contractor will hire the commissioning agent.

3.1.2 Is the Mechanical Contractor to hire the water treatment contractor? Normally the School Districts hires the Water Treatment Contractor and the Mechanical purchases the equipment. Please advise.

RESPONSE: SDP will hire the Water Treatment Contractor

3.1.3 Who is responsible for the Asbestos Abatement? The specifications read as below:

The Asbestos Abatement Contractor (AAC) shall be employed as a sub-contractor to the Prime Mechanical Contractor (GC) awarded this project.

RESPONSE: The mechanical contractor will hire the asbestos abatement contractor.

3.1.4 How many new louvers are required?

RESPONSE: Refer to Sheet A-101, New Work Keynote #8 and Architectural Roof Plan – New Work #4. Two rectangular louvers are indicated.

3.1.5 Does new chimney access door need a fire rating?

RESPONSE: Provide a tight-sealing, non-combustible masonry chimney cleanout cover per 2018 International Building Code Chapter 21.

3.1.6 What is required at roof area where skylight is to be removed?

RESPONSE: Two louvered penthouses (GIH-1 and GIH-2) are to be installed. Refer to M-403 and A-501 details 2 and 3.

3.1.7 Spec. Section 01 1000, “Summary of Work”, Page 3, Section 1.06, #2, B-109 Mechanical Contract states mechanical contractor to install “controls, and low voltage conduit and wire.” Drawing M-702 contradicts this and states “Control wiring by electrical contractor. Is the mechanical contractor (B-109c) or the electrical contractor (B-110c) responsible for the conduit and wiring required for controls?

RESPONSE: Drawing M-702 has been corrected per this addendum. Control and low-voltage (less than 120V) wiring and conduit is to be provided by the mechanical contractor. Power wiring (120V and greater) and conduit is to be provided by the electrical contractor.

3.1.8 Drawing M101 note #15 states to remove all piping in their entirety but Drawing M402 shows to connect 8” steam piping to the existing 14” LPS main. It also shows new connections from the new boilers to the existing 12” LPS main. Which is correct?
RESPONSE: Two louvered penthouses (GIH-1 and GIH-2) are to be installed. Refer to M-403 and A-501 details 2 and 3.

3.1.9 Drawing M101 note #15 states to remove all piping in their entirety but Drawing M402 shows to connect 8” steam piping to existing 14” LPS main. It also shows new connections from the new boilers to the existing 12” LPS main. Which is correct?

RESPONSE: The referenced clerical errors of Sheet M-402 have been corrected. See attached.

3.1.10 New work key note 7 on drawing A101 calls for a new louvered penthouse – see mechanical drawings. We cannot find any louvered penthouse details on the mechanical drawings. Please clarify.

RESPONSE: See Sheet M-601 Gravity Intake Hood Schedule for GIH-1 and GIH-2. Note amendment to this schedule per Addendum 001.

END OF ADDENDUM #001
SECTION 02 6500
UNDERGROUND STORAGE TANK REMOVAL

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Removal and disposal of underground storage tanks and connected piping.
B. Cleaning and vapor freeing of tanks.
C. Fuel removal.
D. Temporary containment of excavated soil.
E. Water disposal.
F. Providing reports required by regulatory agencies.
G. Backfilling.

1.02  REFERENCE STANDARDS

A. API RP 1604 - Closure of Underground Petroleum Storage Tanks; 1996 (R2010).

1.03  SUBMITTALS

A. Site Safety and Health Plan: Describe safety and health plan and procedures as related to underground tank removal and pipe removal, and as related to operations associated with petroleum contaminated soils and water.
B. Excavation and Material Handling Plan: Describe methods, means, equipment, sequence of operations and schedule to be employed in excavation, transport, handling, and stockpiling of soil during underground tank removal.
   1. Submit to Engineer of Record fifteen days before beginning tank removal work.
   2. Include a material handling plan that describes phases of dealing with the contaminated soil and water as it relates to the proposed tank and piping removal.
   3. Include methods of excavating, a material handling plan for the contaminated material, soil testing requirements, safety precautions and requirements, and water pumping and collection requirements.
C. Field Sampling and Laboratory Testing Plan: Describe field sampling methods and quality control procedures.
   1. Identify laboratory and laboratory methods to be used for contamination testing.
   2. Sample reports shall show sample identification for location, date, time, sample method, contamination level, name of individual sampler, identification of laboratory, and quality control procedures.
D. Tank and Piping Removal and Disposal Plan: Describe methods, means, sequence of operations, and schedule to be employed in the testing, pumping, cleaning, de-vaporizing, inspecting, removal, and disposal of underground storage tanks and piping.
E. Spill and Discharge Control Plan: Describe procedures and plan related to potential spills and discharge of contaminated soils and water.
F. Reports:
1. Identification of tanks removed and disposed of, including site map showing location of tank and piping.
2. Starting and ending dates of reporting period.
3. Closure report. Incorporate reports, records, and data into a single binder with the title "SITE ASSESSMENT REPORT" on the cover of the binder.
4. Laboratory testing reports, including location of soil excavated and associated OVA/FID (organic vapor analyzer/flame ionization device) readings, and sampling and test results for:
   a. TPH (total petroleum hydrocarbons).
   b. BTEX (benzene, toluene, ethylbenzene, and xylene).
   c. TCLP (toxicity characteristic leaching procedure); if BTEX indicates gasoline, then provide TCLP.
5. Cumulative quantities of soil excavated, beginning with start date for each tank and associated piping.

G. Record Documents:
1. Building permit, inspection permits, and other permits required for underground tank removal.
2. Results of excavation, including sketch showing location of underground storage tank, sampling locations, and extent of excavation.
3. Contaminated soil disposal paperwork, such as laboratory testing reports.
4. Contaminated water disposal paperwork, such as laboratory testing results.

1.04 QUALITY ASSURANCE
A. Perform work in accordance with local, state, and federal regulations and 40 CFR 280.
B. Qualifications: Prior to start of work, submit documentation of recent experience and resumes of personnel working on the project.
   1. Data shall indicate that tank removal contractor, subcontractors, and personnel employed on the project have been engaged in removal, transportation, and disposal of underground tanks and associated piping, are familiar with and shall abide with the following:
      a. Provide documentation that tank removers are certified if locality of project has this requirement.
   2. Furnish the name and qualifications of the proposed Site Safety and Health Officer, based on education, training, and work experience.
C. References: Furnish data proving experience on at least three prior projects that included types of activities similar to those in this project. Provide project titles, dates of projects, owners of projects, point of contact for each project, and phone numbers of each point of contact.

PART 2 PRODUCTS
2.01 MATERIALS
   A. Plastic Sheeting: ASTM D4397.

PART 3 EXECUTION
3.01 PREPARATION FOR TANK REMOVAL AND DISPOSAL
   A. Site Safety And Health Plan (SSHP): Furnish safety, health, and accident prevention provisions and develop a Site Safety and Health Plan (SSHP).
      1. The SSHP shall incorporate the requirements of 29 CFR 1910 and COE EM-385-1-1.
      2. Site work shall not start until the SSHP is approved by the Engineer of Record and Owner.
   B. Site Safety And Health Officer: Identify an individual to serve as the Site Safety and Health Officer (SSHO).
      1. The SSHO shall report problems and concerns regarding health and safety to the Engineer of Record.
2. The SSHO shall have a working knowledge of local and Federal occupational safety and health regulations, and shall provide training to Contractor employees in air monitoring practices and techniques.
3. The SSHO shall also provide day to day industrial hygiene support, including air monitoring, training, and daily site safety inspections.
4. The SSHO shall be trained in the use of the monitoring and sampling equipment, interpretation of data required to implement the SSHP, and to administer the elements of the SSHP.
5. The SSHO shall remain on site during project operations and may be assigned other duties, such as project foreman or quality control manager.

C. Spill And Discharge Control Plan: Develop, implement, and maintain a comprehensive spill and discharge control plan.
1. The plan shall provide contingency measures for potential spills and discharges from handling and transportation of contaminated soils and water.
2. A possible source of guidance for assessment and remediation is API PUBL 1628.

D. Exclusion Zone (EZ) And Contamination Reduction Zone (CRZ): Do not permit personnel not directly involved with the project to enter work zones, called the EZ and CRZ.
1. The EZ shall be an area around the tank a minimum of 10 feet from the limits of the tank excavation.
2. At the perimeter of the EZ, establish a CRZ.
3. Within the CRZ, equipment and personnel shall be cleaned as stated in the paragraph entitled "Personnel and Equipment Decontamination."
4. The Contractor's site office, parking area, and other support facilities shall be located outside the EZ and CRZ.
5. Clearly mark and post the boundaries of the EZ and CRZ.
6. Include a site map, outlining the extent of work zones and location of support facilities, in the SSHP.

E. Training: Provide health and safety training in accordance with 29 CFR 1910 prior to starting work.
1. Furnish copies of current training certification statements for personnel prior to initial entry into the work site.
2. On-Site Training: Prior to starting on-site work, a health and safety training class shall be held by the SSHO to discuss the implementation of the SSHP.
3. Notify the Engineer of Record and owner 24 hours prior to beginning the training class.

F. Personnel Protection: Furnish appropriate personal safety equipment and protective clothing to personnel.
1. Ensure that safety equipment and protective clothing is kept clean and well maintained.

G. Decontamination: Decontaminate or properly dispose of personal protective equipment and clothing worn in contaminated areas at the end of the work day.
1. The SSHO shall be responsible for ensuring that personal protective clothing and equipment are decontaminated before being reissued.

H. First Aid And Emergency Response Equipment And Procedures: Provide appropriate emergency first aid equipment for treatment of exposure to site physical and chemical hazards.
1. Provide and post a list of emergency phone numbers and points of contact for fire, hospital, police, ambulance, and other necessary contacts.
2. Provide and post a route map detailing the directions to the nearest medical facility.

I. Ignition Sources: Do not permit ignition sources in the EZ and CRZ.

J. Personnel And Equipment Decontamination: Decontaminate personnel and equipment before exiting the work zones.
K. Waste Disposal: The SSHP shall detail the practices and procedures to be utilized to dispose of wastes. Upon completion of the project, certify that equipment and materials were properly decontaminated prior to being removed from the site.

1. In an emergency, take action to remove or minimize the cause of the emergency, alert the Engineer of Record and owner, and institute necessary measures to prevent repetition of the emergency.
2. Equip site-support vehicles with route maps providing directions to the medical treatment facility.

M. Unforeseen Hazards: Notify the Engineer of Record and owner of any unforeseen hazard or condition that becomes evident during work.

3.02 TANK CLEANING

A. Fuel Removal:
1. Consider remaining fuel contaminated or waste fuel; pump into 55 gallon drums or other suitable containers for disposal in accordance with approved procedures meeting local, state, and federal regulations.
   a. Drums or tanks used for containerizing waste fuel shall be furnished by Contractor.
2. Dispose of remaining fuel emulsions in accordance with applicable local, state, and federal regulations.

3.03 TEMPORARY CONTAINMENT OF EXCAVATED SOIL

A. Provide temporary containment area near the excavated area.
B. Cover containment area with 30 mil polyethylene sheeting.
   1. Place excavated soil on the impervious barrier and cover with 6 mil polyethylene sheeting.
   2. Provide straw bale berm around the outer limits of the containment area and cover with polyethylene sheets.
   3. Secure edges of sheets to keep the polyethylene sheeting in place.

3.04 EXCAVATION

A. Provide Engineer of Record with written documentation, no later than 30 days before work begins, that proper state or local authorities have been notified.
B. Notify Engineer of Record at least 48 hours prior to start of tank removal work.
   1. Stage operations to minimize the time that tank excavation is open and the time that contaminated soil is exposed to the weather.
   2. Provide protection measures around the excavation area to prevent water runoff and to contain the soil within the excavation area.
C. Excavation: Excavate as required to remove tanks and piping.
   1. Place soil removed from the excavation in a temporary containment area.
   2. Collect and temporarily store water runoff from stockpiled soils.
D. Excavation Methods: Select methods and equipment to remove soil to minimize disturbance to areas beyond the limits of the excavation area.
   1. Material that becomes contaminated as a result of Contractor's operations shall be removed and disposed of at no additional cost to Owner.

3.05 WATER DISPOSAL

A. Dewatering will be permitted only with approval of Engineer of Record.
B. Store and test water generated during removal of tanks and piping.
   1. If contaminated, transport and dispose of water in an EPA approved disposal site in accordance with federal, state, and local requirements.
   2. Non-contaminated water may be disposed of on-site.
3.06 DISPOSAL OF UNDERGROUND TANKS, ANCHORS, SLABS, AND ASSOCIATED PIPING

A. Preparation: API RP 1604. Remove the fill pipe, gage pipe, vapor recovery truck connection, submersible pumps, and drop tube.
   1. Cap or remove non-product piping, except vent piping.
   2. Plug tank openings so that vapors will exit through vent piping during the vapor-freeing process.

B. Purging: Remove flammable vapors in accordance with API RP 1604. Tanks shall be certified as "vapor free" prior to further work.

C. Cleaning and Testing: Clean tank and perform atmosphere testing in accordance with API RP 1604.
   1. Distribution (product delivery) piping shall be cleaned and removed or the piping shall be cleaned, filled with concrete, and abandoned in place.
   2. Test the tank atmosphere and the excavation area for flammable or combustible vapor concentrations, with a combustible gas indicator until the tank is removed from the excavation and from the site.

D. Tank Removal and Disposal:
   1. Plug or cap accessible holes. One plug shall have a minimum 1/8 inch vent hole.
   2. Remove tank from the excavation, place it on a level surface and render it useless in accordance with API RP 1604.
   3. Transport and dispose of tank at an EPA approved disposal site in accordance with federal, state, and local regulations.

3.07 CLOSURE REPORT (SITE ASSESSMENT REPORT)

A. Provide Engineer of Record a Site Assessment Report in a single binder notebook that contains the full collection of reports relating to this work, including but not limited to, records, starting and ending dates of reporting period, inspections, documentation, and data as follows:
   1. Complete UST Notification Form (within 30 days of closure).
   2. Description of work, including removal procedures, number of tanks removed, identification of tanks removed and disposed of, cubic yards of excavated soil, location of disposal sites, and dates of excavation.
   3. Site plan, including location of tanks and piping, limits of excavation, sampling points, results of excavation, and depths.
   4. Laboratory testing reports, copies of data and test results from testing laboratory.
   5. Tank disposal paperwork, contaminated soil disposal paperwork, and contaminated water disposal paperwork.
   6. Certifications required by implementing agency.
   7. Building permit, inspection permits, and other permits required for underground tank removal, notifications, and inspection reports.
   8. Cumulative quantities of soil excavated, beginning with start date for each tank and associated piping.

3.08 SPILLS OF CONTAMINATED SOILS

A. Use appropriate vehicles and operating practices to prevent spillage or leakage of contaminated materials from occurring during operations. Inspect vehicles leaving the area of contamination to ensure that no contaminated materials adhere to the wheels or undercarriage.

3.09 BACKFILLING

A. Backfill, compact, grade, and pave the work area to return to existing conditions per OSHA standards.

END OF SECTION
PART 1 GENERAL

1.01 RELATED REQUIREMENTS
   A. Section 09 9600 - High-Performance Coatings.
   B. Section 22 0553 - Identification for Plumbing Piping and Equipment.

1.02 REFERENCE STANDARDS
   A. API Spec 5L - Line Pipe; 2018.
   C. API Std 2000 - Venting Atmospheric and Low-Pressure Storage Tanks; 2014.
   E. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing and Fusing Operators; 2017.
   L. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.
   M. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
   N. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2013.
   P. ASME B18.2.1 - Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series); 2012, Including July 2013 Errata.
   Q. ASME B18.2.2 - Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series); 2015.
   S. ASME B31.3 - Process Piping; 2016.
   AB. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2016.
AF. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011 (Amended 2012).
AG. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; 2013.
AH. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.
AI. NACE SP0285 - External Corrosion Control of Underground Storage Tank Systems by Cathodic Protection; 2011.
AJ. NACE SP0286 - Electric Isolation of Cathodically Protected Pipelines; 1997 (Reaffirmed 2007).

1.03 ADMINISTRATIVE REQUIREMENTS
A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.04 SUBMITTALS
A. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
B. Shop Drawings: Indicate tanks, system layout, pipe sizes, location, and elevations. For fuel oil tanks, indicate dimensions and accessories including manholes and hold down straps.
C. Certificates: Certify that products meet or exceed specified requirements.
D. Project Record Documents: Record actual locations of piping system, storage tanks, and system components.
E. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Valve Repacking Kits: One for each type and size of valve.

1.05 QUALITY ASSURANCE
A. Welding Materials and Procedures: Comply with ASME BPVC.
B. Welders Certification: In accordance with ASME BPVC-IX.
C. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
D. Installer Qualifications: Company specializing in performing the type of work specified in this section with minimum three years of experience and approved by manufacturer.
E. Valves: Manufacturer's name and pressure rating marked on valve body.
1.06 DELIVERY, STORAGE, AND HANDLING
   A. Protect piping and fittings from soil and debris with temporary end caps and closures. Maintain in place until installation.

1.07 WARRANTY
   A. Provide five year manufacturer warranty for fuel oil transfer pumpset and accessories.

PART 2 PRODUCTS

2.01 PIPING AND FITTINGS
   A. Regulatory Requirements:
      1. Comply with the material, fabrication, and operating requirements of ASME B31.3, except as modified herein.
      2. Comply with ASME B31.1 for installation of fuel oil piping.
      3. Comply with applicable regulations for installation of fuel oil system.
      4. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of installation of fuel oil system.
      5. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.
   B. Comply with the material, fabrication, and operating requirements of ASME B31.3, except as modified herein.
   C. Carbon Steel Pipe:
      1. Comply with One of the Following:
         a. ASTM A53/A53M, Type E or S, Grade B, seamless or electric welded, Schedule 80 for pipe less than 2-1/2 inch in diameter or Schedule 40 for pipe 2-1/2 inch in diameter and larger.
         b. API Spec 5L, Product Specification Level (PSL) 1, Grade B, submerged-arc welded or gas metal-arc welded.
      2. End Connections:
         a. Forged, socket weld type, complying with ASTM A182/A182M and ASME B16.11 for pipe or fittings less than 2-1/2 inch.
         b. Buttweld type complying with ASTM A234/A234M, Grade WPB and ASME B16.9 for pipe or fittings 2-1/2 inch and larger of the same wall thickness as the adjoining pipe.
         c. Threaded type complying with ASME B16.3, Class 150 or ASME B16.11.
      1. Manufacturers:
         b. Rovanco: www.rovanco.com/#sle
         c. Tricon Piping Systems, Inc.: www.triconpiping.com/#sle
      2. Physical Characteristics:
         a. Fiberglass reinforced plastic (FRP) complying with ASTM D5677.
         b. Chemically compatible with type of fuel handled.
         c. Non-corrosive.
         d. Dielectric.
         e. Non-biodegradable.
         f. Microbial resistant.
         g. Pressure Limitation: Capable of withstanding 5 psig minimum air pressure.
      3. Design Characteristics:
         a. Piping and support allow for drainage.
         b. Allows for complete inspection of the product piping prior to sealing of containment piping.
         c. Pipe Supports:
1) Design based on pipe size, pipe weight, fuel weight, and operating condition to evenly separate containment piping from product piping.
2) Construct of same material as product piping.
3) Design supports so no point loading occurs on the primary or exterior pipe.
4) Permanently attach supports to product pipe by tack welding or adhesive.
5) Design to allow for pipe movement of both product piping and exterior containment piping without causing damage to either.

E. Copper Pipe: Type K.
1. Comply with ASTM B88 and ASTM B88M.
2. Fittings and End Connections:
   a. Wrought Copper and Bronze Solder-Joint Pressure Fittings: Comply with ASME B16.22 and ASTM B75/B75M.
   b. Cast Copper Alloy Solder-Joint Pressure Fittings: Comply with ASME B16.18.
   c. Cast Copper Alloy Fittings for Flared Copper Tube: Comply with ASME B16.26 and ASTM B62.
   d. Brass or bronze adapters for brazed tubing acceptable for connecting tubing to flanges and threaded ends of valves and equipment.
   e. Extracted brazed tee joints acceptable if produced with acceptable tool and installed in accordance with manufacturer's recommendations.
3. Solder:
   a. Comply with ASTM B32, grade Sb5, tin-antimony alloy for service pressures up to 150 psig.
   b. Comply with ASTM B813 for solder flux in non-corrosive, liquid, or paste form.
4. Brazing Filler Metal:
   a. Filler metal to comply with AWS A5.8M/A5.8, Type Bag-5 with AWS Type 3 flux.
   b. Type BCuP-5 or BCuP-6 acceptable for brazing copper-to-copper joints.

2.02 FLANGES, COUPLINGS, AND PIPING COMPONENTS

A. Flanges:
1. Provide flanged end connections on equipment, fittings, piping, piping components, adapters, couplings, and valves complying with ASME B16.5, Class 150.
2. Gaskets, Non-Isolating:
   a. 1/8 inch thick.
   b. Comply with ASME B16.12, raised-faced type.
   c. Material: Buna-N.
3. Gaskets, Electrically Isolating:
   b. Electrical Insulating Material: 1000 ohms resistance.
   c. Chemically compatible with fuel handled.
   d. Full face type.
   e. Provide full surface, spiral-wound, mylar, insulating sleeves between bolts and holes of flanges.
   f. Furnish bolt shank diameter not less than diameter at root of threads.
   g. Provide high-strength 1/8 inch thick, phenolic, insulating washers next to flanges with flat, circular, stainless steel washers over the insulating and under bolt heads and nuts.
   h. Supply adequate bolt length to accommodate insulating gaskets and stainless steel washers.
4. Bolts, Nuts, and Washers:
   a. Comply with ASME B18.2.1 and ASME B18.2.2.
   b. Bolts:
      1) Regular hexagonal type.
2) Threaded in accordance with ASME B1.1, Class 2A fit, Coarse Thread Series, for sizes 1 inch and smaller and Eight-Pitch Thread Series for sizes larger than 1 inch.

3) Provide sufficient length to obtain full bearing on nuts, projecting no more than two full threads beyond nuts with bolts tightened to required torque.

c. Nuts:
   1) Hexagonal, heavy series type.
   2) Threaded in accordance with ASME B1.1, Class 2B fit, Coarse Thread Series for sizes 1 inch and smaller and Eight-Pitch Thread Series for sizes larger than 1 inch.

B. Piping Components:
   1. Provide components that meet the material, fabrication, and operating requirements of ASME B31.3, except as modified herein.
   2. Pressure Design Class: Class 150 as defined in ASME B16.5.
   3. Threaded Unions:
      b. Materials: Comply with ASTM A312/A312M, Grade 304 or 316.
      c. Dielectric Unions: Comply with dimensional, strength, and pressure requirements of ASME B16.39, Class 150.
      d. Provide galvanized or plated steel parts.
      e. Furnish water-impervious insulation barrier capable of limiting galvanic current to one percent of the short-circuit current in a corresponding bimetallic joint and withstand a 600 volt breakdown test when dry.

2.03 GATE VALVES

A. Manufacturers:

B. MSS SP-80, Class 125, bronze body, bronze trim, rising stem, handwheel, inside screw, solid wedge disc, solder ends.

2.04 GLOBE VALVES

A. Manufacturers:

B. MSS SP-80, Class 125, bronze body, bronze trim, handwheel, bronze disc, solder ends.

2.05 BALL VALVES

A. Manufacturers:

B. MSS SP-110, Class 150, 400 psi CWP, bronze, two piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder.

2.06 SWING CHECK VALVES

A. Manufacturers:
B. MSS SP-80, Class 125, bronze body and cap, bronze swing disc, solder ends.

2.07 RELIEF VALVES
A. Manufacturers:
B. Bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated at maximum 60 psi, UL listed for fuel oil, capacities ASME certified and labelled.

2.08 STRAINERS
A. Manufacturers:
B. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.

2.09 FLEXIBLE CONNECTORS
A. Manufacturers:
B. Bronze inner hose and braided exterior sleeve, suitable for minimum 200 psi CWP and 250 degrees F.

2.10 UNDERGROUND FUEL STORAGE TANKS
A. Manufacturers:
B. Tank: Double Wall mild carbon steel, ACT-100-U compliant, UL-58 Type I listed and labeled, UL-1746 listed and labeled, and API Std 650 compliant.
1. Operating Pressure: Atmospheric.
2. Exterior Finish: SP6 Blast, 70 mils of urethane per ACT-100U. Factory spark tested.
3. Provide with anchor straps with neoprene liner and turnbuckles (2 per strap), attachments, fittings, lifting lungs, and tappings for accessories.
C. Filler Cap: 3 inch watertight brass with lock, recessed box and cover.
D. Gauge: Remote reading, electronic, for two wire, 24 volt power, with wall mounted direct reading gauge.
E. Cathodic Protection: Galvanic type with sacrificial magnesium anodes welded to tank, to NACE SP0285.
F. Capacity:
1. Volume: 15,000 gallons.
2. Diameter: 120 inches.
G. Tank Fittings with 150# flanges:
1. Fill: 4 inch.
2. Vent: 4 inch, galvanized, including "T" and elbow assembly with 1/4 inch square mesh screen over inlet.
3. Suction: 4 inch anti-siphon connection to tank bottom with foot valve.
4. Return: 4 inch.
5. Gauge Fitting: 4 inch.
6. Internal Monitor Pipe: 2 inch.
8. Provide striker plates at each opening.

H. Manways: 42 inch diameter, with nuts, bolts, cover, gasket, and extension sleeve; located at top of tank.
1. AASHTO Standard for "H-20" truck loadings.

I. Internal Ladder: 2"x 1/4" bar sides and 3/4" diameter rungs on 12" center.

J. Air Test: Bubble test interior and interstitial space prior to installation with a charge of 5 PSI.

K. Warranty: Provide a 30-year warrant against failure due to exterior corrosion and internal corrosion when used with petroleum products.

L. Level Control System and Secondary Containment Leak Detection System:
1. Manufacturers:
   a. Pneumecator; TMS3000, MP 450 S, and ES825-200F: http://www.pneumecator.com/#sle
   b. Preferred Utilities: https://www.preferred-mfg.com/#sle
   c. Kenco Engineering: http://kenco-eng.com/#sle
   a. Nine digit, seven segment display; LED alarm indicators; and 85 dB alarm
3. Rigid 316 Stainless Steel Magnetostrictive Probe
4. Solid state, electronic, product distinguishing leak sensor utilizing both electro-optical and conductivity technology to differential between hydrocarbon-based liquid and water.
   a. UL Class I, Div1, Groups C and D.
5. UL Approved.

M. Outdoor Overfill Alarm Panel
1. Outdoor overfill alarm panel, 85dB audible alarm with auto-silence after 20 seconds, and persistent red indicator light in NEMA 4x enclosure.

2.11 FUEL OIL PUMPS
A. Manufacturers:
1. Preferred Utilities: www.preferred-mfg.com/#sle
2. Smith-Koch: www.geigerinc.com/#sle
3. Simplex, Inc: www.simplexdirect.com/#sle
4. Suntec: www.suntecpumps.com/#sle

B. Listed and Labeled in accordance with UL 343.

C. Furnish and install one (1) transfer pump set, as required, to deliver fuel oil from storage tank to burner supply loop. Unit shall be a complete factory packaged assembly, consisting of duplex fuel oil pump set; piped, wired and fitted out with required components, mounted onto a steel containment base. Mounting base shall be fabricated of steel plating of not less than 1/8" thick with a 1" high spill proof containment wall surrounding entire base. One 1/4" plugged drain connection shall be included in containment wall. Provide at each corner, external to mounting base, welded steel tie downs for purpose of securing pump set assembly to housekeeping pad. Pumps, motors and related components shall be attached to mounting brackets by means of bolting. Mounting brackets shall be secured to base by continuous weld. Steel brackets for mounting and/or supporting of electrical control panel shall be welded to mounting base. Penetration through containment base for purpose of mounting equipment and/or anchoring same to housekeeping pad shall not be acceptable. All piping shall be schedule 80 carbon steel ASTM-A-53. Fittings shall be 150# minimum malleable iron. Unions shall be installed at the inlet and discharge of each pump, to enable removal of pump without disassembly of piping.
Capacity and sizing shall be based on 40 SSU oil supplied to pump suction. The following components shall be included with the pump set:

1. Two (2) fuel oil pumps; pumps shall be positive displacement, rotary internal gear type with mechanical seal. Motor and pump shall be the close-coupled design. Each pump shall have a minimum capacity and discharge head as scheduled. Pumps shall be capable of developing 25 inches mercury vacuum at 0 PSI factory tested. Pump motors shall have a horsepower as scheduled, 208 Volts, 60 Cycle, 3 Phase, 1800 RPM.

2. Two (2) U.L. listed duplex strainer with brass mesh strainer baskets. Strainer shall be one piece body casting of 150 PSI cast iron with screwed connections. Strainer shall be capable of being cleaned without disruption to oil flow.

3. Two (2) external fuel oil relief valves. Each relief valve shall be a cast bronze body with brass and bronze internals. Valve to have 150 lb. body rating with adjustable range of 0 to 50 lbs. Set relief valve at 10 PSI.

4. Gate valves shall be installed on suction and discharge of each fuel oil pump and prior to all gauges. Valves to be threaded bronze bodied, with bonnet, discs and stem of bronze. Packing to be fuel oil resistant. Provide check valves in the discharge line of each pump. Check valves shall be thread cast bronze body with bronze internals.

5. Pressure gauge, 0-60 PSIG shall be provided on discharge of fuel pumps after throttling valve. Compound gauges shall be installed prior to and after the fuel oil duplex strainer. Gauges shall be 2-1/2 inches diameter and shall have a dial range from 30 inches of vacuum to 15 PSI. Case shall be black finished steel, with steel dial. Movement to be brass with phosphor bronze bourdon tube. Isolation valve to be installed in line before each gauge.

6. Throttling valve. A plug valve or gate valve with a needle type position indicator shall be provided on the discharge of each pump to permit throttling the discharge of each pump to 5 PSIG.

7. One (1) Back Pressure Regulating Valve shall be supplied loose for field mounting by contractor as shown on drawing. Valve shall be set to maintain 5 PSI pressure on fuel oil supply loop.

8. Control panel shall be provided as part of the transfer pump system. Control Cabinet shall be manufactured and labeled in accordance with UL508A. Simply supplying UL recognized individual components is not sufficient. The assembled control cabinet, as a whole, must be inspected for proper wiring methods, fusing, etc. and must be labeled as conforming to UL508A. Inspection and labeling shall be supervised by UL. The system must be manufactured by a nationally recognized Trade Union (I.B.E.W. or similar trade union). Lack of an NRTL certified UL508A wiring methods inspection and label or lack of a Trade Union label will be grounds for rejection. Panel shall be NEMA type with full piano hinge, factory pre-wired and tested. Panel shall house the necessary overload devices, switches, lights, circuit breakers, control circuit transformer, starters, relays and controls. Panel shall be suitable for one electrical power field connection. The following switches and indicators shall be provided: Panel shall be NEMA type with full piano hinge, factory pre-wired and tested. Panel shall house the necessary overload devices, switches, lights, circuit breakers, control circuit transformer, starters, relays and controls. Panel shall be suitable for one electrical power field connection. The following switches and indicators shall be provided:
   a. Auto/Manual/Off selector switch for each pump.
   b. Fused control circuit transformer for each circuit, when motor exceeds 120 volts.
   c. Motor starters, each having three overload relays, with circuit breaker.
   d. PUMP ON indicating light for each pump.
   e. Separate indicating lights for flow failure and oil detection.
   f. Annunciation to sound and indicate flow failure or oil detected in the sump. An additional remote audio and visual alarm signals shall be incorporated in remote Equipment Alarm Panel located in Custodian’s room which will have alarm-silencing push button.
g. Necessary transformers, relays, contactors, power supplies, fuses and devices to accommodate intent of specifications.

h. Numbered terminal block or strip.

i. Identification nameplates for all switches, indicating lamps and components.

j. Electric alternator.

9. Sequence of operation shall allow manual selection of active pump. Should active pump fail, the stand-by pump, after a field adjustable time delay period, shall be brought on line and the alarm horn will sound. System must incorporate an adjustable time delay on failure to eliminate nuisance shut downs.

10. Control Circuits: Independent of each pump with electrical alternator to operate pumps in sequence.

11. Manual Lead-Lag Control: Overrides electrical alternator when active pump is manually selected.

12. Leak detection. Unit shall have an oil detector in the containment base, arranged to shut down both pumps and sound the alarm horn when the detector detects oil in the sump.

D. Factory Testing: Pump Sets must be fully tested prior to shipment. Testing shall include both a pressure and vacuum testing period. First, the complete pump set shall be pressure tested to rated pressure using an air pressure source. The test shall confirm that the pump set piping system can maintain rated pressure for 4 hours. Next, the complete pump set shall be brought to a vacuum greater than 25" Hg. The test shall confirm that the pump set piping system can maintain vacuum for 4 hours. Following a pressure and vacuum test the pump set shall be given a full operational test. The pump set shall be connected to a fuel oil supply and return. The pump set shall be operated normally. Motor amps shall be noted at no load and full load for each motor. The motor amps shall be within 10% of rated motor amps. During the test, the relief valve shall be set and tested. Operation of pump set instrumentation shall be tested. A copy of the test procedures shall be sent to the consulting engineer and owner. The owners and or the consulting engineer at their discretion shall observe this and all other tests. A certificate of factory testing, together with a copy of the wiring diagram and arrangement diagrams shall be placed in the control cabinet prior to shipment.

E. After testing, the entire unit shall be painted with temperature, water and chemical resistant enamel. All nameplates, gauges, brass valves, shafts and other moving parts shall be masked and left unpainted. Provide touch-up paint to marred surfaces after installation and start-up.

F. Install fuel oil transfer pumps on concrete base. Anchor the unit to the base.

2.12 ANTI-SIPHON VALVE

A. Manufacturers:
   1. Preferred Utilities, Model A
   3. OPW

B. UL listed for fuel oil service.

C. Body: Bronze with oil-proof gasketing

D. Spring loaded poppet

E. Composition seat and dashpot

2.13 OIL SAFETY VALVES

A. Manufacturers:
   1. Suntec Industries, Inc.
   2. Webster Fuel Pumps & Valves; a division of Capital City Tool, Inc.
   3. OPW

B. UL listed for fuel oil service. Include metal body; broken-line, oil shutoff feature; and 40-psig minimum pressure rating.
2.14 FUSOMATIC GATE VALVE
   A. Acceptable Manufacturers
      1. Preferred Utilities
   B. Class 125, bronze body, valves suitable for fuel oil service
   C. UL Listed and meets NFPA 31 Standard
   D. Quick-closing, spring-loaded and thermally actuated fusible element that melts at 165 deg. F causing the valve to close tightly.

2.15 TRANSITION SUMP
   A. Manufacturers:
      2. OPW: https://www.opwglobal.com/opw-retail-fueling/#/sle
   B. H-20 Load rating composite material with fueltight and watertight seals at the lid and around piping entries.
   C. 30" burial depth.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that excavations are to required grade, are dry, and have not been over-excavated.

3.02 PREPARATION
   A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
   B. Remove scale and dirt, on inside and outside, before assembly.
   C. Prepare piping connections to equipment with flanges or unions.

3.03 PIPING INSTALLATION
   A. Provide only rigid, metal piping inside the facility. If plastic piping is utilized outside, provide a transition sump just outside the building penetration to transition between materials.
   B. Install in accordance with manufacturer's instructions and API RP 1615.
   C. Provide non-conducting dielectric connections wherever jointing dissimilar metals. Install to NACE SP0286.
   D. Route piping in orderly manner and maintain gradient.
   E. Group piping whenever practical at common elevations.
   F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
   G. Provide clearance for installation of insulation and access to valves and fittings.
   H. Where pipe support members are welded to structural building framing, scrape, brush clean, weld, and apply one coat of zinc rich primer. Refer to Section 09 9600.
   I. Identify piping systems including underground piping. Refer to Section 22 0553.
   J. Install valves with stems upright or horizontal, not inverted.
   K. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

3.04 FUEL TANK INSTALLATION
   A. Install tanks in accordance with manufacturer's instructions and API RP 1615.
   B. Clean and flush underground tanks prior to delivery to site. Seal until pipe connections are made.
C. Install underground tanks on concrete ballast pad with mass equal to tank capacity, and secure with hold-down straps and turnbuckles.

D. Install underground tanks with minimum 24 inches cover.

E. Install single wall underground tanks in concrete vault or provide impermeable liner in excavation around tank.

F. Backfill steel tanks in accordance with NFPA 30 and 31.

G. Provide piping connections to tanks with unions and swing joints. Provide venting to API Std 2000.

H. Extend fill line and cover to grade and provide minimum 24 by 24 by 6 inch concrete pad.

I. Clean and flush day tank prior to delivery to site. Seal until pipe connections are made.

J. Fill tanks at project turn-over with appropriate fuel.

END OF SECTION
1. PROVIDE WITH INTERNAL LADDER, SUCTION LINE POPPET FOOT, STRIKE PLATES, AND INTERNAL STEEL DIPSTICK PIPE.

2. PROVIDE UL LABEL.

3. COORDINATE ELECRICAL REQUIREMENTS OF LEAK DETECTION / LEVEL INDICATOR SYSTEM AND REMOTE OVERFILL ALARM SYSTEM WITH ELECTICAL CONTRACTOR.

4. REMOVE CONDUIT CONTAINING FUEL OIL SUCTION PIPING, FUEL OIL RETURN PIPING, AND LEVEL LINE PIPING FROM UNDERGROUND FUEL OIL STORAGE TANK TO BUILDING.

5. PROVIDE OUTDOOR OVERFILL ALARM WITH AUDIO AND VISUAL ALERTS. MOUNT AT 12'-0" ABOVE GRADE WITH LEAK DETECTION WIRE AND CONDUIT.

6. PROVIDE LEAK DETECTION WIRE AND CONDUIT, LEVEL INDICATOR CONDUIT, FUEL OIL RETURN PIPING TO TANK, STORAGE TANK, FOS, FOR LEVEL, LINE, FILL LINE, AND VENT PIPING.

7. PROVIDE UNDERGROUND STORAGE TANK VENT UP TO ROOF LINE. TERMINATE WITH WHISTLE CAP.

8. PROVIDE REMOTE FILL LINE WITH CONCRETE SURFACE PAD.

9. PROVIDE OVERFILL ALARM PANEL.

10. PROVIDE LEAK DETECTION WIRE AND CONDUIT, LEVEL INDICATOR CONDUIT, FUEL OIL RETURN PIPING TO TANK, STORAGE TANK, FOS, FOR LEVEL, LINE, FILL LINE, AND VENT PIPING.

11. PROVIDE A TRANSITION SUMP TO PERMIT A CHANGE OF MATERIALS IN FUEL OIL PIPING BETWEEN INDOORS AND OUTDOORS.

12. PROVIDE LOCKABLE HANDHOLE FOR SOUNDING CONNECTION WITH CONCRETE SURFACE PAD.


14. PROVIDE CONCRETE PAVING DETAIL 5.

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