PROJECT SPECIFICATIONS

FOR:

GLOUCESTER COUNTY
HARRISON TOWNSHIP EMS BUILDING
Project No.: PD26-041

169-171 BRIDGETON PIKE
MULLICA HILL, NEW JERSEY 08062

PREPARED FOR

GLOUCESTER COUNTY
254 COUNTY HOUSE ROAD
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PREPARED BY

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GENERAL PLUMBING PROVISIONS

PART 1 – GENERAL

1.1 REFERENCE TO CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplementary and other Conditions) and Division 1 - General Requirements, apply to the work specified in Division 22. Unless the specifications contain statements which are more definitive or more restrictive than those contained in the Conditions of the Contract, the specifications shall not be interpreted as waiving or overruling any requirements expressed in the Conditions of the Contract.

1.2 SCOPE OF WORK

A. The scope of the work included under Division 22 of the specifications shall include complete mechanical systems as shown in the Contract Documents and specified herein. Any work reasonably inferable or required to result in a complete installation or the intended operation and performance of the systems, shall be included in the Base Bid except where there is specific reference to exclusion and incorporation in other quotations.

1.3 INTENT OF DRAWINGS

A. Provide a complete mechanical system for the proposed project. The mechanical system provided shall conform to the details stated in the specifications and shown on the drawings. Items or work not shown or specified, but required for a complete mechanical system, shall be provided and shall conform with accepted trade practices. The drawings and specifications are presented to define specific system requirements and serve to expand on the primary contract requirements of providing a complete mechanical system. The drawings are diagrammatic and indicate only the general arrangement of the items comprising the several systems included in the mechanical work.

B. Do not scale the drawings. Because of the scale of the drawings, it is not possible to indicate offsets, fittings, valves, or similar items which may be required to make a complete operating system. Carefully investigate conditions affecting work and install work in such a manner that interferences between pipes, conduit, ducts, equipment, and architectural and structural features shall be avoided and shall provide items that may be required to meet the conditions at the building, without additional cost to the Owner.

C. Bidders shall have sufficient expertise in this type of construction to realize the extent of the work required.

D. It should, therefore, be obvious to any prudent firm with experience in this field that these documents may not explicitly disclose final details; however, the firms offering proposals are represented to possess the expertise necessary to include necessary appointments.

1.4 DEFINITIONS

A. Specific terminology, as used herein, shall have the following meanings:

1. "Furnish"...Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar subsequent requirements.
2. "Install"...Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.
3. "Provide"...Furnish and install, complete and ready for intended use.
4. "Piping"...Pipe, fittings, flanges, valves, controls, hangers, traps, drains, insulation, vents and other items customarily required in connection with the transfer of fluids.
5. "Concealed"...Embedded in masonry or other construction, installed behind wall furring, within double partitions or hung ceilings, in crawl spaces or shafts.
6. "Exposed"...Not concealed.
7. "Conditioned"...Spaces directly provided with heating and cooling.
8. "Unconditioned"...Spaces without heating or cooling including ceiling plenums.
9. "Indoors"...Located inside the exterior walls and roof of the building.
10. "Outdoors"...Located outside the exterior walls and roof of the building.

B. Reference to the following codes and standards shall mean:

Reference	Definition
CGA	Compressed Gas Association, Inc.
ASTM	American Society for Testing Materials
NFPA	National Fire Protection Association
UL	Underwriters Laboratories, Inc.
NEMA	National Electrical Manufacturers Association
USAS	United States of America Standards Institute
ANSI	American National Standards Institute
AWWA	American Water Works Association
FS	Federal Specification, US Government
CS	Commercial Standards issued by US Department of Commerce
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry
AGA	American Gas Association
ADA	Americans with Disabilities Act

C. References to codes, standards, manufacturer's information, etc. are the latest publication in effect during the bid period.

1.5 GENERAL STANDARDS OF MATERIALS

A. Equipment and materials, unless specifically indicated otherwise, shall be new and of first quality, produced by manufacturers who have been regularly engaged in the manufacture of these products for a period of not less than five years.

B. Equipment of one type shall be the products of one manufacturer; similar items of the same classification shall be identical, including equipment, assemblies, parts and components.

C. Materials furnished shall be determined safe by a nationally recognized testing organization, such as Underwriters' Laboratories, Inc., or Factory Mutual Engineering Corporation, and materials shall be labeled, certified or listed by such organizations.

D. With respect to custom made equipment or related installations which are constructed specially for this project, the manufacturer shall certify the safety of same on the basis of test data. The Owner shall be furnished copies of such certificates

E. All products provided shall meet flame spread and smoke spread ratings of 25/50.

1.6 PRODUCTS AND SUBSTITUTIONS

A. Where several manufacturers' products are specified, the bid shall be based upon the specified products only. Proposed substitutions will be considered if received 5 days before the bid date and in accordance with Division 1 requirements.

B. Note that where only one manufacturer's product is specified, the associated systems have been designed on the basis of that product. Where several manufacturer's products are specified, the associated systems have been designed on the basis of the first-named manufacturer's product. When products other than those used as the basis of design are provided, pay additional costs related to modifications to the systems and/or structure required by the use of that product.

C. It is the intent of these specifications that service organizations such as balancing agencies follow the above substitution procedures.

1.7 CODES, PERMITS AND INSPECTIONS

A. Materials furnished and work installed shall comply with the National Standard Plumbing Code, International Mechanical Code, with the International Energy Conservation Code. with the National Fire Codes of the National Fire Protection Association, with the requirements of the local utility companies, and with the requirements of governmental departments or authorities having jurisdiction. Materials and equipment furnished for the electrical portion of the mechanical systems shall bear the approval label of or shall be listed by the Underwriters' Laboratories, Inc. Electrical work shall comply with the National Electrical Code.

B. Provide labor, materials, services, apparatus and drawings required to comply with applicable laws, ordinances, rules and regulations, whether or not shown on the drawings and/or specified.

C. Provide labor, materials, services and apparatus required for the performance and pressure tests specified hereinafter. Final tests shall be conducted in the

presence of the Architect (Engineer) and inspectors of authorities having jurisdiction, who shall be notified, in writing, at least 48 hours in advance of same. Ensure that the work shall stand the final test prior to giving the notification. Should the work fail the final test, necessary corrections shall be made and the work shall be re-submitted for testing and inspection. The cost of the Architect's additional time, travel expenses, and other applicable expenses due to the re-testing shall be included.

D. Obtain and pay for required permits.

1.8 GUARANTEES AND CERTIFICATES

A. Where materials or equipment are specified to comply with requirements of the Underwriters' Laboratory, Inc., the American Refrigeration Institute, the American Society of Mechanical Engineers, or similar technical groups or societies having jurisdiction over the type and design of particular mechanical or electrical equipment specified herein, proof of such compliance shall be submitted. The label or listing of the specified agency shall be acceptable evidence. In lieu of a label or listing, a written certificate may be submitted from an approved, nationally recognized testing organization equipped to perform such services, stating that the items have been tested and conform to the requirements and testing methods of the specified agency. Where equipment is specified to conform to requirements of the ASME Boiler and Pressure Vessel Code, the design, fabrication and complete installation shall conform to that code.

1. Certification shall be submitted attesting to the fact that the specified performance criteria are met by items of equipment.

2. Work shall be guaranteed to be free from leaks or defects. Any defective equipment, materials or workmanship, including damage to the work provided under other divisions of this contract resulting from same, shall be replaced or repaired at no extra cost to the Owner for the duration of the stipulated guarantee periods.

3. Unless specifically indicated otherwise, the duration of the guarantee period shall be one (1) year following the date of final acceptance by the Owner. Owner acceptance will begin with actual occupancy of the areas served by this equipment. Temporary operation of the equipment for temporary conditioning, testing, etc., prior to occupancy will not be considered part of the warranty period.

1.9 QUIET OPERATION AND VIBRATION CONTROL

A. Equipment and associated items shall operate under conditions of load without sound or vibration deemed objectionable by the Architect (Engineer). In the case of moving equipment, sound or vibration noticeable outside of the room in which it is installed, or annoyingly noticeable within the room in which it is installed, shall be deemed objectionable. Sound or vibration deemed objectionable shall be corrected in an approved manner at no extra cost to the Owner. Vibration control shall be provided by means of approved vibration isolators and installed in accordance with the isolator manufacturer's recommendations.

B. The sound pressure levels around mechanical and electrical equipment (fans, pumps, motors, etc.) in equipment spaces shall not exceed 85 dBA at any point three (3) feet from the equipment, with all equipment in the room operating. The sound criteria applies to the complete range of each piece of equipment.

1.10 COORDINATION

A. Coordinate and furnish in writing to the Architect (Engineer) any information necessary to permit the work to be installed satisfactorily and with the least possible interference or delay.

B. Devices and appurtenances which are to be installed in finished areas shall be coordinated with the Architect for final approval as it relates to location, finish, materials, color and texture.

C. When work is installed without proper coordination, changes to this work deemed necessary by the Architect shall be made to correct the conditions without extra cost to the Owner.

1.11 ACCESSIBILITY

A. Coordinate to ensure the sufficiency of the size of shafts and chases, and the adequacy of clearances in hung ceilings and other areas required for the proper installation of this work.

B. Locate equipment which must be serviced, operated or maintained in fully accessible positions. Locations in ceilings requiring access shall be coordinated with, but not limited to, lights, curtain tracks, speakers, and medical gas tracks. Equipment requiring access shall include, but is not necessarily limited to, valves, traps, clean-outs, motors, fire dampers, controllers, switchgear and drain points.

C. Provide drawings for coordination, as required, showing exact locations of access doors for each concealed valve, control, damper, or other device concealed behind finished construction and requiring service. Equipment (valves, RTC) below floor slab or finished grade shall be considered as finished construction. Access doors in finished construction shall be furnished as specified in this section. Locations of access doors in finished construction shall be submitted in sufficient time to be installed in the normal course of the work.

1.12 ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements, furnish access doors by one of the following:

1. Bar-Co., Inc.
2. J. L. Industries
3. Karp Associates, Inc.
4. Nystrom, Inc.

B. Materials and Fabrication:

1. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.
2. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.
3. Frames: Fabricate from 16-gauge steel.
    a. Fabricate frame with exposed flange nominal 1 inch wide around perimeter of frame for units installed in the following construction:
        1) Exposed Masonry
    b. For gypsum drywall or veneer gypsum plaster, furnish perforated frames with drywall bead.
    c. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.
    d. For full-bed plaster applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.

4. Flush Panel Doors: Fabricate from not less than 14-gauge sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175°. Finish with manufacturer's factory-applied prime paint.

    a. For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.
5. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.

C. Furnish access doors under this division for installation by General Contractor. Coordinate during bidding phase with General Contractor.

1.13 ELECTRICAL CONNECTIONS

A. Regardless of voltage, provide temperature control wiring, interlock wiring, and equipment control wiring for the equipment provided under this division of the specifications.
B. Furnish electrical disconnect switches, starters and combination starter disconnects required for equipment provided under this division of the specifications.
C. Power wiring not used for control functions, complete from power source to motor or equipment junction box, including power wiring through starters, shall be provided under Division 16.
D. Coordinate to ensure that electrical devices furnished or provided are compatible with the electrical systems used.
E. Furnish circuit breakers rated for motor protection (for installation under Division 16) for equipment purchased under this division of the specification.

1.14 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Shop drawings, product data, and samples shall be submitted in accordance with the provisions of Division 1 - General Requirements.

B. The following shall be submitted by the Contractor for review by the Architect:
1. Scale shop drawings indicating insert and sleeve locations.

2. Scale shop drawings showing piping and duct runs with sizing indicated.
3. Product data, factory assembly shop drawings, and field installation shop drawings as required for a complete explanation and description of items of equipment, including appurtenances and accessories. Product data for pumps, fans and similar equipment shall include performance curves illustrating equipment performance characteristics under the specified range of operating conditions.
4. Samples of finishes and trim exposed to view, such as cleanout plates, fixture trim, escutcheon plates and similar items.
5. Product data for plumbing fixtures, trim, hangers, and miscellaneous plumbing materials.
6. Product data for piping inserts, rods, hangers, anchors, guides and trapezes.
7. Shop drawings locating piping anchor and guide points and expansion joints or loops.
8. Shop drawings locating access doors in sheet metal work.

1.15 OPERATING AND MAINTENANCE INSTRUCTIONS

A. After final tests and adjustments have been completed, furnish the services of qualified personnel to fully instruct representatives of the Owner in the operation and maintenance procedures for equipment installed including cooling plant, heating plant, air systems, plumbing systems. Operation and maintenance instructions for major items of equipment shall be directly supervised by the equipment manufacturer's representative. Supply qualified personnel to operate equipment for sufficient length of time as required to meet governing authorities' operation and performance tests and as required to assure that the Owner's representatives are properly qualified to take over operation and maintenance procedures. Minimum instruction period shall be 30 man hours. The instruction period shall be broken into segments at the discretion of the Owner.

1. Notify the Architect, the Owner's representative and equipment manufacturers' representatives, by letter, as to the time and date of operating and maintenance instruction periods approved by the Owner at least one (1) week prior to conducting same.

2. Forward to the Architect the signatures of all those present for the instruction periods.

B. Furnish three (3) copied of recommended equipment operation and maintenance procedures manuals as specified herein, assembled and bound together in 8-1/2 x 11 inch three-ring binders. The binders shall be submitted to the Architect in accordance with procedures established for shop drawing submittals in Division 1 - General Requirements.

1. The operation and maintenance procedures manuals shall include the following:
   a. Project title

b. Architect's name and address
c. Date submitted
d. Contractor and subcontractors' name and address
e. Index (in alphabetical order, with page numbers)
f. General description of each system
g. Parts list, identifying the various parts of equipment for repair and replacement purposes.
h. List of spares recommended for normal service requirements.
i. Edited operating instructions outlining step-by-step procedures required for system start-up and operation. The instructions shall include the manufacturer's name, model number, service manual, and brief description of each piece of equipment and its basic operating features.
j. Maintenance instructions describing routine maintenance and lubrication procedures and schedules, and simplified diagrams which illustrate the systems as installed. Instructions as described above shall be tailored for each specific system.
k. Wiring and control diagrams for each piece of equipment, showing "as installed" conditions.
l. Performance curves for pumps, fans and similar equipment.
m. One (1) reviewed copy of each shop drawing submitted.

1.16 SINGULAR NUMBER

A. References made to any item in the singular number shall apply equally to as many identical items that the work may require.

1.17 PROTECTION OF SERVICES

A. Repair, replace and maintain in service any new or existing utilities, facilities or services (underground, overground, interior or exterior) damaged, broken or otherwise rendered inoperative during the course of construction. The method used in repairing, replacing or maintaining the services shall be approved by the Owner and Architect.

1.18 PROTECTION OF FLOORS

A. Protect existing flooring from damage during the construction period. Provide plywood or similar material under equipment or materials stored on floors, and in areas where construction may damage the floor surfaces. Replace floor surfaces (including sealer) damaged during the construction.

1.19 SPECIAL TOOLS

A. Provide the Owner's representative with two (2) sets of special tools required for operation and maintenance of equipment provided.

1.20 REVIEW BY ARCHITECT/ENGINEER

A. Notify the Architect/Engineer at least 48 hours in advance of the date and time of tests specified to be witnessed by the Engineer. The Architect/Engineer reserves

the right to demand repetition of any testing where he is unable to attend due to insufficient notice without additional cost to the owner.

1.21 PRE-BID SITE VISIT

A. Bidders shall visit the site and become completely familiar with existing conditions prior to submitting their bid. No extra charges shall be allowed as a result of existing conditions.

PART 2 – PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. Equipment shall be so built and installed as to deliver its full rated capacity at the efficiency for which it was designed. Equipment shall meet the detailed requirements indicated, and shall be suitable for the installation shown.

B. Where two or more units of the same class of equipment are furnished in same Section of Specifications, provide each from the same manufacturer. Furnish equipment and materials new and free from defects of size, make, type and quality herein specified, or as reviewed. Work shall be installed in a neat and workmanlike manner.

C. Capacities, dimensions, or sizes specified or indicated are minimum, unless otherwise stated. Tolerances used in rating or testing standards specified shall not be allowed in determining capacities of equipment.

D. Materials shall be listed by the Underwriters' Laboratories, Inc. where applicable and shall be manufactured in accordance with applicable standards established by ANSI, NEMA, ASTM, and IEEE.

E. Any products judged not in accordance with the Specifications either before or after installation shall be rejected.

F. Where products are specified with no reference to a particular manufacturer's product, the product used shall meet or exceed industry construction and testing procedure standards applicable to the product, for life expectancy, performance and safety.

G. Where electrical products are a fabricated assembly, the fabricator shall assume responsibility for correct operation of the entire assembly and of its individual components.

H. Tools: Provide special tools for proper operation and maintenance of the equipment.

2.2 ANCHOR BOLTS

A. Provide and set in place, at the time of pouring of concrete foundations, necessary anchor bolts as required for the equipment called for under these specifications. Anchor bolts shall be of the hook type, of proper size and length

to suit the equipment. Anchor bolts shall be set in pipe sleeves of approximately twice the bolt diameter and one half the embedded length of the bolt. Assume full responsibility for proper emplacement of the bolts.

2.3 INSERTS

A. Provide inserts of an approved metallic type for hangers. Where two or more parallel conduits are installed, continuous inserts may be used. Where required to distribute the load on the inserts, a piece of reinforcing steel of sufficient length shall be passed through the insert.

2.4 SLEEVES

A. Provide sleeves in all roofs, floors, and any fire-rated walls. Each sleeve shall extend through its respective floor, wall or partition and shall be cut flush with each surface unless otherwise required.

B. Sleeves in bearing and masonry walls, floors and partitions shall be standard weight steel pipe finished with smooth edges. For other than masonry partitions, through suspended ceilings, and for concealed vertical piping, sleeves shall be No. 22 USG galvanized iron.

C. Sleeves shall be properly installed and securely cemented in place.

D. Floor sleeves shall extend 1 inch above the finished floor, unless otherwise noted. Space between floor sleeves and passing conduit shall be caulked with graphite packing and waterproof caulking compound.

E. Sleeves through exterior walls below grade shall have the space between conduit and sleeve caulked watertight using an approved method.

2.5 FIREPROOFING

A. Where sleeves or other penetrations pierce floors or walls having specific fire ratings, the space between the sleeve and passing conduit shall be fireproofed using 3M Series 7900 Penetration Fire Stop putty. Where a cable tray passes through fire-rated walls, use seal bags as manufactured by International Protection Coatings Company. Installation method shall be per manufacturer's recommendations and approved by the Architect/Engineer.

2.6 MISCELLANEOUS METAL AND STRUCTURAL STEEL

A. Scope of Work: Furnish labor, materials, equipment and services necessary for the installation of miscellaneous metal and structural steel work required to complete this contract. Erect structural steel required for the proper support of equipment required under this contract.

B. Supports, brackets, and clamps and other items specified herein shall be installed in strict accordance with the best practices and recognized code.

C. Materials: Structural steel members required under this part shall conform to ASTM Standard Specification A-7. Other materials shall be as specified hereinafter.

D. Priming: steel and iron work shall be primed with Rust-Oleum 769 or approved equivalent. Before priming, metal shall be thoroughly cleaned free from scale, rust and dirt.

E. Anchors: Provide anchors, bolts, screws, dowels and connecting members, and do cutting and fitting necessary to secure the work to adjoining construction. Build in connecting members to masonry, concrete and structural steel as the work progresses.

F. Supports and Brackets: shall be neatly constructed to structural shapes to adequately support the equipment intended. Supports must be approved prior to installation. Attention is directed to the proper rigid support required for conduit. Field conditions shall regulate the type of support required.

2.7 VIBRATION ISOLATION MOUNTS

A. Provide vibration isolation mounts for all substations, power centers, transformers, etc. All vibration isolation mounts shall be Amber-Booth spring type applicable for the size and weight of the equipment.

2.8 GRADING, FERTILIZING, AND SEEDING

A. Provide labor, materials, equipment, and services required to strip and store topsoil, replace topsoil, and rough and finish grade and fertilize and seed areas disturbed beyond the work area of the General Contract. Topsoil must be stored where directed on the site.

2.9 BITUMINOUS PAVING

A. Provide labor, materials, equipment, and services necessary to repair pavements disturbed under the Contract.

B. Materials, methods, and workmanship shall conform with the requirements of the PA Department of Highways, as published in its specifications Form 408, as amended to date.

C. All patching of existing areas shall match existing materials.

2.10 MOTORS

A. Motors shall be built in accordance with the latest standards of NEMA and as specified. Motors shall be tested in accordance with ASA C50 and conform thereto with respect to insulation resistance and dielectric strength.

B. Each motor shall be provided with conduit terminal box and adequate starting and protective equipment as specified or required. The capacity shall be sufficient to operate associated driven devices under conditions of operation and

load and without overload, and shall be at least the horsepower indicated or specified. Each motor type shall be for quiet operation.

C. Motor starting equipment must be selected so that starting currents or transients do not have an adverse effect on lighting or other electrical equipment. No open transition wye-delta starting of motors shall be permitted.

PART 3 – EXECUTION

3.1 GENERAL

A. Provide information to the General Contractor for any chases or openings required under this Contract. No cutting shall be done which may affect the building structurally or architecturally without the prior approval of the Architect. Damaged construction shall be restored to its original conditions and finished to match the surrounding work. Refer to "Supplementary General Conditions" for the disposition of Cutting and Patching.

B. Grades, elevations, and dimensions shown on the drawings are approximately correct; however, field check and otherwise verify such data at the site before proceeding with the work. Make necessary survey equipment available at all times and make use of such equipment wherever necessary to properly install equipment.

C. The Contractor shall be entirely responsible for apparatus, equipment, and appurtenances furnished by him or his subcontractors in connection with the work and special care shall be taken to protect parts thereof in such manner as may be necessary or as may be directed. Protection shall include covers, crating, sheds or other means to prevent dirt, grit, plaster or other foreign substances from entering the working parts of machinery or equipment. Special care shall be taken to keep open ends of pipes closed while in storage and during installation. Where equipment must be stored outside the building, it shall be totally covered and secured with heavy weatherproofing tarps and kept dry at all times. Where equipment has been subjected to moisture, it shall be removed from the site and replaced with new equipment. Protect open excavating until covered over.

D. Due to the schematic nature and small scale of the electrical drawings, it is not possible to indicate exact locations, offsets, fittings, access panels, pull boxes, and miscellaneous parts which may be required to form a complete system. The drawings are generally indicative of the work to be installed. Arrange work accordingly furnishing necessary parts and equipment as may be required to meet the various conditions and to provide a complete circuit from end use device to circuit protective device in panel.

E. The Contractor shall include in his bid price, the cost to furnish and install two additional lavatories, including all necessary sanitary and domestic water piping.

F. Within thirty (30) days after acceptance of bids, submit to the Architect for approval, a complete list of equipment and materials to be furnished under this contract, giving names and addresses of manufacturers and material they intend

to furnish. This source of supply shall be listed on forms available from the Architect.

3.2 CLEARANCES

A. Take caution when on routing conduit and location of equipment. In many cases, clearances in ceiling plenums is limited due to ductwork and other mechanical lines and systems and steel. The Contractor shall be responsible for routing around mechanical equipment and ducts in order that everything can remain concealed in finished areas.

3.3 CUTTING AND PATCHING

A. Provide cutting and patching necessary to install the work specified herein. Patching shall match adjacent surfaces. Refer to Section 01045, Cutting and Patching, for specific direction.

B. No structural members shall be cut without prior approval of the Architect, and such cutting shall be done in a manner directed by the Architect.

C. Provide ceiling removal and replacement where work above ceilings is required. Replace ceiling components damaged in the process.

D. Provide patching where electrical devices are removed from walls, ceilings or floors as required under demolition.

3.4 PAINTING

A. Finished painting shall be performed by others except for standard factory finishes.

B. Electrical motors, pump casings, and other similar items shall be provided with three coats of machinery enamel at the factory, and shall be carefully cleaned, rubbed down, and oiled after installation.

3.5 LOCATIONS

A. Apply for detailed and specific information regarding the location of equipment as the final location may differ from that indicated on the drawings. Outlets, equipment or wiring improperly placed because of failure to obtain this information shall be relocated and re-installed without additional expense to the Owner. Determine the actual direction of door swings, so that local switches and other controls shall be installed at the lockside of doors, unless otherwise noted. Improperly located switches shall be relocated without additional expense to the Owner.

B. The design shall be subject to such revisions as may be necessary to overcome building obstructions. No changes shall be made in location of outlets or equipment without written consent of the Architect and Owner.

C. Unless otherwise mentioned or indicated, mounting heights of outlets are shown on the drawings or in the specification. Dimensions given shall be considered to be from center of outlet to finished floor.

D. Properly rough for the electrical conduit and equipment under this contract and modify as required for coordination during the construction period.

3.6 DUST, DIRT AND NOISE

A. Carry out new work and make changes, relocations, and installations with a minimum of noise. Site areas and new equipment, floors and walls, shall be adequately protected from dust and dirt caused by the work. Protection shall include suitable temporary barriers or coverings. The exterior and interior premises of each building shall be kept clean as possible during construction. Damages to surfaces or equipment as a result of negligence shall be replaced or corrected as required.

3.7 RECORD DRAWINGS

A. During the construction period, maintain in good order a complete set of blue line electrical contract drawings. Record the actual electrical installation as the work progresses. Include changes to the contract and to equipment sizes and types. Keep these drawings available at the site at all times for inspection.

B. Take proper caution against the use of superseded drawings. Check such copies and mark "void." Where drawings have been corrected by memorandum, assume the responsibility for marking all drawings so affected with the changes; such marked drawings shall remain in use until revised drawings are issued.

C. At the conclusion of the work, obtain a set of sepias from the Architect. Incorporate "as built" data in a clearly legible manner. Return such marked prints or sepias within 30 days to the Architect.

D. At the conclusion of the work, provide to the Architect a complete set of drawings which indicate precisely how the electrical single line and riser diagram equipment has been installed. Return such reproducible drawings within 30 days to the Architect.

3.8 EQUIPMENT, FOUNDATIONS, SUPPORTS, PIERS AND ATTACHMENTS

A. Provide necessary foundations, supports, pads, bases and piers required for equipment specified in this division; submit drawings in accordance with Shop Drawing Submittal requirements prior to the purchase, fabrication or construction of same.

B. Provide concrete pads for base-mounted transformers and rotating equipment, and for floor-mounted equipment located in equipment rooms and as indicated on the drawings. Pads shall be extended 6 inches beyond matching base in all directions with top edge chamfered. Inset 6 inch steel dowel rods into floors to anchor pads.

C. Construction of foundations, supports, pads, bases and piers, where mounted on the floor, shall be of the same materials and same quality of finish as the adjacent and surrounding floor material.

D. Equipment shall be securely attached to the building structure in an approved manner. Attachments shall be of a strong and durable nature and any attachments that are, in the opinion of the Architect, not strong and durable shall be replaced as directed.

3.9 SCAFFOLDING

A. Furnish and erect scaffolding and ladders required in the installation of wiring, equipment and fixtures.

END OF SECTION

PLUMBING SLEEVES, SEALS, AND ESCUTCHEONS

PART 1 - GENERAL

1.1 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification.

B. Federal Specifications (Fed. Spec.):

L-C-53OC .....Coating, Pipe, Thermoplastic Resin
L-T-1512A.....Tape, Pressure Sensitive Adhesive, Pipe Wrapping
0-C-114B(2)...Calcium Hypochlorite, Technical
0-S-602E .....Sodium Hypochlorite Solution
BB-C-120C ....Chlorine, Technical, Liquid
WW-V-35C.....Valve Ball Brass or Bronze
WW-V-1967 ...Valve, Butterfly (Threaded Ends And Solder Ends)

C. American National Standards Institute (ANSI):

American Society of Mechanical Engineers (ASME): (Copyrighted Society)
A11.21.1M-80 Floor Drains ANSI/ASME
B16.3-85.....Malleable Iron Threaded Fittings ANSI/ASME
B16.4-85.....Cast Iron Threaded Fittings Classes 125 and 250 ANSI/ASME
B16.9-86.....Factory-Made Wrought Steel Buttwelding Fittings ANSI/ASME
B16.11-80.....Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME
B16.12-83.....Cast Iron Threaded Drainage Fittings ANSI/ASME
B16.15-85.....Cast Bronze Threaded Fittings ANSI/ASME
B16.18-84.....Cast Copper Alloy Solder-Joint Pressure Fittings ANSI/ASME
B16.22-89.....Wrought Copper and Copper Alloy Solder Joint Pressure Fittings ANSI/ASME
B31.1 .....Pipe Welding
B31.8-86.....Gas Transmission and Distribution Piping Systems ANSI/ASME
B40.1-85.....Gauges-Pressure Indicating Dial Type-Elastic Element ANSI/ASME

D. American Society for Testing and Materials (ASTM):

A47-84 .....Ferritic Malleable Iron Castings Revision 1989
A53-89 .....Pipe, Steel, Black And Hot-Dipped, Zinc-coated Revision A Welded and Seamless
A74-87 .....Cast Iron Soil Pipe and Fittings
A183-83.....Carbon Steel Track Bolts and Nuts
A312-89.....Seamless and Welded Austenitic Stainless Steel Pipe
A536-84.....Ductile Iron Castings
A733-89.....Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
B32-89 .....Solder Metal
B61-86 .....Steam or Bronze Castings
B62-86 .....Composition Bronze or Ounce Metal Castings
B75-86 .....Seamless Copper Tube
B88-89 .....Seamless Copper Water Tube
B152 .....Copper Sheet
B-819……..Medical Gas Seamless Copper Tube
B306-88.....Copper Drainage Tube (DWV)

B584-89 .....Copper Alloy Sand Castings for General Applications Revision A
B687-88 .....Brass, Copper, and Chromium-Plated Pipe Nipples
C564-88 .....Rubber Gaskets for Cast Iron Soil Pipe and Fittings
D2000-86 .....Rubber Products in Automotive Applications
D2146-82 .....Propylene Plastic Molding and Extrusion Materials
D2447-89 .....Polyethylene (PE) Plastic Pipe, Schedule 40 and 80, Based on Outside Diameter
D2564-89 .....Solvent Cements for Poly (Vinyl Chloride) (PVC) Pipe Plastic Pipe and Fittings
D2665-89 .....Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Revision A Vent Pipe and Fittings
D4101-82 .....Propylene Plastic Injection and Extrusion Materials

E. American Water Works Association (AWWA):

C151-86 .....Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
C203-86 .....Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied
C651-86 .....Disinfecting Water Mains
C701-88 .....Cold Water Meters-Turbine Type, for Customer Service

F. National Fire Protection Association (NFPA):

54-88 .....National Fuel Gas Code

G. American Welding Society (AWS):

A5.8-89 .....Filler Metals for Brazing

H. National Association of Plumbing - Heating - Cooling Contractors (PHCC):

National Standard Plumbing Code - 1990

I. Cast Iron Soil Pipe Institute (CISPI):

301-85 .....Hubless Cast Iron Soil and Fittings

J. International Association of Plumbing and Mechanical Officials (IAPMO):

Uniform Plumbing Code - 1988

IS6-82 .....Installation Standard

K. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):

SP-70-84 .....Cast Iron Gate Valves, Flanged and Threaded Ends.

L. American Society of Sanitary Engineers (ASSE):

1003.....Water Pressure Reducing Valves
1010.....Water Hammer Arresters
1001-70 .....Pipe Applied Atmospheric Type Vacuum Breakers
1013-88 .....Reduced Pressure Principle Backflow Preventers
1015-88 .....Double Check Backflow Prevention Assembly
1020-81 .....Vacuum Breakers, Anti-Siphon, Pressure Type

M. Factory Mutual (FM):

1680-89 .....Coupling Used in Hubless Cast Iron Systems for Drains, Waste and Vent Systems.

PART 2 - PRODUCTS

2.1 PIPE SLEEVES AND ESCUTCHEON PLATES

A. Provide sleeves for piping passing through roofs, floors, ceilings, walls, partitions, air handling equipment, structural members, and other building parts.

B. Sealant shall be equivalent to Dow Corning 795 Silicone Sealant for general purpose use and Dow Corning 786 Mildew Resistant Silicone Sealant for Kitchen, Food Preparation, and Dining areas. Prime sleeves in accordance with manufacturer's recommendations.

C. Sealant in one-hour and two-hour walls and one-hour and two-hour floors shall be equivalent to Dow Corning Fire Stop System Sealants and Foams. Sealants and foams shall be UL listed and installed in accordance with manufacturer's recommendations.

D. Schedule of Sleeve Materials

Sleeve Type	Sleeve Material
1	18 gauge galvanized steel
2	Std. weight galvanized steel pipe
3	Std. weight galvanized steel pipe with a continuously welded water stop of 1/4 inch steel plate extending a minimum of 2 inches from the outside of the sleeve. (F&S Mfg. Co. Figure 204 or approved equal.)
4	Cast iron pipe sleeve with center flange. (James B. Clow & Sons No. F-1430 & F-1435, or approved equal.)
5	Std. weight galvanized steel pipe with flashing clamp device welded to pipe sleeve or watertight sleeves. (Josam 1870-A2 with oakum and lead caulking as required, or approved equal.)
6	Metal deck and wall sleeves.

E. Escutcheon Plates

1. Schedule of Escutcheon Plate Materials

Location	Escutcheon Plate Material
Finished spaces	Anodized aluminum or chrome-plated brass
Unfinished spaces	Plain brass, cast iron or aluminum

2.2 PIPE FLASHING FITTINGS

A. Pipes passing through roof construction shall be provided with pipe portal type curb.

PART 3 - EXECUTION

3.1 GENERAL

3.2 PIPE SLEEVES

A. Grout sleeves to building structure for watertight fit.

B. Schedule of Sleeve Lengths

Location	Sleeve Length
Floors	Equal to depth of floor construction and at least 1 inch above finished floor construction. In waterproof floor construction, sleeves shall extend a minimum of 2 inches above finished floor construction.
Roofs	Equal to depth of roof construction including insulation.
Walls and Partitions	Equal to depth of construction and terminated flush with finished surfaces.

C. Schedule of Sleeve Caulking and Packing

Caulking/ Packing Type	Caulking/Packing Requirements
A	Space between pipe and sleeve shall be packed with oakum and caulked watertight with lead.
B	Space between pipe or pipe covering and sleeve shall be caulked with an incombustible permanently plastic waterproof, non-staining compound leaving a smooth, finished appearance.
C	Verminproofing - space between pipe and sleeve shall be packed with insulation consisting of sections of foam glass equal in length to length of sleeve, caulked at both ends with sealant according to manufacturer's recommendations. Verminproofing for pipes with insulation shall be minimum 1 inch thick sections of foam glass as long as sleeves with space between foam glass and sleeve packed with industrial felt or fiberglass caulked at both ends with sealant according to manufacturer's recommendations.

D. Schedule of Sleeve Applications

Location	Sleeve Type Thru Fire Rated Construction	Sleeve Type Thru Non-Fire Rated Construction	Sleeve Caulking and Packing Type
Membrane water-proof floor, roof and wall construction	5	5	C

Location	Sleeve Type Thru Fire Rated Construction	Sleeve Type Thru Non-Fire Rated Construction	Sleeve Caulking and Packing Type
Non-membrane waterproof floor, roof and wall construction where flashing is required	5	5	C
Interior walls, partitions, and floors	2	1 or 2	C
Exterior walls	---	3 or 4	C
Cellular metal deck floors	2	6	B
Precast concrete floor with poured concrete topping (**NOTE**: sleeves with flat flanges or guides which rest on top of precast slab required)	--	1	B

3.3 PIPE FLASHING FITTINGS

A. Pipe passing through roof construction shall be arranged to provide a minimum of 12 inches clearance from walls or other obstructions so as to permit proper flashing.

3.4 DRIP PANS FOR PROTECTION OF ELECTRICAL EQUIPMENT

A. Examine the drawings and confirm the final location of electrical equipment to be installed in the vicinity of piping. Plan and arrange overhead piping no closer than two feet from a vertical line to electric motors and controllers, switchboards, panel boards, or similar equipment. Piping is not permitted in Electric Equipment, Transformer, Switchgear, Telephone Gear Rooms.

B. Where the installation of piping does not comply with the requirements of foregoing paragraph, where feasible, the piping shall be relocated.

C. Where piping cannot be relocated, furnish gutters as follows:

1. Provide and erect a gutter of 16 ounce cold rolled copper or heavy galvanized steel, under every pipe which is within 2 feet from a vertical line to any motor, electrical controllers, switchboards, panel boards, or the like.
2. Each gutter shall be soldered and made watertight, properly suspended and carefully pitched to a convenient point for draining. Provide a 3/4 inch drain with valve as directed, to nearest floor drain or slop sink, as approved.

3. In lieu of such separate gutters, a continuous protecting sheet of similar construction adequately supported and braced, properly rimmed, pitched and drained, may be provided over any such motor, and extending 2 feet in all directions beyond the motor, over which such piping has to run.

END OF SECTION

PLUMBING VALVES

PART 1 – GENERAL

1.1 GENERAL

A. Provide manual valves as shown on the drawings, specified herein, and as required for proper control and maintenance of piping systems and equipment.

B. Valves shall be the product of one manufacturer except for special applications.

C. Valves shall be of same minimum working pressure and materials as specified for fittings of the system in which they are installed, except as herein modified. Regardless of service, valves shall be designed for a minimum 125 psi steam working pressure. Valves shall be proven tight at the specified test pressure.

D. Gate valves shall be suitable for repacking under system pressure.

E. Install valves in accessible locations.

F. Valves for equipment shutoff shall be size of pipe indicated on the drawings before reducing to equipment size.

G. Valves in mechanical equipment rooms above 7 feet shall have chain-wheel operators.

PART 2 – PRODUCTS

2.1 BUTTERFLY VALVES

A. Butterfly valves greater than 2 inches: lug type with carbon steel body, 316 stainless steel disc, and gear operated hand wheel. Liner shall be 317 stainless steel with PTFE woven fabric. Class 150 body, 285 psi bubble tight shut-off in either direction.

1. Approved manufacture and model:

   a. General Signal; DeZurik Unit. – Model BHP series Class 150
   b. Bray International, Inc. – Model 40 series Class 150
   c. Contromatics International, Inc. – Model QF series Class 150

2. Domestic water system, 4 inches and larger: MSS SP-70, Class 125, 200 psi CWP, ASTM A 126 cast iron body and bonnet, solid cast iron wedge, brass alloy stem, outside screw and yoke, teflon-impregnated packing with two-piece packing gland, flanged end connections; and with cast iron hand wheel.

   a. Approved manufacture and model:

      1) Crane Co.; Crane Valve Group; Crane Valves. – Model 465 ½
      2) Hammond Valve. – Model IR 1140

3) Milwaukee Valve Company. – Model F-2885
4) Watts Industries, Inc.; Water Products Div. – Model F-503

2.1 BALL VALVES

A. Ball valves 3 inches and below: 600 WOG, chromium plated ball, TFE seats, blow-out proof stem, and solder connections.

1. Approved manufacture and model:

a. Crane Co.; Crane Valve Group; Crane Valves. – Model 9323
b. Hammond Valve. – Model 8311
c. Watts Industries, Inc.; Water Products Div. – Model B-6001
d. Conbraco Industries, Inc.; Apollo Div. – Model 70-200

2.2 CHECK VALVES (PUMP DISCHARGE ONLY)

A. Check valves shall be non-slam, silent operating, wafer type, designed to open/close at approximately 1 foot differential pressure. Check valves shall have cast iron body, replaceable lapped bronze seat, lapped and balanced twin bronze flappers loaded with stainless steel torsion spring, and stainless steel trim.

1. Approved manufacture and model:

a. Hammond Valve. – Model IR9253
b. Milwaukee Valve. – Model 1400
c. Watts Industries, Inc.; Water Products Div. – Model ICV-125

2.3 CHECK VALVES

A. Check valves shall be bronze body "Y" pattern swing check valves. Check valves shall have renewable bronze discs. Class 200 valves.

1. Approved manufacture and model:

a. Crane Co.; Crane Valve Group; Crane Valves. – Model 36
b. Milwaukee Valve. – Model 508
c. Hammond Valve. – Model IB944

2.4 PLUG VALVES

A. Plug valves 2 inches and smaller in water piping shall be of all-bronze construction with square heads and screwed connections.

B. Plug valves greater than 2 inches in water piping shall be of all-iron construction with square heads, flanged connections and teflon seals.

C. Plug valves in gas piping shall be gas company approved type lubricated plug valves.

1. Approved manufacture and model:

a. 2 inches and Below:
1) General Signal; DeZurik Unit. – Model 400 Series
2) Homestead Valve Div. Olson Technologies Inc. – Model 120 Series
3) Val-Matic Valve & Mfg. Corp. – Model 5800R Series

b. 2-1/2 inches and Above:
1) General Signal; DeZurik Unit. – Model 100 Series
2) Homestead Valve Div. Olson Technologies Inc. – Model 120 Series
3) Val-Matic Valve & Mfg. Corp. – Model 5800R Series

2.5 GAS COCKS

A. Gas cocks in gas piping shall be gas company approved type lubricated cock.

PART 3 – EXECUTION

3.1 GENERAL

A. Provide shut-off valves at each plumbing fixture and at equipment requiring plumbing connections regardless of whether shown on the drawings.

B. Provide non-slam check valves as indicated at pump discharges.

C. Install valves so that the tops of the valve stems are above the horizontal.

END OF SECTION

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 PIPING SYSTEM STANDARDS OF MATERIALS

A. Piping and fitting materials shall conform to the specification standards of the recognized authorities listed below. References shall be to the latest edition in force at the time of bidding.

B. Materials listed below shall be subject to approval of local governing authorities.

C. Plumbing systems which connect to equipment provided or installed under the HVAC section of the drawings or specifications shall be terminated within five feet of final connection point of the equipment with a shutoff valve as specified in the plumbing valve section. Final connection is specified under the HVAC section.

D. Each pipe length shall have the manufacturer's name cast, stamped, or rolled on.

E. Each fitting shall have the manufacturer's symbol and pressure rating cast, stamped, or rolled on.

1.2 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification.

B. Federal Specifications (Fed. Spec.):

L-C-53OC.....Coating, Pipe, Thermoplastic Resin
L-T-1512A.....Tape, Pressure Sensitive Adhesive, Pipe Wrapping
0-C-114B(2).....Calcium Hypochlorite, Technical
0-S-602E.....Sodium Hypochlorite Solution
BB-C-120C.....Chlorine, Technical, Liquid
WW-V-35C.....Valve Ball Brass or Bronze
WW-V-1967.....Valve, Butterfly (Threaded Ends And Solder Ends)

C. American National Standards Institute (ANSI):

American Society of Mechanical Engineers (ASME): (Copyrighted Society)
A11.21.1M-80.....Floor Drains ANSI/ASME
B16.3-85.....Malleable Iron Threaded Fittings ANSI/ASME
B16.4-85.....Cast Iron Threaded Fittings Classes 125 and 250 ANSI/ASME
B16.9-86.....Factory-Made Wrought Steel Buttwelding Fittings ANSI/ASME
B16.11-80.....Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME
B16.12-83.....Cast Iron Threaded Drainage Fittings ANSI/ASME
B16.15-85.....Cast Bronze Threaded Fittings ANSI/ASME
B16.18-84.....Cast Copper Alloy Solder-Joint Pressure Fittings ANSI/ASME
B16.22-89.....Wrought Copper and Copper Alloy Solder Joint Pressure Fittings ANSI/ASME
B31.1.....Pipe Welding
B31.8-86.....Gas Transmission and Distribution Piping Systems ANSI/ASME
B40.1-85.....Gauges-Pressure Indicating Dial Type-Elastic Element ANSI/ASME

D. American Society for Testing and Materials (ASTM):

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A53-89.....Pipe, Steel, Black And Hot-Dipped, Zinc-coated Revision A Welded and Seamless
A74-87.....Cast Iron Soil Pipe and Fittings
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A733-89.....Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples

B32-89.....Solder Metal
B61-86.....Steam or Bronze Castings
B62-86.....Composition Bronze or Ounce Metal Castings
B75-86.....Seamless Copper Tube
B88-89.....Seamless Copper Water Tube
B152.....Copper Sheet
B-819……..Medical Gas Seamless Copper Tube
B306-88.....Copper Drainage Tube (DWV)
B584-89.....Copper Alloy Sand Castings for General Applications Revision A
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D2146-82 .....Propylene Plastic Molding and Extrusion Materials
D2447-89 .....Polyethylene (PE) Plastic Pipe, Schedule 40 and 80, Based on Outside Diameter
D2564-89 .....Solvent Cements for Poly (Vinyl Chloride) (PVC) Pipe Plastic Pipe and Fittings
D2665-89 .....Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Revision A Vent Pipe and Fittings
D4101-82 .....Propylene Plastic Injection and Extrusion Materials

E. American Water Works Association (AWWA):
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C203-86 .....Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied
C651-86 .....Disinfecting Water Mains
C701-88 .....Cold Water Meters-Turbine Type, for Customer Service

F. National Fire Protection Association (NFPA):
54-88 .....National Fuel Gas Code

G. American Welding Society (AWS):
A5.8-89.....Filler Metals for Brazing

H. National Association of Plumbing - Heating - Cooling Contractors (PHCC):
National Standard Plumbing Code - 1990

I. Cast Iron Soil Pipe Institute (CISPI):
301-85 .....Hubless Cast Iron Soil and Fittings

J. International Association of Plumbing and Mechanical Officials (IAPMO):
Uniform Plumbing Code - 1988
IS6-82.....Installation Standard

K. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
SP-70-84 .....Cast Iron Gate Valves, Flanged and Threaded Ends.

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1003 .....Water Pressure Reducing Valves
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1001-70 .....Pipe Applied Atmospheric Type Vacuum Breakers
1013-88 .....Reduced Pressure Principle Backflow Preventers
1015-88 .....Double Check Backflow Prevention Assembly
1020-81 .....Vacuum Breakers, Anti-Siphon, Pressure Type

M. Factory Mutual (FM):
1680-89 .....Coupling Used in Hubless Cast Iron Systems for Drains, Waste and Vent Systems.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. General

1. Hanger design shall conform to ANSI Code B 31.1.0 for Pressure Piping and the Manufacturers' Standardization Society of the Valve and Fitting Industry, (MSS) SP-58 and SP-69, unless supplemented or modified herein.
2. Specified bracket clamp and rod sizes are minimum sizes. Support and hanger design shall include a safety factor of 5.
3. Approved type trapeze hangers may be used instead of separate clevis hangers, with suspension rods having double nuts and securely attached to the construction in an approved manner.
4. Plastic-coated hangers and clamps shall be provided for uninsulated brass or copper pipe, unless shields are provided between hangers or clamps and uninsulated brass or copper pipe.
5. Provide steel required for support of pipes other than steel shown on structural drawings.
6. Chain straps, perforated bars, wire hangers or expansion shields are not permitted.
7. Inserts for piping shall be of a type which shall not interfere with structural reinforcing and which shall not displace excessive amounts of concrete.
8. Piping located near floors that can be supported from floor or walls shall be provided with approved floor stands, wall brackets, roller supports, masonry piers or similar items.
9. Resilient hangers and isolation devices shall be provided on piping connected to rotating equipment, including pumps, air handling units, and on other piping which may vibrate and create audible noise. See Section 15057, Vibration Isolation, of the Specification
10. Rigid hangers for horizontal piping shall provide a means of vertical adjustment after erection.
11. Hangers or supports shall be provided for existing piping that is to remain in areas affected by demolition.
12. Vertical piping shall utilize riser clamp specifically designed for piping.

B. Pipe Hanger Schedule

1. Manufacturers' Model Numbers

Hanger Type	F&S	F&M	Grinnell	Central Iron
360 shield, split	981	---	---	548
Beam Clamp	55	282	218	39
Multi-J hook blade	120	---	---	208
Clevis hangar	86	239	260	10
180 degree shield	980	80	167	550
Rigid trapeze	710	---	Std. 46	551
U-bolt	37	176	137, 137C	98H
Adj. steel pipe stanchion	421	291	259	71
Welded steel bracket	800, 801	151, 155	195, 199	195, 199
Riser clamp	91, 93, 94	241	261, 261C	37, 261
Pipe rest	92, 925	---	---	552
Base elbow support	720, 721	---	---	67, 68
Dbl. bolt pipe clamp	89	261	295	295
Welded beam attach.	966	---	66	66
Insert	180A,	178	280 Series	100, 101

Hanger Type	F&S	F&M	Grinnell	Central Iron
Cont. slotted insert	180B 150A, 150B	190	---	50
Underground pipe hanger	275	---	---	600A

C. Hanger Rod Schedules

Pipe Size	Minimum Rod Size
Up to 2 inches	3/8 inch diameter
2-1/2 inches to 4 inches	1/2 inch diameter
4 inches to 5 inches	5/8 inch diameter
Above 5 inches	Special design

PART 3 - EXECUTION

3.1 GENERAL

A. Provide adequate provision for expansion and contraction in portions of the piping systems, to prevent undue strains on piping, building anchor points, and connected equipment.

B. Piping connections to plumbing fixtures and equipment shall be provided with offsets and shutoff valves arranged such that equipment can be serviced or removed without dismantling the pipe.

C. Pitch water piping up in direction of flow to ensure adequate flow without air binding and to prevent noise and water hammer. Branch connections to mains shall be made in such a manner as to prevent air trapping and prevent free passage of air. Mains shall be laid out to meet field conditions, maintain adequate headroom and clear work.

D. Any piping passing through roof construction shall be arranged to provide a minimum of 12 inch clearance from walls or other obstructions so as to permit proper flashing. Set pipe flashing fittings at a suitable level above the roof to permit proper termination of flashing.

E. Converging or diverging Bullheaded Tee’s are not permitted.

F. Provide hose drain connections on water systems downstream of floor main shut-off valves.

3.2 PIPE HANGERS AND SUPPORTS

A. Pipe Hanger Support Schedule

Building Construction	Pipe Support Method
Poured concrete floor slabs	Galvanized steel inserts, and/or fish plates of sufficient area to support twice the calculated dead load
Building structural steel	Beam attachments and similar devices
Precast concrete floor slabs	Fish plates of sufficient area to support twice the calculated dead load and approve type specialty hanger accessories manufactured for the specific purpose of attaching to precast floors
Metal deck floor slabs with concrete fill	Galvanized steel inserts and/or fish plates of sufficient area to support twice the calculated dead load, and approved type specialty hanger accessories manufactured for the specific purpose of attaching to metal deck floors
Concrete slabs where piping revisions are required and approved after slabs are poured or existing slabs	"Phillips" or "Hilti" expansion bolts and shields for piping 4 inches and smaller, with main supports welded to structural steel at maximum 20 feet on center 4 inch x 4 inch x 3/8 inch thick clip knee angles with 3/4 inch expansion bolt in shear (horizontal) and supporting rod at 90° from anchor bolt for piping greater than 4 inches, attached to concrete

Building Construction	Pipe Support Method
	beams or columns
Concrete floor slabs on grade with ground water condition	Drainage, waste and vent piping to be encased in slab construction

B. Pipe Support Spacing

1. Pipe supports shall be spaced as follows:

Less than 3/4 inch pipe	On 5 foot centers
1 inch and 1-1/4 inch pipe	On 6 foot centers
1-1/2 inch to 2-1/2 inch pipe	On 10 foot centers
3 inch and 4 inch pipe	On 12 foot centers
6 inch and larger pipe	On 15 foot centers
Cast iron soil pipe	Support at every joint

2. Provide hangers no more than 12 inches from direction changes.

END OF SECTION

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide identification of plumbing piping, valves, and equipment.

1.2 STANDARDS

A. ANSI/ASME A13.1: Scheme for the Identification of Piping Systems.

1.3 ACCEPTABLE MANUFACTURERS

A. Seton, W.H. Brady, Bunting, or EMED Company. Provide specific model numbers where indicated.

1.4 SHOP DRAWING REQUIREMENTS

A. Submittal not required.

PART 2 - PRODUCTS

2.1 PIPE IDENTIFICATION

A. Pipe Markers (Above Ground—Indoor)

1. Pipe bands indicating contents and flow direction shall be flexible vinyl film with acrylic pressure sensitive adhesive suitable for pipe surface temperatures of -40°F to 220°F.
2. Product:
    a. Seton Opticode
    b. W.H. Brady B-350 Perma-Code
    c. Bunting Identiflow

B. Pipe Markers (Above Ground—Outdoor)

1. Pipe bands indicating contents and flow direction shall be snap-on markers consisting of a surface-printed and overcoat-protected vinyl base material suitable for pipe surface temperatures from -40°F to 150°F.
2. Product:
    a. Seton Weather-Code, Style AA
    b. W.H. Brady B-915 BradySnap-On
    c. Bunting

C. Pipe Markers (Underground)

1. Metallic Pipe - Underground metallic pipe shall be identified by underground warning tape. Tape shall be 0.004 inch thick, 6 inch wide polyethylene tape, color coded, with continuous message stating "Caution" and stating which type of pipe is buried.

2. Nonmetallic Pipe - Underground nonmetallic pipe shall be identified by underground metallic warning tape. Tape shall be 0.004 inch thick, 6 inch wide polyethylene tape with metallic core, color coded, with continuous message stating "Caution" and stating the type of pipe buried.

D. Pipe marking shall comply with ANSI A13.1 Scheme for the Identification of Pipe Systems. Markers shall be in compliance with respect to:

1. Marker length

2. Background color

3. Letter color

4. Letter size

2.2 EQUIPMENT NAMEPLATES

A. Heavy gauge (.025) aluminum with four mounting holes. Coloring in background, lettering, and pads in aluminum.

2.3 VALVE TAGS

A. Brass with stamped numbers and letters (black-filled), 1-1/2 inch square with 1/2 inch numbers and 1/4 inch letters.

B. Fastening shall be by brass "S" hooks, brass jack chains, or brass ball chains.

2.4 VALVE CHARTS

A. 8-1/2 inch by 11 inch (minimum or of sufficient size), wood or aluminum frames with Plexiglas covers. Include valve numbers, sizes, functions, and locations. Coordinate location with Owner. Chart shall have key plan denoting approximate valve location.

PART 3 - EXECUTION

3.1 PIPE IDENTIFICATION

A. Pipe locations to be marked are as follows:

1. Piping shall also have direction of flow arrows matching the legend and background colors adjacent to each marker and at branches.

2. Markers shall be placed on piping at 20 foot maximum intervals. In addition, wherever a pipe passes through a wall, floor, or ceiling, it should be marked on each side of the wall, floor, or ceiling. Where pipe insulation or pipe is to be painted, it should be painted to match the

background color of its contents (as indicated below). Fire protection piping should be painted red. In addition to pipe marking, valves shall have brass tags indicating system and valve number.

B. Colors for pipe marking systems shall be in accordance with ANSI standards.

C. Underground piping shall be identified with identification tape continuously while below grade. Depth of tape shall be 12 inches below grade for piping buried up to 30 inches deep, and 18 to 24 inches above pipe for depths below 30 inches deep.

3.2 VALVE IDENTIFICATION

A. Provide identification tags for valves including control valves and shutoff valves serving individual fixtures and equipment shall not be tagged.

B. Provide valve charts in an approved location secured to wall.

C. Include a copy of the valve chart in each operation and maintenance manual.

END OF SECTION

PLUMBING PIPING AND EQUIPMENT INSULATION

PART 1 – GENERAL

1.1 GENERAL

A. Unless specifically noted otherwise, insulation shall have composite fire and smoke hazard ratings (including insulation, jacket or facing, PVC covers, and adhesives), as tested by ASTM E84, NFPA 255 or UL 723 procedures, not exceeding a flame spread rating of 25 and smoke developed rating of 50.

B. Piping systems, which includes existing piping that may need reinsulated, shall be insulated in accordance with the schedule below, including flanges, fittings, valves, expansion joints, vents, drains and similar appurtenances. Piping subject to freezing shall be insulated with a minimum of 2 inches insulation.

C. Piping tests shall be completed before insulation proceeds.

D. Insulation shall be provided continuously through sleeves and openings.

E. Adhesives and coatings shall be as manufactured by Benjamin-Foster or equivalent.

1. Vapor Barrier Adhesive: Benjamin Foster 80-07.
2. Vapor Barrier Coating: Benjamin Foster 30-35.
3. Lagging Adhesive: Benjamin Foster 85-20.
4. Glass Cloth Adhesive: Benjamin Foster 85-20.
5. Weatherproofing Mastic: Benjamin Foster 48-00.

F. Asbestos shall not be used in the manufacture of insulation products.

G. Refer to Section 220517 for verminproof insulation in sleeves.

PART 2 – PRODUCTS

2.1 PIPING SYSTEM INSULATION

A. Domestic cold and hot water piping, including hot water recirculating piping shall be insulated with 1 inch fiberglass.

B. Horizontal storm water piping, drain bodies, and storm water located above hung ceilings shall be insulated with ½ inch fiberglass.

C. Emergency generator exhaust shall be insulated with 4 inch calcium silicate block insulation having aluminum or stainless steel cover for insulation outdoors.

D. Exterior domestic piping shall be insulated with 2 inch fiberglass.

E. Piping with electric heat trace shall be insulated with 2 inch fiberglass having weather –proof jacket.

F. Fuel oil supply and return piping shall be insulated with ½ inch fiberglass sealed with vapor barrier adhesive.

2.2 FIBER GLASS INSULATION

A. Insulation, including fiberglass inserts, shall be glass fiber with a maximum K factor of 0.24 at 75 degrees F mean temperature with factory applied all-service jacket with self-sealing lip. Exposed pipe insulation material must be the one piece type. Sectional type may used for concealed piping.

B. Seal butt joints with 3 inch wide butt stripe adhered neatly in place.

C. Fittings and valves for steam piping shall be insulated with fiberglass inserts and finished with .024 inch thick aluminum fitting flange and valve covers.

D. Exposed piping shall be protected with .024 inch thick stainless steel or aluminum jacketing and fitting covers.

E. Product: Owens-Corning SSL-11, Manville Micro-Lok, Knauff ASJ-SSL, Certainteed Alley-K.

2.3 CALCIUM SILICATE BLOCK INSULATION

A. Insulation shall be 11 pounds per cubic foot density molded asbestos-free hydrous calcium silicate with a K factor of 0.38 at 200°F mean temperature. Insulation shall be fastened in place with adhesive as per manufacturer's recommendations and 16 gauge copper-clad wire on 9 inch maximum centers. Fill joints with insulating cement.

B. Provide 1 inch galvanized wire mesh on insulated surfaces. Secure and provide tight. Apply 1/4 inch thick finishing cement. Use corner beads for a smooth finish where insulation is terminated.

C. For insulation outdoors, provide 0.024 inch thick stainless steel jacket banded, overlapped, secured with pop rivets or screws, and sealant placed on joints as per manufacturer's recommendations for a watertight finish.

D. Product: Owens-Corning calcium silicate insulation, Manville Thermo-12, Knauff Temperlite 1200, Certainteed Calmax.

PART 3 – EXECUTION

3.1 GENERAL

A. Insulation shall be applied on clean, dry surfaces.

B. Insulation shall be continuous through construction openings and sleeves.

C. Insulation on cold surfaces where vapor barrier jackets are required shall be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors and similar devices that are secured directly to cold surfaces shall be adequately insulated and vapor sealed to prevent condensation.

D. For pipe handling fluids below 70°F, provide one of the following means of preventing contact between pipe insulation and hanger or support:

1. High density rigid fiberglass insulation insert, equal in thickness to pipe insulation, with factory applied jacket and metal protection shield at a width equal to 1/2 the outside insulation diameter and a length equal to 12 inches for piping to 5 inches in diameter and 24 inches for piping 6 inches in diameter and larger installed between pipe and hanger or support. Shield gauge thickness shall be 18 gauge for piping 4 inches in diameter and less and 16 gauge for piping 5 inches in diameter and larger.

E. For piping handling fluids 70°F and above, rest pipe directly on hanger, insulate pipe and hanger.

F. Apply insulation in strict accordance with manufacturer's recommendations.

G. Piping located on roof shall have 18 gauge stainless steel shield a minimum of 36 inches in length the full circumference of pipe. Locate where insulation will be stepped on due to maintenance traffic.

END OF SECTION

DOMESTIC WATER PIPING

PART 1 – GENERAL

1.1 PIPING SYSTEM STANDARDS OF MATERIALS

A. Piping and fitting materials shall conform to the specification standards of the recognized authorities listed below. References shall be to the latest edition in force at the time of bidding.

B. Materials listed below shall be subject to approval of local governing authorities.

C. Plumbing systems which connect to equipment provided or installed under the HVAC section of the drawings or specifications shall be terminated within five feet of final connection point of the equipment with a shutoff valve as specified in the plumbing valve section. Final connection is specified under the HVAC section.

D. Each pipe length shall have the manufacturer's name cast, stamped, or rolled on.

E. Each fitting shall have the manufacturer's symbol and pressure rating cast, stamped, or rolled on.

1.2 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification.

B. Federal Specifications (Fed. Spec.):

L-C-53OC	Coating, Pipe, Thermoplastic Resin
L-T-1512A	Tape, Pressure Sensitive Adhesive, Pipe Wrapping
0-C-114B(2)	Calcium Hypochlorite, Technical
0-S-602E	Sodium Hypochlorite Solution
BB-C-120C	Chlorine, Technical, Liquid
WW-V-35C	Valve Ball Brass or Bronze
WW-V-1967	Valve, Butterfly (Threaded Ends And Solder Ends)

C. American National Standards Institute (ANSI):

American Society of Mechanical Engineers (ASME): (Copyrighted Society)
A11.21.1M-80 Floor Drains ANSI/ASME
B16.3-85 ..... Malleable Iron Threaded Fittings ANSI/ASME
B16.4-85 ..... Cast Iron Threaded Fittings Classes 125 and 250 ANSI/ASME
B16.9-86 ..... Factory-Made Wrought Steel Buttwelding Fittings ANSI/ASME
B16.11-80 ..... Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME
B16.12-83 ..... Cast Iron Threaded Drainage Fittings ANSI/ASME
B16.15-85 ..... Cast Bronze Threaded Fittings ANSI/ASME
B16.18-84 ..... Cast Copper Alloy Solder-Joint Pressure Fittings ANSI/ASME
B16.22-89 ..... Wrought Copper and Copper Alloy Solder Joint Pressure Fittings ANSI/ASME
B31.1 Pipe Welding

B31.8-86 .....Gas Transmission and Distribution Piping Systems ANSI/ASME
B40.1-85 .....Gauges-Pressure Indicating Dial Type-Elastic Element ANSI/ASME

D. American Society for Testing and Materials (ASTM):

A47-84 Ferritic Malleable Iron Castings Revision 1989
A53-89 Pipe, Steel, Black And Hot-Dipped, Zinc-coated Revision A Welded and Seamless
A74-87 Cast Iron Soil Pipe and Fittings
A183-83 .....Carbon Steel Track Bolts and Nuts
A312-89 .....Seamless and Welded Austenitic Stainless Steel Pipe
A536-84 .....Ductile Iron Castings
A733-89 .....Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
B32-89 Solder Metal
B61-86 Steam or Bronze Castings
B62-86 Composition Bronze or Ounce Metal Castings
B75-86 Seamless Copper Tube
B88-89 Seamless Copper Water Tube
B152 Copper Sheet
B-819……..Medical Gas Seamless Copper Tube
B306-88 .....Copper Drainage Tube (DWV)
B584-89 .....Copper Alloy Sand Castings for General Applications Revision A
B687-88 .....Brass, Copper, and Chromium-Plated Pipe Nipples
C564-88 .....Rubber Gaskets for Cast Iron Soil Pipe and Fittings
D2000-86 .....Rubber Products in Automotive Applications
D2146-82 .....Propylene Plastic Molding and Extrusion Materials
D2447-89 .....Polyethylene (PE) Plastic Pipe, Schedule 40 and 80, Based on Outside Diameter
D2564-89 .....Solvent Cements for Poly (Vinyl Chloride) (PVC) Pipe Plastic Pipe and Fittings
D2665-89 .....Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Revision A Vent Pipe and Fittings
D4101-82 .....Propylene Plastic Injection and Extrusion Materials

E. American Water Works Association (AWWA):

C151-86 .....Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
C203-86 .....Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied
C651-86 .....Disinfecting Water Mains
C701-88 .....Cold Water Meters-Turbine Type, for Customer Service

F. National Fire Protection Association (NFPA):

54-88 National Fuel Gas Code

G. American Welding Society (AWS):
A5.8-89.....Filler Metals for Brazing

H. National Association of Plumbing - Heating - Cooling Contractors (PHCC):
National Standard Plumbing Code – 2009

I. Cast Iron Soil Pipe Institute (CISPI):
301-85 Hubless Cast Iron Soil and Fittings

J. International Association of Plumbing and Mechanical Officials (IAPMO):
Uniform Plumbing Code - 1988
IS6-82 Installation Standard

K. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
SP-70-84 .....Cast Iron Gate Valves, Flanged and Threaded Ends.

L. American Society of Sanitary Engineers (ASSE):
1003 Water Pressure Reducing Valves
1010 Water Hammer Arresters
1001-70 .....Pipe Applied Atmospheric Type Vacuum Breakers
1013-88 .....Reduced Pressure Principle Backflow Preventers
1015-88 .....Double Check Backflow Prevention Assembly
1020-81 .....Vacuum Breakers, Anti-Siphon, Pressure Type

M. Factory Mutual (FM):

1680-89 .....Coupling Used in Hubless Cast Iron Systems for Drains, Waste and Vent Systems.

PART 2 – PRODUCTS

2.1 PIPING AND FITTINGS MATERIAL SCHEDULE

A. Piping systems shall be constructed of the following materials as scheduled below, subject to approval by authorities having jurisdiction.

Systems	Pipe	Fittings	Remarks
Relief valve discharge piping	Type L hard drawn copper tubing w/95-5 tin antinomy solder joints	Cast bronze or wrought copper with solder joints	
Water Main Piping (Piping from water main to meter and from meter into the building)	Class 52 ductile iron pipe	Ductile iron fittings	Pipe and fittings shall conform with the requirements of the water company
Cold water piping, underground, 2-1/2 inches and smaller	Type K soft drawn copper tubing, with 95-5 tin antimony or 96-4 tin silver	Wrought copper fittings, solder joint	Fitting pressure rating as per ANSI B16.18, B16.22

Systems	Pipe	Fittings	Remarks
Interior building or above ground domestic water systems, 4 inches and smaller (cold water systems)	Type L hard drawn copper tubing with 95-5 tin antimony solder joints	Cast bronze or wrought copper with solder joints	Fitting pressure rating as per ANSI B16.22, B16.18, 125 lb. steam and 300 lb. steam
Interior building or above ground domestic water systems, 4 inches and smaller (hot and hot water circulating systems)	Type L hard drawn copper tubing with 95-5 tin antimony solder joints	Cast bronze or wrought copper with solder joints	Fitting pressure rating as per ANSI B16.22, B16.18, 125 lb. steam and 300 lb. steam
Interior building or above ground domestic water piping, 4 inches and larger (cold water systems)	Type L hard drawn copper tubing with 95-5 tin antimony solder joints	Cast bronze flanged fittings and flanges	Fitting pressure rating: 125 and 300 lb. steam
Interior building or above ground domestic water piping, 4 inches and larger (hot and hot water circulating systems)	Type L hard drawn copper tubing with 95-5 tin antimony solder joints	Cast bronze flanged fittings and flanges	Fitting pressure rating: 125 and 300 lb. steam
	Schedule 40 galvanized steel pipe, threaded	Galvanized malleable iron, screwed	Fitting pressure rating: 150 lb. steam
		Galvanized ductile iron, screwed or flanged	Fitting pressure rating: 125 and 300 lb. steam (screwed), 150 lb. (flanged)
		Galvanized victaulic style 75 or 77 couplings with grooved end pipe	Fitting pressure rating as per 500 WWP
Domestic water piping downstream of mixing valve to shower head			
Exposed final connections to fixtures	Chromium plated brass	Chromium plated brass	Fitting pressure rating: 125 lb. steam
	Schedule 40 black	Welded steel fittings	1) Pipe coating

Systems	Pipe	Fittings	Remarks
	steel pipe		and anodes in accordance with gas company requirements 2) Welding to be performed by a certified welder

B. Escutcheon Plates

1. Schedule of Escutcheon Plate Materials

Location	Escutcheon Plate Material
Finished spaces	Anodized aluminum or chrome-plated brass
Unfinished spaces	Plain brass, cast iron or aluminum

2.2 PLUMBING PIPING SYSTEM PRESSURE CLASSIFICATION

A. Piping, fittings, components, and equipment for domestic plumbing piping systems shall have an operating pressure of 75 psig and a component rating pressure of 125 psig.

2.3 PIPE FLASHING FITTINGS

A. Pipes passing through roof construction shall be provided with pipe portal type curb.

2.4 HEAT TRACING

A. Electric heat tracing for piping shall be Delta Therm #PF constant wattage cable with (2) 12 AWG copper bus wire and Nichrome wire heating element.

B. Electric heat tracing shall be 277 volt, 4.8 watts per linear foot. Maximum length per circuit shall be 710 feet.

C. Electric heat tracing shall be thermostatically controlled with line sensing thermostat in a Nema 4 enclosure.

D. Provide necessary accessories including, but not limited to, the following for a complete operational system:

1. Power connection kit.
2. Splice, end seal and tee kit.
3. Glass cloth and adhesive tape.

2.5 PIPE WELDING

A. Refer to Basic Materials and Methods, Section 15050, for welding requirements on piping.

PART 3 – EXECUTION

3.1 GENERAL

A. The drawings schematically indicate the size and location of piping. Piping system layout shall be modified as required to meet field conditions and facilitate coordination. Piping shall conform to the latest ASA code for pressure piping. Unless otherwise noted, all piping, valves, and associated fittings shall be concealed behind walls, above ceilings, or below floors.

B. Provide adequate provision for expansion and contraction in portions of the piping systems, to prevent undue strains on piping, building anchor points, and connected equipment.

C. Piping connections to plumbing fixtures and equipment shall be provided with offsets and shutoff valves arranged such that equipment can be serviced or removed without dismantling the pipe.

D. Pitch water piping up in direction of flow to ensure adequate flow without air binding and to prevent noise and water hammer. Branch connections to mains shall be made in such a manner as to prevent air trapping and prevent free passage of air. Mains shall be laid out to meet field conditions, maintain adequate headroom and clear work.

E. Any piping passing through roof construction shall be arranged to provide a minimum of 12 inch clearance from walls or other obstructions so as to permit proper flashing. Set pipe flashing fittings at a suitable level above the roof to permit proper termination of flashing.

F. Converging or diverging Bullheaded Tee’s are not permitted.

G. Provide hose drain connections on water systems downstream of floor main shut-off valves.

3.2 PIPING SYSTEM PRESSURE TESTS

A. The following procedures shall be observed for piping system pressure tests:

1. Preliminary testing, notification of inspectors and other responsibilities as specified in Section 220500, Paragraph 1.7 - CODES, PERMITS AND INSPECTIONS shall be observed.

2. Take all due precautions to prevent damage to the building and its contents that may be incurred by such tests; repair or make good any damage caused by the tests at no additional cost to the Owner.

3. Tests shall apply full test pressure to the piping for a sufficient period of time to detect leaks and defects. Refer to individual piping testing procedures for approved testing of liquids or gases.

4. Tests shall be conducted prior to the installation of any required fitting insulation. If delicate control mechanisms, not including control valves, are installed in the piping, they shall be removed to prevent shock damage.

5. The section of piping to be tested shall be brought up to the specified test pressure. If the test pressure falls more than the specified amount during the test period, the point of leakage shall be found, repaired and the test repeated. This procedure shall be repeated until the piping system has been proved absolutely tight.

6. Leaks shall be repaired by removing the valve, fitting, joint or section that is leaking and reinstalling new materials and joints as specified. Use of mastic of "no-leak" compounds or other temporary means of repairing leaks shall not be permitted.

3.3 DOMESTIC WATER SYSTEM (COLD, HOT, TEMPERED, AND RECIRCULATING SYSTEMS)

A. Installation Procedures

1. Water piping shall be arranged to drain to low points and to provide for air elimination at high points.

2. Mains, risers and branch connections to same shall be arranged to permit expansion and contraction without strain by means of elbow swings and/or expansion joints.

3. A riser control valve shall be provided on each water riser. Provide a drain valve on each riser located downstream of riser control valve on upfeed risers.

4. Valves, check valves, reducing valves, shock absorbers, tempering valves, etc. shall be easily accessible for maintenance and/or removal.

5. Screwed joints shall be made with best quality approved pipe compound, carefully placed on male threads only and not on the fittings.

6. Cut and threaded pipe shall have the cutting burrs and sharp edges reamed out.

7. In erecting pipe, friction wrenches shall be used exclusively, and any pipe cut, dented or otherwise damaged shall be replaced.

8. Ferrous to non-ferrous pipe connections shall be made with Epco Sales, Inc., or other approved dielectric pipe or flange union isolating joints to prevent any electrolytic action between dissimilar metals.

9. Copper pipe and tubing shall be cut square and reamed out to remove burrs. Outside and inside of the fittings and outside of the tubing at each

end shall be well cleaned with steel wool before brazing to remove traces of oxidation regardless of how clean the surfaces of the pipe and fittings may appear.

B. Domestic Water System Pressure Test

1. The entire domestic water system shall be tested to a hydrostatic pressure equal to 1-1/2 times the system normal operating pressure.

2. The water used for the pressure test shall be supplied from a potable water source.

C. Cleaning, Flushing and Disinfection

1. Before being placed in operation, the domestic water piping systems shall be cleaned, flushed and disinfected in strict accordance with the requirements of the local health department or other authorities having jurisdiction.

2. The piping systems shall be sterilized with a solution containing not less than 50 parts per million of chlorine, which shall conform to the standards of the American Water Works Association, and the solution shall be introduced into the system in an approved manner. The solution shall be allowed to remain in the system for a minimum period of 24 hours. During the sterilization period, valves and outlets shall be opened and closed several times. After the sterilization period, the solution shall be flushed from the system using clean water until the residual chlorine content is less than 0.2 parts per million, or as required by the local health department or other authority having jurisdiction.

3. Required water samples shall be taken and submitted to an approved laboratory for routine bacteriological examination. Copies of the test results shall be submitted to the Architect and the local health department or other authority having jurisdiction.

4. Provide the means for disposing the solution used to disinfect the system. The solution shall be disposed of in an approved manner that shall eliminate the possibility of damage to property or contamination of the water supply.

END OF SECTION

NATURAL GAS PIPING

PART 1 – GENERAL

1.1 PIPING SYSTEM STANDARDS OF MATERIALS

A. Piping and fitting materials shall conform to the specification standards of the recognized authorities listed below. References shall be to the latest edition in force at the time of bidding.

B. Materials listed below shall be subject to approval of local governing authorities.

C. Plumbing systems which connect to equipment provided or installed under the HVAC section of the drawings or specifications shall be terminated within five feet of final connection point of the equipment with a shutoff valve as specified in the plumbing valve section. Final connection is specified under the HVAC section.

D. Each pipe length shall have the manufacturer's name cast, stamped, or rolled on

E. Each fitting shall have the manufacturer's symbol and pressure rating cast, stamped, or rolled on.

1.2 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification.

B. Federal Specifications (Fed. Spec.):
L-C-53OC .....Coating, Pipe, Thermoplastic Resin
L-T-1512A.....Tape, Pressure Sensitive Adhesive, Pipe Wrapping
WW-V-35C.....Valve Ball Brass or Bronze
WW-V-1967 ...Valve, Butterfly (Threaded Ends And Solder Ends)

C. American National Standards Institute (ANSI):
American Society of Mechanical Engineers (ASME): (Copyrighted Society)
B16.3-85 .....Malleable Iron Threaded Fittings ANSI/ASME
B16.4-85 .....Cast Iron Threaded Fittings Classes 125 and 250 ANSI/ASME
B16.11-80 .....Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME
B16.15-85 .....Cast Bronze Threaded Fittings ANSI/ASME
B31.1 Pipe Welding
B31.8-86 .....Gas Transmission and Distribution Piping Systems ANSI/ASME
B40.1-85 .....Gauges-Pressure Indicating Dial Type-Elastic Element ANSI/ASME

D. American Society for Testing and Materials (ASTM):
A47-84Ferritic Malleable Iron Castings Revision 1989
A53-89Pipe, Steel, Black And Hot-Dipped, Zinc-coated Revision A Welded and Seamless
A183-83 .....Carbon Steel Track Bolts and Nuts
A312-89 .....Seamless and Welded Austenitic Stainless Steel Pipe
A536-84 .....Ductile Iron Castings

A733-89 .....Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
B32-89 Solder Metal
B62-86 Composition Bronze or Ounce Metal Castings
B75-86 Seamless Copper Tube
D2564-89 .....Solvent Cements for Poly (Vinyl Chloride) (PVC) Pipe Plastic Pipe and Fittings
D4101-82 .....Propylene Plastic Injection and Extrusion Materials

E. American Welding Society (AWS):
A5.8-89 .....Filler Metals for Brazing

F. National Association of Plumbing - Heating - Cooling Contractors (PHCC):
National Standard Plumbing Code – 1990

G. International Association of Plumbing and Mechanical Officials (IAPMO):
Uniform Plumbing Code - 1988
IS6-82 Installation Standard

H. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
SP-70-84 .....Cast Iron Gate Valves, Flanged and Threaded Ends.

PART 2 – PRODUCTS

2.1 PIPING AND FITTINGS MATERIAL SCHEDULE

A. Piping systems shall be constructed of the following materials as scheduled below, subject to approval by authorities having jurisdiction.

Systems	Pipe	Fittings	Remarks
Natural gas piping below grade	Schedule 40 black steel pipe	Welded steel fittings	1) Pipe coating and anodes in accordance with gas company requirements 2) Welding to be performed by a certified welder
Natural gas piping above ground outside building	Schedule 40 black steel pipe	Screwed malleable iron for fittings 2 inches and smaller, welded steel for fittings larger than 2 inches	1) Pipe painting and support in accordance with gas company requirements 2) Welding to be performed by a certified welder
Natural gas piping inside building	Schedule 40 black steel pipe	Screwed malleable iron for fittings 2 inches and smaller, welded steel for	1) Pipe painting and support in accordance with

Systems	Pipe	Fittings	Remarks
		fittings larger than 2 inches	gas company requirements 2) Welding to be performed by a certified welder 3) Sleeve and vent for gas pipe in ceiling space and riser per gas company requirements

2.2 PLUMBING PIPING SYSTEM PRESSURE CLASSIFICATION

1. Piping, fittings, components, and equipment for natural gas systems shall have an operating pressure of 4 inches and a component rating pressure of 125 psig.

PART 3 - EXECUTION

3.1 GENERAL

A. The drawings schematically indicate the size and location of piping. Piping system layout shall be modified as required to meet field conditions and facilitate coordination. Piping shall conform to the latest ASA code for pressure piping. Unless otherwise noted, all piping, valves, and associated fittings shall be concealed behind walls, above ceilings, or below floors.

B. Provide adequate provision for expansion and contraction in portions of the piping systems, to prevent undue strains on piping, building anchor points, and connected equipment.

C. Piping connections to plumbing fixtures and equipment shall be provided with offsets and shutoff valves arranged such that equipment can be serviced or removed without dismantling the pipe.

D. Any piping passing through roof construction shall be arranged to provide a minimum of 12 inch clearance from walls or other obstructions so as to permit proper flashing. Set pipe flashing fittings at a suitable level above the roof to permit proper termination of flashing.

E. Converging or diverging Bullheaded Tee’s are not permitted.

F. Provide hose drain connections on water systems downstream of floor main shut-off valves.

3.2 PIPING SYSTEM PRESSURE TESTS

A. The following procedures shall be observed for piping system pressure tests:

1. Preliminary testing, notification of inspectors and other responsibilities as specified in Section 15010, Paragraph 1.9 - CODES, PERMITS AND INSPECTIONS shall be observed.

2. Take all due precautions to prevent damage to the building and its contents that may be incurred by such tests; repair or make good any damage caused by the tests at no additional cost to the Owner.

3. Tests shall apply full test pressure to the piping for a sufficient period of time to detect leaks and defects. Refer to individual piping testing procedures for approved testing of liquids or gases.

4. Tests shall be conducted prior to the installation of any required fitting insulation. If delicate control mechanisms, not including control valves, are installed in the piping, they shall be removed to prevent shock damage.

5. The section of piping to be tested shall be brought up to the specified test pressure. If the test pressure falls more than the specified amount during the test period, the point of leakage shall be found, repaired and the test repeated. This procedure shall be repeated until the piping system has been proved absolutely tight.

6. Leaks shall be repaired by removing the valve, fitting, joint or section that is leaking and reinstalling new materials and joints as specified. Use of mastic of "no-leak" compounds or other temporary means of repairing leaks shall not be permitted.

3.3 NATURAL GAS SYSTEM

A. Installation Procedure

1. Piping shall be installed without pockets, with drips at low points and with valves at each outlet.

2. Final connections shall be made to pieces of equipment.

3. Right and left nipples shall not be used in lieu of unions.

4. Complete gas service connections to existing gas utility mains with service extensions into buildings, piping, valves, metering and pressure regulation in accordance with utility company requirements.

5. Provide plug valves at gas piping risers and main control points.

6. Provide gas cocks at gas equipment and appliances.

B. Natural Gas System Inspection

1. Every third weld in the gas riser piping shall be x-ray inspected in accordance with the gas company requirements. The results of the tests shall be forward to the gas company and to the Architect.

C. Natural Gas System Testing

1. The entire gas piping system shall be tested in accordance with the gas company requirements. At a minimum, piping shall be tested at a pressure of 90 psig for 24 hours using a recording type pressure gauge. Test natural gas sleeves at a pressure of 90 psig for 24 hours using a recording type pressure gauge. Equipment, materials and services required shall be provided.

2. Final tests shall be conducted in the presence of and to the satisfaction of the Architect and inspectors of any and all authorities having jurisdiction, including the gas company, who shall be notified a minimum of 48 hours in advance of same. Preliminary testing shall be completed prior to such notification.

3. While subjected to the test pressure, the piping system shall be visually examined for signs of leakage or other defects. Exposed joints shall be checked by means of a soap bubble test or other foaming agent test. Any reduction to test pressure measured by the gauge during the testing period shall be deemed to indicate the presence of a leak unless such reduction can be readily attributable to some other cause.

4. Test records shall be maintained during the testing and shall confirm that piping has been pressure tested as specified above.

5. Purging of piping shall be accomplished in accordance with the provisions contained in USAS-Z-83.1.

END OF SECTION

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 PIPING SYSTEM STANDARDS OF MATERIALS

A. Piping and fitting materials shall conform to the specification standards of the recognized authorities listed below. References shall be to the latest edition in force at the time of bidding.

B. Materials listed below shall be subject to approval of local governing authorities.

C. Plumbing systems which connect to equipment provided or installed under the HVAC section of the drawings or specifications shall be terminated within five feet of final connection point of the equipment with a shutoff valve as specified in the plumbing valve section. Final connection is specified under the HVAC section.

D. Each pipe length shall have the manufacturer's name cast, stamped, or rolled on.

E. Each fitting shall have the manufacturer's symbol and pressure rating cast, stamped, or rolled on.

1.2 APPLICABLE PUBLICATIONS

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BB-C-120C ....Chlorine, Technical, Liquid
WW-V-35C.....Valve Ball Brass or Bronze
WW-V-1967 ...Valve, Butterfly (Threaded Ends And Solder Ends)

C. American National Standards Institute (ANSI):
American Society of Mechanical Engineers (ASME): (Copyrighted Society)
A11.21.1M-80 Floor Drains ANSI/ASME

B16.3-85.....Malleable Iron Threaded Fittings ANSI/ASME
B16.4-85.....Cast Iron Threaded Fittings Classes 125 and 250 ANSI/ASME
B16.9-86.....Factory-Made Wrought Steel Buttwelding Fittings ANSI/ASME
B16.11-80.....Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME
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B16.15-85.....Cast Bronze Threaded Fittings ANSI/ASME
B16.18-84.....Cast Copper Alloy Solder-Joint Pressure Fittings ANSI/ASME

B16.22-89 .....Wrought Copper and Copper Alloy Solder Joint Pressure Fittings ANSI/ASME
B31.1 Pipe Welding
B31.8-86 .....Gas Transmission and Distribution Piping Systems ANSI/ASME
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D. American Society for Testing and Materials (ASTM):

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A74-87 Cast Iron Soil Pipe and Fittings
A183-83 .....Carbon Steel Track Bolts and Nuts
A312-89 .....Seamless and Welded Austenitic Stainless Steel Pipe
A536-84 .....Ductile Iron Castings
A733-89 .....Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
B32-89 Solder Metal
B61-86 Steam or Bronze Castings
B62-86 Composition Bronze or Ounce Metal Castings
B75-86 Seamless Copper Tube
B88-89 Seamless Copper Water Tube
B152 Copper Sheet
B-819……..Medical Gas Seamless Copper Tube
B306-88 .....Copper Drainage Tube (DWV)
B584-89 .....Copper Alloy Sand Castings for General Applications Revision A
B687-88 .....Brass, Copper, and Chromium-Plated Pipe Nipples
C564-88 .....Rubber Gaskets for Cast Iron Soil Pipe and Fittings
D2000-86 .....Rubber Products in Automotive Applications
D2146-82 .....Propylene Plastic Molding and Extrusion Materials
D2447-89 .....Polyethylene (PE) Plastic Pipe, Schedule 40 and 80, Based on Outside Diameter
D2564-89 .....Solvent Cements for Poly (Vinyl Chloride) (PVC) Pipe Plastic Pipe and Fittings
D2665-89 .....Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Revision A Vent Pipe and Fittings
D4101-82 .....Propylene Plastic Injection and Extrusion Materials

E. American Water Works Association (AWWA):

C151-86 .....Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
C203-86 .....Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied
C651-86 .....Disinfecting Water Mains
C701-88 .....Cold Water Meters-Turbine Type, for Customer Service

F. National Fire Protection Association (NFPA):

54-88 National Fuel Gas Code

G. American Welding Society (AWS):
A5.8-89 .....Filler Metals for Brazing

H. National Association of Plumbing - Heating - Cooling Contractors (PHCC):
National Standard Plumbing Code – 2009

I. Cast Iron Soil Pipe Institute (CISPI):
301-85 Hubless Cast Iron Soil and Fittings

J. International Association of Plumbing and Mechanical Officials (IAPMO):
Uniform Plumbing Code - 1988
IS6-82 Installation Standard

K. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
SP-70-84 .....Cast Iron Gate Valves, Flanged and Threaded Ends.

L. American Society of Sanitary Engineers (ASSE):
1003 Water Pressure Reducing Valves
1010 Water Hammer Arresters
1001-70 .....Pipe Applied Atmospheric Type Vacuum Breakers
1013-88 .....Reduced Pressure Principle Backflow Preventers
1015-88 .....Double Check Backflow Prevention Assembly
1020-81 .....Vacuum Breakers, Anti-Siphon, Pressure Type

M. Factory Mutual (FM):
1680-89 .....Coupling Used in Hubless Cast Iron Systems for Drains, Waste and Vent Systems.

PART 2 – PRODUCTS

2.1 PIPING AND FITTINGS MATERIAL SCHEDULE

A. Piping systems shall be constructed of the following materials as scheduled below, subject to approval by authorities having jurisdiction.

Systems	Pipe	Fittings	Remarks
Relief valve discharge piping	Type L hard drawn copper tubing w/95-5 tin antinomy solder joints	Cast bronze or wrought copper with solder joints	
Soil, waste, vent & storm drainage piping, underground	Serviceweight cast iron, bell & spigot Schedule 40 PVC	Cast iron bell and spigot with lead and oakum joints Schedule 40 PVC Socketweld	Min. pipe size 2 inches
Soil, waste, vent & storm drainage	Serviceweight cast iron, bell & spigot	Cast iron recessed drainage fittings, with	

Systems	Pipe	Fittings	Remarks
piping, above ground		rubber compression gaskets	
	Serviceweight cast iron, no-hub	Cast iron recessed drainage fittings with elastomeric gasket and stainless steel clamps	
	Copper drainage tube, type DWV	Cast brass recessed drainage fittings, with solder joints	Use soil pipe adapter for any connection to cast iron pipes at ground level
	Schedule 40 PVC	Schedule 40 PVC Socketweld	

2.2 HEAT TRACING

A. Electric heat tracing for piping shall be. Delta Therm #PF constant wattage cable with (2) 12 AWG copper bus wire and Nichrome wire heating element.
Electric heat tracing shall be 277 volt, 4.8 watts per linear foot. Maximum length per circuit shall be 710 feet.

B. Electric heat tracing shall be thermostatically controlled with line sensing thermostat in a Nema 4 enclosure.

C. Provide necessary accessories including, but not limited to, the following for a complete operational system:

1. Power connection kit.
2. Splice, end seal and tee kit.
3. Glass cloth and adhesive tape.

PART 3 – EXECUTION

3.1 GENERAL

A. The drawings schematically indicate the size and location of piping. Piping system layout shall be modified as required to meet field conditions and facilitate coordination. Piping shall conform to the latest ASA code for pressure piping. Unless otherwise noted, all piping, valves, and associated fittings shall be concealed behind walls, above ceilings, or below floors.

B. Provide adequate provision for expansion and contraction in portions of the piping systems, to prevent undue strains on piping, building anchor points, and connected equipment.

C. Piping connections to plumbing fixtures and equipment shall be provided with offsets and shutoff valves arranged such that equipment can be serviced or removed without dismantling the pipe.

D. Pitch water piping up in direction of flow to ensure adequate flow without air binding and to prevent noise and water hammer. Branch connections to mains

shall be made in such a manner as to prevent air trapping and prevent free passage of air. Mains shall be laid out to meet field conditions, maintain adequate headroom and clear work.

E. Any piping passing through roof construction shall be arranged to provide a minimum of 12 inch clearance from walls or other obstructions so as to permit proper flashing. Set pipe flashing fittings at a suitable level above the roof to permit proper termination of flashing.

F. Converging or diverging Bullheaded Tee's are not permitted.

3.2 PIPING SYSTEM PRESSURE TESTS

A. The following procedures shall be observed for piping system pressure tests:

1. Take all due precautions to prevent damage to the building and its contents that may be incurred by such tests; repair or make good any damage caused by the tests at no additional cost to the Owner.

2. Tests shall apply full test pressure to the piping for a sufficient period of time to detect leaks and defects. Refer to individual piping testing procedures for approved testing of liquids or gases.

3. Tests shall be conducted prior to the installation of any required fitting insulation. If delicate control mechanisms, not including control valves, are installed in the piping, they shall be removed to prevent shock damage.

4. The section of piping to be tested shall be brought up to the specified test pressure. If the test pressure falls more than the specified amount during the test period, the point of leakage shall be found, repaired and the test repeated. This procedure shall be repeated until the piping system has been proved absolutely tight.

5. Leaks shall be repaired by removing the valve, fitting, joint or section that is leaking and reinstalling new materials and joints as specified. Use of mastic of "no-leak" compounds or other temporary means of repairing leaks shall not be permitted.

3.3 SANITARY AND STORM WATER, DRAINAGE SYSTEMS

A. Installation Procedures

1. Drainage piping 3 inches and larger, unless otherwise indicated shall be pitched at a minimum rate of 1/8 inch per foot in direction of flow. Drainage piping smaller than 3 inches shall pitch at 1/4 inch per foot. Branch connections to stacks or main drains shall not be made in a manner that shall permit backflow.

2. Vent piping shall be arranged to drain any condensate back to drainage piping.

3. Cast iron hub and spigot pipe shall have joints made with elastomeric compression gasket.

4. Screwed joints shall be made with best quality pipe joint compound, carefully placed on the threads of pipe and not on the fittings.

5. Cut and threaded pipe shall have the cutting burrs and sharp edges reamed out.

6. Connections between galvanized steel and cast iron pipe shall be made with elastomeric compression gasket; the end of the galvanized steel pipe shall be fitted with a ring or part of a coupling screwed on to form a spigot.

7. Provide test tees in vertical soil, and leader stacks at required intervals to permit testing in sections, as not to delay work program as a whole.

8. Provide cleanouts at the base of soil lines and at changes in direction of horizontal piping. Distance between cleanouts of horizontal runs shall be the minimum required by Code or 50 feet, whichever is less. Cleanouts shall be made accessible by means of approved deck plates, access panels and doors.

9. Access doors and frames for cleanouts located behind walls shall be furnished for installation by others. A complete list of wall cleanout locations shall be furnished prior to erection of walls.

10. Where cleanouts occur in floors, they shall be compatible with surrounding finished surface.

11. Cleanout plugs shall be lubricated with graphite to facilitate removal. No pipe compound is to be used on plugs.

12. Cleanouts shall be full size of pipe up to 6 inches, and 6 inches for pipes 6 inches and larger.

13. When connecting to existing sanitary system, clean out sanitary from tie-in to next downstream cleanout.

B. Sanitary and, Storm Water, System Testing

1. The entire sanitary, soil, and vent system piping shall be subjected to hydrostatic testing comprised of plugging openings in the lines, filling the system (or portion thereof) with water to produce at least a 10 foot head of water at the highest point of the section tested. The water shall be kept in the section tested for at least 15 minutes before inspection starts, and the section tested shall stand without loss of level for the entire duration of the inspection.

2. The interior storm water drainage system shall be tested in accordance with the testing requirements for the sanitary, soil, acid waste, and vent system piping.

3. In the event that the test period occurs during months in which freezing weather may occur, an air test shall be conducted instead of the water tests specified in Section 3.05 B(1), to prevent the possibility of the oakum being saturated with water, freezing, and cracking the cast iron soil pipe at the hub. The air test shall be conducted as follows:

   a. Attach an air compressor testing apparatus to any suitable opening and, after plugging other inlets and outlets to the system, force air into the system until there is a uniform gauge pressure of 5 psi or sufficient to balance a column of mercury 10 inches in height. This pressure shall be held without the introduction of additional air for a period of at least 15 minutes.

4. Final Test - After all fixtures have been installed and the fixture traps filled with water, a final test of the drainage and vent system should be conducted using either a smoke or peppermint test.

   a. Smoke Test - The smoke test shall be made by filling traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, they shall be closed and a pressure equivalent to a 1 inch water column shall be built up and maintained for 15 minutes before inspection starts.

   b. Peppermint Test - Where the peppermint test is preferred, 2 ounces of oil of peppermint shall be introduced into each line or stack.

3.4 HEAT TRACING

A. Install heat tracing in accordance with manufacturer's recommendations.

END OF SECTION

DOMESTIC WATER HEATERS

PART 1 – GENERAL

1.1 GENERAL

A. Provide domestic water heaters and accessories as shown on the drawings and specified herein.

PART 2 – PRODUCTS

2.1 COMMERCIAL HIGH EFFICIENCY WATER HEATERS

A. Domestic Water heaters shall be Bradford White Commercial ef Series or equivalent high efficiency type and shall have PVC flue and combustion air venting. Unit shall have efficiency of 98.1%.

B. Water heater shall tank lined with an Vitraglas enamel and shall have non-cfc insulated jacket to permit zero inch clearance to combustibles. Unit shall multiple magnesium anode rods and shall have hand hole cleanout to inspect and clean tank interior.

C. Water heater shall have 100 gallon storage capacity with 199.0 MBH natural gas burner and shall have a recovery of 239 GPH @ 100 degree F rise.

D. Unit shall have a direct spark ignition with a pre-mix power burner that shall automatically increase or decrease fuel flow when a change in combustion air is detected.

E. Water heater shall have digital display having the capability of adjusting the degree setting.

F. Unit shall be complete with 1 inch drain valve, properly sized pressure and temperature relief valve, temperature limiting device, and concentric vent kit to permit one exit opening through wall or roof.

G. Entire unit shall have a one-year warranty from start-up and shall carry 5-year tank warranty.

2.2 HOT WATER RECIRCULATION PUMPS

A. Recirculation pumps for recirculating domestic hot water shall be ITT Bell and Gossett ln-line Booster Pump or approved equivalent.

B. Pump shall be all-bronze construction, bronze sleeve mechanical seal, and 1-1/2 inch flange size.

C. Pump shall be non-overloading at any point on the pump curve. Pump shall have oil lubricated bearings.

2.3 PRESSURE AND TEMPERATURE RELIEF VALVE

A. Pressure and temperature relief valves shall be Watts ASME rated automatic reseating temperature and pressure relief valves of bronze body construction with test lever. Model number and size to be based on heater size.

2.4 EXPANSION TANK

A. Description: steel, pressure-rated tank constructed with welded joints and factory-installed, butyl-rubber bladder. Include air pre-charge to system-operating pressure at tank.

B. Construction: The tank must be constructed in accordance with Section VIII of the ASME boiler and pressure vessel code and stamped 150 psig working-pressure rating.

C. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.

D. Tank Interior Finish: Materials and thickness complying with NSF 61, barrier materials for potable-water tank linings. Extend finish into and through tank fittings and outlets.

E. Tank Exterior Finish: Manufacturer’s standard, unless finish is indicated.

F. Air-Charging Valve: Factory installed.

G. Products: Wessels Series TTA
Taco Series PAX
B& G Series PTA

PART 3 – EXECUTION

3.1 GENERAL

A. Install water heaters in accordance with manufacturer's recommendations.

B. Verify proper operation of water heater and controls. Record outlet temperature at tank outlet and downstream of mixing valve. Verify proper operation of the recirculation pump.

END OF SECTION

PLUMBING FIXTURES AND TRIM

PART 1 – GENERAL

1.1 GENERAL

A. Provide plumbing fixtures as indicated on the drawings and specified herein. Lavatory accessories shall conform to requirements of the International Energy Conservation Code.

B. For fixtures not provided with traps, provide an adjustable chrome-plated P-trap of the same size as fixture tailpiece or 1-1/2 inch whichever is greater. Traps shall be Eljer drain trap 804 with 17 gauge tubing outlet with wall flange and slip joint inlet. Exposed piping, fittings, escutcheons, valves, etc. shall be chrome-plated metals. Exposed metal on fixtures shall be chrome-plated brass.

C. Exposed piping, fitting escutcheon, valves, etc. shall be chrome-plated metals. Exposed metal on fixtures shall be chrome-plated brass.

D. Unless required otherwise by ADA of 1992, mounting heights shall be verified and coordinated by the Owner. Mounting heights when listed are suggested heights only.

E. All faucet finishes shall be polished chrome unless otherwise noted.

F. All faucets shall be certified lead-free.

PART 2 – PRODUCTS

2.1 PLUMBING FIXTURES

A. Plumbing fixtures shall be as manufactured by American Standard, Kohler, or Eljer, unless otherwise indicated. Faucets and trim shall be as manufactured by Chicago Faucets, American Standard, T&S Brass, Crane, and Eljer unless otherwise specified. Plate numbers are provided below to indicate type and standard of quality of fixtures to be provided:

1. ADA Water Closets (WC-1)

   a. Floor Mounted with Tank
      American Standard Cadet FloWise 2467.100, elongated rim, pressure assisted siphon jet, floor mounted.

2. Wall Hung Lavatories (LAV-1)

   a. American Standard Comrade 0124.131, 20”x18”, vitreous china wall hung lavatory for concealed arms.

   b. Handicapped
      Mount unit as required to maintain clearances per local codes.

3. Drop in Kitchen Sink (KS-1)

a. Elkay Lustertone Classic Stainless Steel 29” x 18” x 6 1/2” Equal Double Bowl Drop-in ADA Sink with Perfect Drain. Model # LRAD291865PD.

4. Kitchen Trim (KF-1)

a. Elkay Avado® Single Hole Kitchen Faucet with Semi-professional Spout and Lever Handle LKAV2061.

b. Handicapped Installation – Insulate waste and domestic hot water under sink.

5. Lavatory Trim

a. American Standard Colony Pro 7075.056 deck type faucet combination with aerator and grid drain.

b. Handicapped Installation – Insulate waste and domestic hot water under sink.

6. Mop Service Basin

a. Fiat molded stone mop service basin with #830-A supply fitting and #8899CC Mop Hanger.

7. Wall Hydrant WH

a. Zurn Z-1310 non freeze exposed keyed wall hydrant.

2.2 FLOOR DRAINS (FD)

A. Zurn Z-415 drains with Type B strainer. In areas with finished floors, provide stainless steel top; otherwise, provide polished bronze top.

2.3 FITTINGS FOR FIXTURES SUPPLIED BY OTHERS

A. Provide trap, tailpiece, and supply pipes as specified in Paragraph 1.1, General, of this section.

PART 3 – EXECUTION

3.1 GENERAL

A. Install and connect fixtures in a secure, true, plumb and symmetrical manner. Thoroughly clean each fixture after installation and leave in proper working order, absolutely solid in their respective positions. For sinks and lavatories, verify clockwise rotation for cold water stem and counterclockwise rotation for hot water stem while facing respective stems.

B. Water supply piping serving flush valves for water closets, urinals and associated accessories shall be securely anchored within the construction at each exit point to ensure that flush valves, equipment and accessories shall be absolutely rigid with no movement in supply pipes. Movement in fixtures shall be sufficient cause for rejection.

C. When fixture trim is completed, adjust stops to provide proper flow through each valve or faucet.

D. Each fixture shall be filled with water and checked for leaks and retarded drainage.

E. Flush valves, loose key or wheel handle stops, valves and similar devices shall be adjusted and balanced to provide first class operation of the various systems.

F. Floor-mounted fixtures shall not be installed until finished floor is in place.

G. Where any plumbing fixture comes in contact with the wall, seal with a non-shrink, mildew-resistant caulking.

H. Provide waterproofing of floor drains as required by local codes. Flashing material shall be approved by local codes. Flashing material shall extend a minimum of 18 inches from the center of the floor drain in all directions.

I. Installation of handicap shall meet requirements of Americans with Disabilities Act.

J. Provide final connection and install fixtures and equipment furnished by others.

END OF SECTION

GENERAL HVAC PROVISIONS

PART 1 – GENERAL

1.1 REFERENCE TO CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplementary and other Conditions) and Division 1 - General Requirements, apply to the work specified in Division 23. Unless the specifications contain statements which are more definitive or more restrictive than those contained in the Conditions of the Contract, the specifications shall not be interpreted as waiving or overruling any requirements expressed in the Conditions of the Contract.

1.2 SCOPE OF WORK

A. The scope of the work included under Division 23 of the specifications shall include complete mechanical systems as shown in the Contract Documents and specified herein. Any work reasonably inferable or required to result in a complete installation or the intended operation and performance of the systems, shall be included in the Base Bid except where there is specific reference to exclusion and incorporation in other quotations.

1.3 INTENT OF DRAWINGS

A. Provide a complete mechanical system for the proposed project. The mechanical system provided shall conform to the details stated in the specifications and shown on the drawings. Items or work not shown or specified, but required for a complete mechanical system, shall be provided and shall conform with accepted trade practices. The drawings and specifications are presented to define specific system requirements and serve to expand on the primary contract requirements of providing a complete mechanical system. The drawings are diagrammatic and indicate only the general arrangement of the items comprising the several systems included in the mechanical work.

B. Do not scale the drawings. Because of the scale of the drawings, it is not possible to indicate offsets, fittings, valves, or similar items which may be required to make a complete operating system. Carefully investigate conditions affecting work and install work in such a manner that interferences between pipes, conduit, ducts, equipment, and architectural and structural features shall be avoided and shall provide items that may be required to meet the conditions at the building, without additional cost to the Owner.

C. Bidders shall have sufficient expertise in this type of construction to realize the extent of the work required.

D. It should, therefore, be obvious to any prudent firm with experience in this field that these documents may not explicitly disclose final details; however, the firms offering proposals are represented to possess the expertise necessary to include necessary appointments.

1.4 DEFINITIONS

A. Specific terminology, as used herein, shall have the following meanings:

1. "Furnish"...Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar subsequent requirements.
2. "Install"...Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.
3. "Provide"...Furnish and install, complete and ready for intended use.
4. "Piping"...Pipe, fittings, flanges, valves, controls, hangers, traps, drains, insulation, vents and other items customarily required in connection with the transfer of fluids.
5. "Concealed"...Embedded in masonry or other construction, installed behind wall furring, within double partitions or hung ceilings, in crawl spaces or shafts.
6. "Exposed"...Not concealed.
7. "Conditioned"...Spaces directly provided with heating and cooling.
8. "Unconditioned"...Spaces without heating or cooling including ceiling plenums.
9. "Indoors"...Located inside the exterior walls and roof of the building.
10. "Outdoors"...Located outside the exterior walls and roof of the building.

B. Reference to the following codes and standards shall mean:

Reference	Definition
ASTM	American Society for Testing Materials
NFPA	National Fire Protection Association
UL	Underwriters Laboratories, Inc.
NEMA	National Electrical Manufacturers Association
USAS	United States of America Standards Institute
ANSI	American National Standards Institute
FS	Federal Specification, US Government
CS	Commercial Standards issued by US Department of Commerce
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
ARI	Air Conditioning and Refrigeration Institute
ADA	Americans with Disabilities Act
AMCA	Air Movement and Control Association

C. References to codes, standards, manufacturer's information, etc. are the latest publication in effect during the bid period.

1.5 GENERAL STANDARDS OF MATERIALS

A. Equipment and materials, unless specifically indicated otherwise, shall be new and of first quality, produced by manufacturers who have been regularly engaged in the manufacture of these products for a period of not less than five years.

B. Equipment of one type shall be the products of one manufacturer; similar items of the same classification shall be identical, including equipment, assemblies, parts and components.

C. Materials furnished shall be determined safe by a nationally recognized testing organization, such as Underwriters' Laboratories, Inc., or Factory Mutual Engineering Corporation, and materials shall be labeled, certified or listed by such organizations.

D. With respect to custom made equipment or related installations which are constructed specially for this project, the manufacturer shall certify the safety of same on the basis of test data. The Owner shall be furnished copies of such certificates.

E. All products provided shall meet flame spread and smoke spread ratings of 25/50.

1.6 PRODUCTS AND SUBSTITUTIONS

A. Where several manufacturers' products are specified, the bid shall be based upon the specified products only. Proposed substitutions will be considered if received 5 days before the bid date and in accordance with Division 1 requirements.

B. Note that where only one manufacturer's product is specified, the associated systems have been designed on the basis of that product. Where several manufacturer's products are specified, the associated systems have been designed on the basis of the first-named manufacturer's product. When products other than those used as the basis of design are provided, pay additional costs related to modifications to the systems and/or structure required by the use of that product.

C. It is the intent of these specifications that service organizations such as balancing agencies follow the above substitution procedures.

1.7 CODES, PERMITS AND INSPECTIONS

A. Materials furnished and work installed shall comply with the International Mechanical Code, with the International Energy Conservation Code. with the National Fire Codes of the National Fire Protection Association, with the requirements of the local utility companies, and with the requirements of governmental departments or authorities having jurisdiction. Materials and equipment furnished for the electrical portion of the mechanical systems shall bear the approval label of or shall be listed by the Underwriters' Laboratories, Inc. Electrical work shall comply with the National Electrical Code.

B. Provide labor, materials, services, apparatus and drawings required to comply with applicable laws, ordinances, rules and regulations, whether or not shown on the drawings and/or specified.

C. Provide labor, materials, services and apparatus required for the performance and pressure tests specified hereinafter. Final tests shall be conducted in the presence of the Architect (Engineer) and inspectors of authorities having jurisdiction, who shall be notified, in writing, at least 48 hours in advance of same. Ensure that the work shall stand the final test prior to giving the notification. Should the work fail the final test, necessary corrections shall be made and the work shall be re-submitted for testing and inspection. The cost of the Architect's additional time, travel expenses, and other applicable expenses due to the re-testing shall be included.

D. Obtain and pay for required permits.

1.8 GUARANTEES AND CERTIFICATES

A. Where materials or equipment are specified to comply with requirements of the Underwriters' Laboratory, Inc., the American Refrigeration Institute, the American Society of Mechanical Engineers, or similar technical groups or societies having jurisdiction over the type and design of particular mechanical or electrical equipment specified herein, proof of such compliance shall be submitted. The label or listing of the specified agency shall be acceptable evidence. In lieu of a label or listing, a written certificate may be submitted from an approved, nationally recognized testing organization equipped to perform such services, stating that the items have been tested and conform to the requirements and testing methods of the specified agency. Where equipment is specified to conform to requirements of the ASME Boiler and Pressure Vessel Code, the design, fabrication and complete installation shall conform to that code.

1. Certification shall be submitted attesting to the fact that the specified performance criteria are met by items of equipment.

2. Work shall be guaranteed to be free from leaks or defects. Any defective equipment, materials or workmanship, including damage to the work provided under other divisions of this contract resulting from same, shall be replaced or repaired at no extra cost to the Owner for the duration of the stipulated guarantee periods.

3. Unless specifically indicated otherwise, the duration of the guarantee period shall be one (1) year following the date of final acceptance by the Owner. Owner acceptance will begin with actual occupancy of the areas served by this equipment. Temporary operation of the equipment for temporary conditioning, testing, etc., prior to occupancy will not be considered part of the warranty period.

1.9 QUIET OPERATION AND VIBRATION CONTROL

A. Equipment and associated items shall operate under conditions of load without sound or vibration deemed objectionable by the Architect (Engineer). In the case of moving equipment, sound or vibration noticeable outside of the room in which it is installed, or annoyingly noticeable within the room in which it is installed, shall be deemed objectionable. Sound or vibration deemed objectionable shall be corrected in an approved manner at no extra cost to the Owner. Vibration

control shall be provided by means of approved vibration isolators and installed in accordance with the isolator manufacturer's recommendations.

B. The sound pressure levels around mechanical and electrical equipment (fans, pumps, motors, etc.) in equipment spaces shall not exceed 85 dBA at any point three (3) feet from the equipment, with all equipment in the room operating. The sound criteria applies to the complete range of each piece of equipment.

1.10 COORDINATION

A. Coordinate and furnish in writing to the Architect (Engineer) any information necessary to permit the work to be installed satisfactorily and with the least possible interference or delay.

B. Devices and appurtenances which are to be installed in finished areas shall be coordinated with the Architect for final approval as it relates to location, finish, materials, color and texture.

C. When work is installed without proper coordination, changes to this work deemed necessary by the Architect shall be made to correct the conditions without extra cost to the Owner.

1.11 ACCESSIBILITY

A. Coordinate to ensure the sufficiency of the size of shafts and chases, and the adequacy of clearances in hung ceilings and other areas required for the proper installation of this work.

B. Locate equipment which must be serviced, operated or maintained in fully accessible positions. Locations in ceilings requiring access shall be coordinated with, but not limited to, lights, curtain tracks, speakers, and medical gas tracks. Equipment requiring access shall include, but is not necessarily limited to, valves, traps, clean-outs, motors, fire dampers, controllers, switchgear and drain points.

C. Provide drawings for coordination, as required, showing exact locations of access doors for each concealed valve, control, damper, or other device concealed behind finished construction and requiring service. Equipment (valves, RTC) below floor slab or finished grade shall be considered as finished construction. Access doors in finished construction shall be furnished as specified in this section. Locations of access doors in finished construction shall be submitted in sufficient time to be installed in the normal course of the work.

1.12 ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements, furnish access doors by one of the following:

1. Bar-Co., Inc.
2. J. L. Industries
3. Karp Associates, Inc.
4. Nystrom, Inc.

B. Materials and Fabrication:

1. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.

2. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.

3. Frames: Fabricate from 16-gauge steel.

   a. Fabricate frame with exposed flange nominal 1 inch wide around perimeter of frame for units installed in the following construction:
      1) Exposed Masonry

   b. For gypsum drywall or veneer gypsum plaster, furnish perforated frames with drywall bead.
   c. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.
   d. For full-bed plaster applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.

4. Flush Panel Doors: Fabricate from not less than 14-gauge sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175°. Finish with manufacturer's factory-applied prime paint.

   a. For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.

5. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.

C. Furnish access doors under this division for installation by General Contractor. Coordinate during bidding phase with General Contractor.

1.13 ELECTRICAL CONNECTIONS

A. Regardless of voltage, provide temperature control wiring, interlock wiring, and equipment control wiring for the equipment provided under this division of the specifications.

B. Furnish electrical disconnect switches, starters and combination starter disconnects required for equipment provided under this division of the specifications.

C. Power wiring not used for control functions, complete from power source to motor or equipment junction box, including power wiring through starters, shall be provided under Division 16.

D. Coordinate to ensure that electrical devices furnished or provided are compatible with the electrical systems used.

E. Furnish circuit breakers rated for motor protection (for installation under Division 16) for equipment purchased under this division of the specification.

1.14 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Shop drawings, product data, and samples shall be submitted in accordance with the provisions of Division 1 - General Requirements.

B. The following shall be submitted by the Contractor for review by the Architect:

1. Scale shop drawings indicating insert and sleeve locations.
2. Scale shop drawings showing piping and duct runs with sizing indicated.
3. Product data, factory assembly shop drawings, and field installation shop drawings as required for a complete explanation and description of items of equipment, including appurtenances and accessories. Product data for pumps, fans and similar equipment shall include performance curves illustrating equipment performance characteristics under the specified range of operating conditions.
4. Samples of finishes and trim exposed to view, such as cleanout plates, fixture trim, escutcheon plates and similar items.
5. Product data for plumbing fixtures, trim, hangers, and miscellaneous plumbing materials.
6. Product data for piping inserts, rods, hangers, anchors, guides and trapezes.
7. Shop drawings locating piping anchor and guide points and expansion joints or loops.
8. Shop drawings locating access doors in sheet metal work.

1.15 OPERATING AND MAINTENANCE INSTRUCTIONS

A. After final tests and adjustments have been completed, furnish the services of qualified personnel to fully instruct representatives of the Owner in the operation and maintenance procedures for equipment installed including cooling plant, heating plant, air systems, plumbing systems. Operation and maintenance instructions for major items of equipment shall be directly supervised by the equipment manufacturer's representative. Supply qualified personnel to operate equipment for sufficient length of time as required to meet governing authorities' operation and performance tests and as required to assure that the Owner's representatives are properly qualified to take over operation and maintenance procedures. Minimum instruction period shall be 30 man hours. The instruction period shall be broken into segments at the discretion of the Owner.

1. Notify the Architect, the Owner's representative and equipment manufacturers' representatives, by letter, as to the time and date of operating and maintenance instruction periods approved by the Owner at least one (1) week prior to conducting same.

2. Forward to the Architect the signatures of all those present for the instruction periods.

B. Furnish three (3) copied of recommended equipment operation and maintenance procedures manuals as specified herein, assembled and bound together in 8-1/2 x 11 inch three-ring binders. The binders shall be submitted to the Architect in accordance with procedures established for shop drawing submittals in Division 1 - General Requirements.

1. The operation and maintenance procedures manuals shall include the following:
   a. Project title
   b. Architect's name and address
   c. Date submitted
   d. Contractor and subcontractors' name and address
   e. Index (in alphabetical order, with page numbers)
   f. General description of each system
   g. Parts list, identifying the various parts of equipment for repair and replacement purposes.
   h. List of spares recommended for normal service requirements.
   i. Edited operating instructions outlining step-by-step procedures required for system start-up and operation. The instructions shall include the manufacturer's name, model number, service manual, and brief description of each piece of equipment and its basic operating features.
   j. Maintenance instructions describing routine maintenance and lubrication procedures and schedules, and simplified diagrams which illustrate the systems as installed. Instructions as described above shall be tailored for each specific system.
   k. Wiring and control diagrams for each piece of equipment, showing "as installed" conditions.
   l. Performance curves for pumps, fans and similar equipment.
   m. One (1) reviewed copy of each shop drawing submitted.

1.16 SINGULAR NUMBER

A. References made to any item in the singular number shall apply equally to as many identical items that the work may require.

1.17 PROTECTION OF SERVICES

A. Repair, replace and maintain in service any new or existing utilities, facilities or services (underground, overground, interior or exterior) damaged, broken or otherwise rendered inoperative during the course of construction. The method used in repairing, replacing or maintaining the services shall be approved by the Owner and Architect.

1.18 PROTECTION OF FLOORS

A. Protect existing flooring from damage during the construction period. Provide plywood or similar material under equipment or materials stored on floors, and in

areas where construction may damage the floor surfaces. Replace floor surfaces (including sealer) damaged during the construction.

1.19 SPECIAL TOOLS

A. Provide the Owner's representative with two (2) sets of special tools required for operation and maintenance of equipment provided.

1.20 REVIEW BY ARCHITECT/ENGINEER

A. Notify the Architect/Engineer at least 48 hours in advance of the date and time of tests specified to be witnessed by the Engineer. The Architect/Engineer reserves the right to demand repetition of any testing where he is unable to attend due to insufficient notice without additional cost to the owner.

1.21 PRE-BID SITE VISIT

A. Bidders shall visit the site and become completely familiar with existing conditions prior to submitting their bid. No extra charges shall be allowed as a result of existing conditions.

PART 2 – PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. Equipment shall be so built and installed as to deliver its full rated capacity at the efficiency for which it was designed. Equipment shall meet the detailed requirements indicated, and shall be suitable for the installation shown.

B. Where two or more units of the same class of equipment are furnished in same Section of Specifications, provide each from the same manufacturer. Furnish equipment and materials new and free from defects of size, make, type and quality herein specified, or as reviewed. Work shall be installed in a neat and workmanlike manner.

C. Capacities, dimensions, or sizes specified or indicated are minimum, unless otherwise stated. Tolerances used in rating or testing standards specified shall not be allowed in determining capacities of equipment.

D. Materials shall be listed by the Underwriters' Laboratories, Inc. where applicable and shall be manufactured in accordance with applicable standards established by ANSI, NEMA, ASTM, and IEEE.

E. Any products judged not in accordance with the Specifications either before or after installation shall be rejected.

F. Where products are specified with no reference to a particular manufacturer's product, the product used shall meet or exceed industry construction and testing procedure standards applicable to the product, for life expectancy, performance and safety.

G. Where electrical products are a fabricated assembly, the fabricator shall assume responsibility for correct operation of the entire assembly and of its individual components.

H. Tools: Provide special tools for proper operation and maintenance of the equipment.

2.2 ANCHOR BOLTS

A. Provide and set in place, at the time of pouring of concrete foundations, necessary anchor bolts as required for the equipment called for under these specifications. Anchor bolts shall be of the hook type, of proper size and length to suit the equipment. Anchor bolts shall be set in pipe sleeves of approximately twice the bolt diameter and one half the embedded length of the bolt. Assume full responsibility for proper emplacement of the bolts.

2.3 INSERTS

A. Provide inserts of an approved metallic type for hangers. Where two or more parallel conduits are installed, continuous inserts may be used. Where required to distribute the load on the inserts, a piece of reinforcing steel of sufficient length shall be passed through the insert.

2.4 SLEEVES

A. Provide sleeves in all roofs, floors, and any fire-rated walls. Each sleeve shall extend through its respective floor, wall or partition and shall be cut flush with each surface unless otherwise required.

B. Sleeves in bearing and masonry walls, floors and partitions shall be standard weight steel pipe finished with smooth edges. For other than masonry partitions, through suspended ceilings, and for concealed vertical piping, sleeves shall be No. 22 USG galvanized iron.

C. Sleeves shall be properly installed and securely cemented in place.

D. Floor sleeves shall extend 1 inch above the finished floor, unless otherwise noted. Space between floor sleeves and passing conduit shall be caulked with graphite packing and waterproof caulking compound.

E. Sleeves through exterior walls below grade shall have the space between conduit and sleeve caulked watertight using an approved method.

2.5 FIREPROOFING

A. Where sleeves or other penetrations pierce floors or walls having specific fire ratings, the space between the sleeve and passing conduit shall be fireproofed using 3M Series 7900 Penetration Fire Stop putty. Where a cable tray passes through fire-rated walls, use seal bags as manufactured by International Protection Coatings Company. Installation method shall be per manufacturer's recommendations and approved by the Architect/Engineer.

2.6 MISCELLANEOUS METAL AND STRUCTURAL STEEL

A. Scope of Work: Furnish labor, materials, equipment and services necessary for the installation of miscellaneous metal and structural steel work required to complete this contract. Erect structural steel required for the proper support of equipment required under this contract.

B. Supports, brackets, and clamps and other items specified herein shall be installed in strict accordance with the best practices and recognized code.

C. Materials: Structural steel members required under this part shall conform to ASTM Standard Specification A-7. Other materials shall be as specified hereinafter.

D. Priming: steel and iron work shall be primed with Rust-Oleum 769 or approved equivalent. Before priming, metal shall be thoroughly cleaned free from scale, rust and dirt.

E. Anchors: Provide anchors, bolts, screws, dowels and connecting members, and do cutting and fitting necessary to secure the work to adjoining construction. Build in connecting members to masonry, concrete and structural steel as the work progresses.

F. Supports and Brackets: shall be neatly constructed to structural shapes to adequately support the equipment intended. Supports must be approved prior to installation. Attention is directed to the proper rigid support required for conduit. Field conditions shall regulate the type of support required.

2.7 VIBRATION ISOLATION MOUNTS

A. Provide vibration isolation mounts for all substations, power centers, transformers, etc. All vibration isolation mounts shall be Amber-Booth spring type applicable for the size and weight of the equipment.

2.8 GRADING, FERTILIZING, AND SEEDING

A. Provide labor, materials, equipment, and services required to strip and store topsoil, replace topsoil, and rough and finish grade and fertilize and seed areas disturbed beyond the work area of the General Contract. Topsoil must be stored where directed on the site.

2.9 BITUMINOUS PAVING

A. Provide labor, materials, equipment, and services necessary to repair pavements disturbed under the Contract.

B. Materials, methods, and workmanship shall conform with the requirements of the PA Department of Highways, as published in its specifications Form 408, as amended to date.

C. All patching of existing areas shall match existing materials.

2.10 MOTORS

A. Motors shall be built in accordance with the latest standards of NEMA and as specified. Motors shall be tested in accordance with ASA C50 and conform thereto with respect to insulation resistance and dielectric strength.

B. Each motor shall be provided with conduit terminal box and adequate starting and protective equipment as specified or required. The capacity shall be sufficient to operate associated driven devices under conditions of operation and load and without overload, and shall be at least the horsepower indicated or specified. Each motor type shall be for quiet operation.

C. Motor starting equipment must be selected so that starting currents or transients do not have an adverse effect on lighting or other electrical equipment. No open transition wye-delta starting of motors shall be permitted.

PART 3 – EXECUTION

3.1 GENERAL

A. Provide information to the General Contractor for any chases or openings required under this Contract. No cutting shall be done which may affect the building structurally or architecturally without the prior approval of the Architect. Damaged construction shall be restored to its original conditions and finished to match the surrounding work. Refer to "Supplementary General Conditions" for the disposition of Cutting and Patching.

B. Grades, elevations, and dimensions shown on the drawings are approximately correct; however, field check and otherwise verify such data at the site before proceeding with the work. Make necessary survey equipment available at all times and make use of such equipment wherever necessary to properly install equipment.

C. The Contractor shall be entirely responsible for apparatus, equipment, and appurtenances furnished by him or his subcontractors in connection with the work and special care shall be taken to protect parts thereof in such manner as may be necessary or as may be directed. Protection shall include covers, crating, sheds or other means to prevent dirt, grit, plaster or other foreign substances from entering the working parts of machinery or equipment. Special care shall be taken to keep open ends of pipes closed while in storage and during installation. Where equipment must be stored outside the building, it shall be totally covered and secured with heavy weatherproofing tarps and kept dry at all times. Where equipment has been subjected to moisture, it shall be removed from the site and replaced with new equipment. Protect open excavating until covered over.

D. Due to the schematic nature and small scale of the electrical drawings, it is not possible to indicate exact locations, offsets, fittings, access panels, pull boxes, and miscellaneous parts which may be required to form a complete system. The

drawings are generally indicative of the work to be installed. Arrange work accordingly furnishing necessary parts and equipment as may be required to meet the various conditions and to provide a complete circuit from end use device to circuit protective device in panel.

E. The Contractor shall include in his bid price, the cost to furnish and install the necessary amount of supply and return air ductwork, including all diffusers and return air registers, to serve the equivalent of three (3) tons of air conditioning.

F. Within thirty (30) days after acceptance of bids, submit to the Architect for approval, a complete list of equipment and materials to be furnished under this contract, giving names and addresses of manufacturers and material they intend to furnish. This source of supply shall be listed on forms available from the Architect.

3.2 CLEARANCES

A. Take caution when on routing conduit and location of equipment. In many cases, clearances in ceiling plenums is limited due to ductwork and other mechanical lines and systems and steel. The Contractor shall be responsible for routing around mechanical equipment and ducts in order that everything can remain concealed in finished areas.

3.3 CUTTING AND PATCHING

A. Provide cutting and patching necessary to install the work specified herein. Patching shall match adjacent surfaces. Refer to Section 01045, Cutting and Patching, for specific direction.

B. No structural members shall be cut without prior approval of the Architect, and such cutting shall be done in a manner directed by the Architect.

C. Provide ceiling removal and replacement where work above ceilings is required. Replace ceiling components damaged in the process.

D. Provide patching where electrical devices are removed from walls, ceilings or floors as required under demolition.

3.4 PAINTING

A. Finished painting shall be performed by others except for standard factory finishes

B. Electrical motors, pump casings, and other similar items shall be provided with three coats of machinery enamel at the factory, and shall be carefully cleaned, rubbed down, and oiled after installation.

3.5 LOCATIONS

A. Apply for detailed and specific information regarding the location of equipment as the final location may differ from that indicated on the drawings. Outlets,

equipment or wiring improperly placed because of failure to obtain this information shall be relocated and re-installed without additional expense to the Owner. Determine the actual direction of door swings, so that local switches and other controls shall be installed at the lockside of doors, unless otherwise noted. Improperly located switches shall be relocated without additional expense to the Owner.

B. The design shall be subject to such revisions as may be necessary to overcome building obstructions. No changes shall be made in location of outlets or equipment without written consent of the Architect and Owner.

C. Unless otherwise mentioned or indicated, mounting heights of outlets are shown on the drawings or in the specification. Dimensions given shall be considered to be from center of outlet to finished floor.

D. Properly rough for the electrical conduit and equipment under this contract and modify as required for coordination during the construction period.

3.6 DUST, DIRT AND NOISE

A. Carry out new work and make changes, relocations, and installations with a minimum of noise. Site areas and new equipment, floors and walls, shall be adequately protected from dust and dirt caused by the work. Protection shall include suitable temporary barriers or coverings. The exterior and interior premises of each building shall be kept clean as possible during construction. Damages to surfaces or equipment as a result of negligence shall be replaced or corrected as required.

3.7 RECORD DRAWINGS

A. During the construction period, maintain in good order a complete set of blue line electrical contract drawings. Record the actual electrical installation as the work progresses. Include changes to the contract and to equipment sizes and types. Keep these drawings available at the site at all times for inspection.

B. Take proper caution against the use of superseded drawings. Check such copies and mark "void." Where drawings have been corrected by memorandum, assume the responsibility for marking all drawings so affected with the changes; such marked drawings shall remain in use until revised drawings are issued.

C. At the conclusion of the work, obtain a set of sepias from the Architect. Incorporate "as built" data in a clearly legible manner. Return such marked prints or sepias within 30 days to the Architect.

D. At the conclusion of the work, provide to the Architect a complete set of drawings which indicate precisely how the electrical single line and riser diagram equipment has been installed. Return such reproducible drawings within 30 days to the Architect.

3.8 EQUIPMENT, FOUNDATIONS, SUPPORTS, PIERS AND ATTACHMENTS

A. Provide necessary foundations, supports, pads, bases and piers required for equipment specified in this division; submit drawings in accordance with Shop Drawing Submittal requirements prior to the purchase, fabrication or construction of same.

B. Provide concrete pads for base-mounted transformers and rotating equipment, and for floor-mounted equipment located in equipment rooms and as indicated on the drawings. Pads shall be extended 6 inches beyond matching base in all directions with top edge chamfered. Inset 6 inch steel dowel rods into floors to anchor pads.

C. Construction of foundations, supports, pads, bases and piers, where mounted on the floor, shall be of the same materials and same quality of finish as the adjacent and surrounding floor material.

D. Equipment shall be securely attached to the building structure in an approved manner. Attachments shall be of a strong and durable nature and any attachments that are, in the opinion of the Architect, not strong and durable shall be replaced as directed.

3.9 SCAFFOLDING

A. Furnish and erect scaffolding and ladders required in the installation of wiring, equipment and fixtures.

END OF SECTION

HVAC PIPING SLEEVES, SEALS, AND ESCUTCHEONS

PART 1 – GENERAL

1.1 PIPING SYSTEM STANDARDS OF MATERIALS

A. Piping and fitting materials shall conform to the specification standards of the recognized authorities listed below. References shall be to the latest edition in force at the time of bidding.

B. Materials listed below shall be subject to approval of local governing authorities.

PART 2 – PRODUCTS

2.1 PIPE SLEEVES AND ESCUTCHEON PLATES

A. Provide sleeves for piping passing through roofs, floors, ceilings, walls, partitions, air handling equipment, structural members, and other building parts.

B. Sealant shall be equivalent to Dow Corning 795 Silicone Sealant for general purpose use and Dow Corning 786 Mildew Resistant Silicone Sealant for Kitchen, Food Preparation, Dining areas, and wet areas. Prime sleeves in accordance with manufacturer's recommendations.

C. Sealant in one-hour and two-hour walls and one-hour and two-hour floors shall be equivalent to Dow Corning Fire Stop System Sealants and Foams. Sealants and foams shall be UL listed and installed in accordance with manufacturer's recommendations.

D. Schedule of Sleeve Materials

Sleeve Type	Sleeve Material
1	18 gauge galvanized steel
2	Std. weight galvanized steel pipe
3	Std. weight galvanized steel pipe with a continuously welded water stop of 1/4 inch steel plate extending a minimum of 2 inches from the outside of the sleeve. (F&S Mfg. Co. Figure 204 or approved equal.)
4	Cast iron pipe sleeve with center flange. (James B. Clow & Sons No. F-1430 & F-1435, or approved equal.)
5	Std. weight galvanized steel pipe with flashing clamp device welded to pipe sleeve or watertight sleeves. (Josam 1870-A2 with oakum and lead caulking as required, or approved equal.)
6	Metal deck and wall sleeves.

E. Escutcheon Plates

1. Schedule of Escutcheon Plate Materials

Location	Escutcheon Plate Material
Finished spaces	Anodized aluminum or chrome-plated brass
Unfinished spaces	Plain brass, cast iron or aluminum

2.2 PIPE FLASHING FITTINGS

A. Pipes passing through roof construction shall be provided with roof curb and piping portal as specified in Section 15058.

PART 3 – EXECUTION

3.1 PIPE SLEEVES

A. Install sleeves in time to permit construction progress as scheduled.

B. Grout sleeves to building structure for watertight fit.

C. Schedule of Sleeve Lengths

Location	Sleeve Length
Floors	Equal to depth of floor construction and at least 1 inch above finished floor construction. In waterproof floor construction, sleeves shall extend a minimum of 2 inches above finished floor construction
Roofs	Equal to depth of roof construction including insulation
Walls and Partitions	Equal to depth of construction and terminated flush with finished surfaces

D. Schedule of Sleeve Caulking and Packing

Caulking/ Packing Type	Caulking/Packing Requirements
A	Space between pipe and sleeve shall be packed with oakum and caulked watertight with lead.
B	Space between pipe or pipe covering and sleeve shall be caulked with an incombustible permanently plastic waterproof, non-staining compound leaving a smooth, finished appearance.
C	Verminproofing - space between pipe and sleeve shall be packed with industrial felt or fiberglass caulked at both ends with sealant according to manufacturer's recommendations. Verminproof insulation shall be minimum 1 inch thickness and shall be sections of foam glass as long as sleeves.

E. Schedule of Sleeve Applications

Location	Sleeve Type Thru Fire Rated Construction	Sleeve Type Thru Non-Fire Rated Construction	Sleeve Caulking and Packing Type
Membrane water-proof floor, roof and wall construction	5	5	C
Non-membrane waterproof floor, roof and wall construction where flashing is required	5	5	C
Interior walls, partitions, and floors	2	1 or 2	C
Exterior walls	---	3 or 4	C

Location	Sleeve Type Thru Fire Rated Construction	Sleeve Type Thru Non-Fire Rated Construction	Sleeve Caulking and Packing Type
Cellular metal deck floors	2	6	B
Precast concrete floor with poured concrete topping (NOTE: sleeves with flat flanges or guides which rest on top of precast slab required	--	1	B

3.2 PIPE FLASHING FITTINGS

A. Any pipe passing through roof construction shall be arranged to provide a minimum of 12 inches clearance from walls or other obstructions so as to permit proper flashing.

END OF SECTION

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 – GENERAL

1.1 PIPING SYSTEM STANDARDS OF MATERIALS

A. Piping and fitting materials shall conform to the specification standards of the recognized authorities listed below. References shall be to the latest edition in force at the time of bidding.

B. Materials listed below shall be subject to approval of local governing authorities.

C. Each pipe length shall have the manufacturer's name cast, stamped, or rolled on.

D. Each fitting shall have the manufacturer's symbol and pressure rating cast, stamped, or rolled on.

1.2 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification.

B. Federal Specifications (Fed. Spec.):

L-C-53OC .....Coating, Pipe, Thermoplastic Resin
L-T-1512A.....Tape, Pressure Sensitive Adhesive, Pipe Wrapping
0-C-114B(2)...Calcium Hypochlorite, Technical
0-S-602E .....Sodium Hypochlorite Solution
BB-C-120C ....Chlorine, Technical, Liquid
WW-V-35C.....Valve Ball Brass or Bronze
WW-V-1967 ...Valve, Butterfly (Threaded Ends And Solder Ends)

C. American National Standards Institute (ANSI):

American Society of Mechanical Engineers (ASME): (Copyrighted Society)
A11.21.1M-80 Floor Drains ANSI/ASME
B16.3-85 Malleable Iron Threaded Fittings ANSI/ASME
B16.4-85.....Cast Iron Threaded Fittings Classes 125 and 250 ANSI/ASME
B16.9-86.....Factory-Made Wrought Steel Buttwelding Fittings ANSI/ASME
B16.11-80.....Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME
B16.12-83.....Cast Iron Threaded Drainage Fittings ANSI/ASME
B16.15-85.....Cast Bronze Threaded Fittings ANSI/ASME
B16.18-84.....Cast Copper Alloy Solder-Joint Pressure Fittings ANSI/ASME
B16.22-89.....Wrought Copper and Copper Alloy Solder Joint Pressure Fittings ANSI/ASME
B31.1 .....Pipe Welding
B31.8-86.....Gas Transmission and Distribution Piping Systems ANSI/ASME
B40.1-85.....Gauges-Pressure Indicating Dial Type-Elastic Element ANSI/ASME

D. American Society for Testing and Materials (ASTM):

A47-84 ..... Ferritic Malleable Iron Castings Revision 1989
A53-89 ..... Pipe, Steel, Black And Hot-Dipped, Zinc-coated Revision A Welded and Seamless
A74-87 ..... Cast Iron Soil Pipe and Fittings
A183-83 ..... Carbon Steel Track Bolts and Nuts
A312-89 ..... Seamless and Welded Austenitic Stainless Steel Pipe
A536-84 ..... Ductile Iron Castings
A733-89 ..... Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
B32-89 ..... Solder Metal
B61-86 ..... Steam or Bronze Castings
B62-86 ..... Composition Bronze or Ounce Metal Castings
B75-86 ..... Seamless Copper Tube
B88-89 ..... Seamless Copper Water Tube
B152 ..... Copper Sheet
B-819…….Medical Gas Seamless Copper Tube
B306-88 ..... Copper Drainage Tube (DWV)
B584-89 ..... Copper Alloy Sand Castings for General Applications Revision A
B687-88 ..... Brass, Copper, and Chromium-Plated Pipe Nipples
C564-88 ..... Rubber Gaskets for Cast Iron Soil Pipe and Fittings
D2000-86 ..... Rubber Products in Automotive Applications
D2146-82 ..... Propylene Plastic Molding and Extrusion Materials
D2447-89 ..... Polyethylene (PE) Plastic Pipe, Schedule 40 and 80, Based on Outside Diameter
D2564-89 ..... Solvent Cements for Poly (Vinyl Chloride) (PVC) Pipe Plastic Pipe and Fittings
D2665-89 ..... Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Revision A Vent Pipe and Fittings
D4101-82 ..... Propylene Plastic Injection and Extrusion Materials

E. American Water Works Association (AWWA):

C151-86 ..... Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
C203-86 ..... Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied
C651-86 ..... Disinfecting Water Mains
C701-88 ..... Cold Water Meters-Turbine Type, for Customer Service

F. National Fire Protection Association (NFPA):
54-88 ..... National Fuel Gas Code

G. American Welding Society (AWS):
A5.8-89 ..... Filler Metals for Brazing

H. National Association of Plumbing - Heating - Cooling Contractors (PHCC):
National Standard Plumbing Code – 2009

I. Cast Iron Soil Pipe Institute (CISPI):
301-85 .....Hubless Cast Iron Soil and Fittings

J. International Association of Plumbing and Mechanical Officials (IAPMO):
Uniform Plumbing Code - 1988
IS6-82 .....Installation Standard

K. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
SP-70-84 .....Cast Iron Gate Valves, Flanged and Threaded Ends.

L. American Society of Sanitary Engineers (ASSE):
1003 Water Pressure Reducing Valves
1010 Water Hammer Arresters
1001-70 Pipe Applied Atmospheric Type Vacuum Breakers
1013-88 Reduced Pressure Principle Backflow Preventers
1015-88 Double Check Backflow Prevention Assembly
1020-81 Vacuum Breakers, Anti-Siphon, Pressure Type

M. Factory Mutual (FM):
1680-89 Coupling Used in Hubless Cast Iron Systems for Drains, Waste and Vent Systems.

PART 2 – PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. General

1. Hanger design shall conform to ANSI Code B 31.1.0 for Pressure Piping and the Manufacturers' Standardization Society of the Valve and Fitting Industry, (MSS) SP-58 and SP-69, unless supplemented or modified herein.

2. Specified bracket clamp and rod sizes are minimum sizes. Support and hanger design shall include a safety factor of 5.

3. Approved type trapeze hangers may be used instead of separate clevis hangers, with suspension rods having double nuts and securely attached to the construction in an approved manner.

4. Plastic-coated hangers and clamps shall be provided for uninsulated brass or copper pipe, unless shields are provided between hangers or clamps and uninsulated brass or copper pipe.

5. Provide steel required for support of pipes other than steel shown on structural drawings.

6. Chain straps, perforated bars, wire hangers or expansion shields are not permitted.

7. Inserts for piping shall be of a type which shall not interfere with structural reinforcing and which shall not displace excessive amounts of concrete.

8. Piping located near floors that can be supported from floor or walls shall be provided with approved floor stands, wall brackets, roller supports, masonry piers or similar items.

9. Resilient hangers and isolation devices shall be provided on piping connected to rotating equipment, including pumps, air handling units, and on other piping which may vibrate and create audible noise.

10. Rigid hangers for horizontal piping shall provide a means of vertical adjustment after erection.

11. Hangers or supports shall be provided for existing piping that is to remain in areas affected by demolition.

12. Vertical piping shall utilize riser clamp specifically designed for piping.

B. Pipe Hanger Schedule

1. Manufacturers' Model Numbers

Hanger Type	F&S	F&M	Grinnell	Central Iron
360 shield, split	981	---	---	548
Beam Clamp	55	282	218	39
Multi-J hook blade	120	---	---	208
Clevis hangar	86	239	260	10
180 degree shield	980	80	167	550
Rigid trapeze	710	---	Std. 46	551
U-bolt	37	176	137, 137C	98H
Adj. steel pipe stanchion	421	291	259	71
Welded steel bracket	800, 801	151, 155	195, 199	195, 199
Riser clamp	91, 93, 94	241	261, 261C	37, 261
Pipe rest	92, 925	---	---	552
Base elbow support	720, 721	---	---	67, 68
Dbl. bolt pipe clamp	89	261	295	295
Welded beam attach.	966	---	66	66
Insert	180A, 180B	178	280 Series	100, 101
Cont. slotted insert	150A, 150B	190	---	50
Underground pipe hanger	275	---	---	600A

C. Hanger Rod Schedules

Pipe Size	Minimum Rod Size
Up to 2 inches	3/8 inch diameter
2-1/2 inches to 4 inches	1/2 inch diameter
4 inches to 5 inches	5/8 inch diameter
Above 5 inches	Special design

PART 3 – EXECUTION

3.1 GENERAL

A. Provide adequate provision for expansion and contraction in portions of the piping systems, to prevent undue strains on piping, building anchor points, and connected equipment.

B. Piping connections to plumbing fixtures and equipment shall be provided with offsets and shutoff valves arranged such that equipment can be serviced or removed without dismantling the pipe.

C. Pitch water piping up in direction of flow to ensure adequate flow without air binding and to prevent noise and water hammer. Branch connections to mains shall be made in such a manner as to prevent air trapping and prevent free passage of air. Mains shall be laid out to meet field conditions, maintain adequate headroom and clear work.

D. Any piping passing through roof construction shall be arranged to provide a minimum of 12 inch clearance from walls or other obstructions so as to permit proper flashing. Set pipe flashing fittings at a suitable level above the roof to permit proper termination of flashing.

E. Converging or diverging Bullheaded Tee's are not permitted.

F. Provide hose drain connections on water systems downstream of floor main shut-off valves.

3.2 PIPE HANGERS AND SUPPORTS

A. Pipe Hanger Support Schedule

Building Construction	Pipe Support Method
Poured concrete floor slabs	Galvanized steel inserts, and/or fish plates of sufficient area to support twice the calculated dead load
Building structural steel	Beam attachments and similar devices
Precast concrete floor slabs	Fish plates of sufficient area to support twice the calculated dead load and approve type specialty hanger accessories manufactured for the specific purpose of attaching to precast floors
Metal deck floor slabs with concrete fill	Galvanized steel inserts and/or fish plates of sufficient area to support twice the calculated dead load, and approved

Building Construction	Pipe Support Method
	type specialty hanger accessories manufactured for the specific purpose of attaching to metal deck floors
Concrete slabs where piping revisions are required and approved after slabs are poured or existing slabs	"Phillips" or "Hilti" expansion bolts and shields for piping 4 inches and smaller, with main supports welded to structural steel at maximum 20 feet on center 4 inch x 4 inch x 3/8 inch thick clip knee angles with 3/4 inch expansion bolt in shear (horizontal) and supporting rod at 90° from anchor bolt for piping greater than 4 inches, attached to concrete beams or columns
Concrete floor slabs on grade with ground water condition	Drainage, waste and vent piping to be encased in slab construction

B. Pipe Support Spacing

1. Pipe supports shall be spaced as follows:

Less than 3/4 inch pipe	On 5 foot centers
1 inch and 1-1/4 inch pipe	On 6 foot centers
1-1/2 inch to 2-1/2 inch pipe	On 10 foot centers
3 inch and 4 inch pipe	On 12 foot centers
6 inch and larger pipe	On 15 foot centers
Cast iron soil pipe	Support at every joint

2. Provide hangers no more than 12 inches from direction changes.

END OF SECTION

IDENTIFICATION FOR HVAC DUCT AND EQUIPMENT

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide identification of mechanical piping, valves, equipment, and ductwork installed.

1.2 STANDARDS

A. ANSI/ASME A13.1: Scheme for the Identification of Piping Systems.

1.3 ACCEPTABLE MANUFACTURERS

A. Seton, W.H. Brady, Bunting, or EMED Company. Provide specific model numbers where indicated.

1.4 SHOP DRAWING REQUIREMENTS

A. Submittal not required.

PART 2 – PRODUCTS

2.1 DUCT IDENTIFICATION

A. Provide color-coded ductwork labels with factory lettering indicating fan system identification, service, and direction of flow. Duct labels for indoor ductwork shall be flexible vinyl film with acrylic pressure-sensitive adhesive suitable for duct surface temperatures of -40°F to 220°F.

2.2 EQUIPMENT NAMEPLATES

A. Heavy gauge (.025) aluminum with four mounting holes. Coloring in background, lettering, and pads in aluminum.

PART 3 – EXECUTION

3.1 DUCT IDENTIFICATION

A. Duct locations to be marked are as follows:

1. Ducts shall also have direction of flow arrows matching the legend and background colors adjacent to each marker and at branches.

2. Markers shall be placed on ductwork at 20 foot maximum intervals on bottom and most visibly accessible side. In addition, wherever a duct passes through a wall, floor, or ceiling, it should be marked on each side of the wall, floor, or ceiling. Where duct insulation or duct is to be painted,

it should be painted to match the background color of its contents (as indicated below).

B. Colors for duct marking systems shall be as follows:

Duct System	Legend	Background
Supply	Black	Yellow
Return	Black	Yellow
Outdoor	Black	Yellow
General Exhaust	Black	Yellow

END OF SECTION

TESTING, ADJUSTING AND BALANCING

PART 1 – GENERAL

1.1 GENERAL

A. Systems shall be cleaned, pressure tests completed and approved, and in continuous operation before balancing begins. Minimum continuous operation shall be 24 hours.

B. Final tests and adjustments necessary to demonstrate compliance with specified performance requirements for major items of equipment (such as boilers, air conditioning units and refrigeration machines) shall be directly supervised by the manufacturer's representatives.

C. Provide complete balancing of each and every fan, trunk duct, branch duct, ducted outlet and return.

D. Provide air system balancing and testing by an approved member of the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB). Balancing shall be in accordance with the AABC manual. The balancers must submit to the Architect a resume of experience, a sample of the forms to be used for the final report, and an inventory of the instruments to be used. Types, serial numbers and dates of last calibration of instruments used shall be listed in final balance reports.

E. The Architect shall be notified in writing of the date and time of final balancing and testing activities. Notification must be received at least 48 hours in advance so that the Architect can be present if he so wishes.

F. It shall be the TAB firm’s responsibility to review the drawings and to notify the Engineer if additional valves and dampers are required to properly balance the various systems prior to the installation of those systems. If the TAB firm reviews the drawings and does not notify the Engineer that additional valves and dampers are required, then the TAB firm shall be responsible to provide additional valves and dampers as required to properly balance the various systems at no additional cost to the Owner.

G. Provide test wells, openings, and dampers as required by the testing agency at no additional cost to the Owner.

1.2 CERTIFIED BALANCE REPORTS

A. Obtain copies of the final Air Flow and Water Flow Balance and Test Reports from the balancing agencies. Submit same to the Architect in accordance with the shop drawing submittal requirements for the Architect's evaluation and approval. Final Balance and Test Reports shall be certified by a Registered Professional Engineer.

1.3 AIR FLOW AND TEST PROCEDURE

A. The following shall be recorded for each heat pump unit, and heat recovery unit at the time of testing:

1. Outdoor temperature, date, and time.
2. Condition of filter (change if dirty).
3. Cooling coil condition (wet/dry).

B. The system shall be set up to provide minimum design fresh air.

C. The following data shall be recorded for each fan system:

1. Fan and motor RPM.
2. Motor current and voltage.
3. Fan, coil and filter static pressures.
4. Name plate data of fans and motors.
5. Motor sheave, fan pulley, and belt sizes, if applicable.

D. Traverse the main supply, return, and exhaust ducts to determine CFM deliveries of the fan.

E. Check CFM at each major duct run. If fan CFMs are more than 10 percent above or 5 percent below design values, re-adjust fan speed by adjusting sheave or replacing pulleys, whichever is applicable, to obtain specified CFMs.

F. After it has been determined that the fans are providing design CFMs at required static pressures, balancing of the outlets may proceed. The outlets shall be balanced to within 10 percent above or 5 percent below the design values. Outlets shall be balanced at volume dampers and not at diffuser or register dampers.

G. If the system is equipped with an economizer free-cooling system, the balancer shall traverse the main supply ducts with the system set at 100 percent outside air. If readings indicate more than a 5 percent variation in total air supply, the fans or dampers shall be readjusted. Volume dampers shall be permanently marked at the final balance condition.

H. Adjust flow patterns of supply diffusers and registers to minimize drafty conditions. Install additional baffles as required.

I. After completion of the system air balancing and acceptance of the final report by the Architect, a final recording of the following items shall be provided and posted at the supply fan unit under cooling design conditions:

1. Outside temperature, date, and time.
2. Filter S.P.
3. Coil S.P. and air temperature entering and leaving coils.
4. Suction S.P.
5. Discharge S.P. and leaving air temperature.

1.4 APPROVED BALANCING AGENCIES

A. WAE Balancing, Inc. (AABC)

B. SSM Industries (NEBB)

C. Kahoe Air Balance (AABC)

D. PBC, Inc. (Professional Balance Co. - AABC)

PART 2 – PRODUCTS

1.5 TEST HOLE CAPS

A. Test holes shall be closed with caps suitable for duct static pressure scheduled.

PART 3 – EXECUTION

1.6 GENERAL

A. The Testing and Balancing Agency shall obtain, for their use, two (2) sets of as-built drawings from the General Contractor.

B. Coordinate with the General Contractor to ensure proper balancing above inaccessible ceilings before the ceilings are completed.

END OF SECTION

DUCT INSULATION

PART 1 – GENERAL

1.1 GENERAL

A. Insulation shall be provided continuously through sleeves and openings.

B. Testing of ductwork shall be complete before insulation on the exterior of the duct starts.

C. Insulation shall stop at fire dampers and at electric duct heaters. Ends of insulation shall be sealed and lapped with vapor barrier.

D. Duct systems shall be insulated in accordance with the schedule below.

E. Adhesives and coatings shall be as manufactured by Insulcoustic, Benjamin Foster, or approved equivalent as follows:

		Insulcoustic	Benjamin Foster	Childers
1	Vapor Barrier Adhesive	225	80-07	CP-54
2	Vapor Barrier Coating	501	30-35	CP-30
3	Lagging Adhesive	102	30-36	CP-52
4	Insulation Adhesive	225	85-20	CP-54
5	Glass Cloth Adhesive	225	85-20	CP-54
6	Weatherproofing Mastic	V1-AC	GPM	CP-10/11

F. Asbestos shall not be used in the manufacture of insulation products.

PART 2 – PRODUCTS

2.1 TYPE I-1 INSULATION

A. Acoustic duct lining shall consist of 1” thick glass fiber blanket of 3 pounds per cubic foot density. The airstream surface shall be protected against erosion with reinforced coating or mat-facing. Insulation edges shall be treated with a factory-applied coating to prevent surface flaring. Duct dimensions given on the drawing for lined ductwork are inside clear dimensions. Sheet metal sizes must be increased to allow for the thickness of the insulation.

B. The liner shall meet the Life Safety Standards as established by NFPA 90A and 90B, FHC 25/50 and Limited Combustibility. The airstream surface shall be treated with an EPA-registered, anti-microbial agent so it will not support microbial growth as tested in accordance with ASTM G21 and G22. The duct lining should be rated for air velocities up to 6000 fpm and air temperatures up to 250 deg. F.

C. Duct lining shall have a maximum thermal conductivity (K) of 0.25 Btu-in./hr.-ft^2-^{0}F at 75^{0}F mean temperature, a minimum insulating value of R-4.2, and an NRC not less than 0.70 as tested per ASTM C 1071 using Type “A” mounting.

D. Acoustic duct lining shall be installed in strict accordance with SMACNA Duct Construction Standards and NAIMA Duct Liner Installation Standards. The liner shall be adhered to the sheet metal with full coverage with an approved adhesive conforming to ASTM C 916. All Cut and fitted without gaps. Duct liner shall be Additionally secured with mechanical fasteners spaced per the manufacturer's recommendations. Metal nosing shall be provided over transversely oriented liner edges facing the airstream at fan discharges, access doors, and any other exposed edge conditions.

E. Product: Owens Corning Acoustic Duct Liner, Knauf Duct Liner EM; Manville Linacoustic RC; Certaintedd ToughGard R.

2.2 EXTENT OF INSULATION

A. Insulate the following:

1. Supply ductwork
2. Return ductwork
3. Outside air ductwork

2.3 DUCT LAGGING

A. Duct lagging shall be limp barrier material, reinforced with a fiberglass screen, and loaded with barium sulphate.

B. Lagging shall have acoustical rating of STC-27.

C. Product shall be Kinetics Noise Control Model KNM-100 RB.

PART 3 – EXECUTION

3.1 GENERAL

A. Insulation shall be applied on clean, dry ductwork.

B. Apply insulation in accordance with manufacturer's recommendations.

C. Apply lagging in accordance with manufacturer's recommendations.

END OF SECTION

HVAC PIPING INSULATION

PART 1 – GENERAL

1.1 GENERAL

A. Unless specifically noted otherwise, insulation shall have composite fire and smoke hazard ratings (including insulation, jacket or facing, PVC covers, and adhesives), as tested by ASTM E84, NFPA 255 or UL 723 procedures, not exceeding a flame spread rating of 25 and smoke developed rating of 50.

B. Piping systems shall be insulated in accordance with the schedule below, including flanges, fittings, valves, expansion joints, vents, drains and similar appurtenances. Piping subject to freezing shall be insulated with a minimum of 2 inch insulation.

C. Piping tests shall be completed before insulation proceeds.

D. Insulation shall be provided continuously through sleeves and openings.

E. Adhesives and coatings shall be as manufactured by Insulcoustic, Benjamin Foster, Childers, or approved equals, as follows:

	Insulcoustic	Benjamin-Foster	Childers
Vapor Barrier Adhesive	225	80-07	CP-54
Vapor Barrier Coating	501	30-35	CP-30
Lagging Adhesive	102	30-36	CP-52
Insulation Adhesive	225	85-20	CP-54
Glass Cloth Adhesive	225	85-20	CP-54
Weatherproofing Mastic	VI-AC	48-00	CP-10/11

F. Asbestos shall not be used in the manufacture of insulation products.

PART 2 – PRODUCTS

2.1 PIPING SYSTEM INSULATION SCHEDULE

Piping System	Insulation Type	Minimum Insulation Thickness	Notes
Air conditioning condensate, control air piping 25 feet downstream of dryer	P-1	1/2 inch	
Refrigerant piping	P-1	1-1/2 inch for pipes 1-1/4 inches and above; 1 inch for pipes under 1-1/4 inches	
Refrigerant piping	P-2	1 inch for pipes 2 inches and above; 3/4 inch for pipes under 2 inches	

2.2 TYPE P-1 GLASS FIBER

A. Insulation, including fiberglass fitting inserts, shall be glass fiber with a maximum K factor of .24 at 75°F mean temperature with factory applied all-service jacket with self-sealing lip. Exposed pipe insulation material must be the one piece type. Sectional type may be used for concealed piping.

B. Seal butt joints with 3 inch wide butt stripe adhered neatly in place.

C. Fittings and valves for piping shall be insulated with preformed fiberglass inserts of the same density as the pipe insulation and finished with a PVC fitting cover. Provide one fiberglass insert per fitting or valve for each 1 inch of piping insulation specified. Field cut or loose blanket insulation is not acceptable.

D. Fittings and valves for steam piping shall be insulated with fiberglass inserts and finished with .024 inch thick aluminum fitting flange and valve covers.

E. Exposed piping outdoors shall be finished with a factory attached all-service jacket, protected with two 1/16 inch coats of Childers CP/10 or CP/11 weather barrier coating.

F. Exposed piping in finished spaces shall be protected with .024 inch thick stainless steel or aluminum jacketing and fitting covers.

G. Product: Owens-Corning SSL-11, Manville Micro-Lok, Knauff ASJ-SSL, Certainteed Alley-K.

2.3 P-2 INSULATION (PHENOLIC)

A. Insulation, including two-piece molded fitting covers, shall be phenolic with a maximum K factor of .13 at 75°F mean temperature with factory applied all-service jacket with self-sealing lip. Exposed pipe insulation material must be the one-piece type. Sectional type may be used for concealed piping.

B. Insulation shall be Koolphen K by Kingspan or approved equivalent.

C. Seal butt joints with 3 inch wide butt strip adhered neatly in place.

PART 3 – EXECUTION

3.1 GENERAL

A. Insulation shall be applied on clean, dry surfaces.

B. Insulation shall be continuous through construction openings and sleeves.

C. Insulation on cold surfaces where vapor barrier jackets are required shall be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors and similar devices that are secured directly to cold surfaces shall be adequately insulated and vapor sealed to prevent condensation.

D. For pipes handling fluids below 70°F, provide one of the following means of preventing contact between pipe insulation and hanger or support:

1. High density rigid fiberglass insulation insert, equal in thickness to pipe insulation, with factory applied jacket and metal protection shield or saddle, between pipe and hanger or support.

2. Insulation protection shields or saddles of sufficient length and strength to support weight of pipe without crushing insulation and shaped to fit not less than half the pipe circumference.

E. For pipes handling fluids 70°F and above, rest pipe directly on hanger, insulate pipe and hanger.

F. Apply insulation in strict accordance with manufacturer's recommendations.

G. Piping located on roof shall have 18 gauge stainless steel shield a minimum of 36 inches in length the full circumference of pipe. Locate where insulation will be stepped on due to maintenance traffic.

END OF SECTION

NATURAL GAS PIPING

PART 1 – GENERAL

1.1 PIPING SYSTEM STANDARDS OF MATERIALS

A. Piping and fitting materials shall conform to the specification standards of the recognized authorities listed below. References shall be to the latest edition in force at the time of bidding.

B. Materials listed below shall be subject to approval of local governing authorities.

C. Plumbing systems which connect to equipment provided or installed under the HVAC section of the drawings or specifications shall be terminated within five feet of final connection point of the equipment with a shutoff valve as specified in the plumbing valve section. Final connection is specified under the HVAC section.

D. Each pipe length shall have the manufacturer's name cast, stamped, or rolled on.

E. Each fitting shall have the manufacturer's symbol and pressure rating cast, stamped, or rolled on.

1.2 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification.

B. Federal Specifications (Fed. Spec.):
L-C-53OC .....Coating, Pipe, Thermoplastic Resin
L-T-1512A.....Tape, Pressure Sensitive Adhesive, Pipe Wrapping
WW-V-35C.....Valve Ball Brass or Bronze
WW-V-1967 ...Valve, Butterfly (Threaded Ends And Solder Ends)

C. American National Standards Institute (ANSI):
American Society of Mechanical Engineers (ASME): (Copyrighted Society)
B16.3-85 .....Malleable Iron Threaded Fittings ANSI/ASME
B16.4-85 .....Cast Iron Threaded Fittings Classes 125 and 250 ANSI/ASME
B16.11-80 .....Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME
B16.15-85 .....Cast Bronze Threaded Fittings ANSI/ASME
B31.1 .....Pipe Welding
B31.8-86 .....Gas Transmission and Distribution Piping Systems ANSI/ASME
B40.1-85 .....Gauges-Pressure Indicating Dial Type-Elastic Element ANSI/ASME

D. American Society for Testing and Materials (ASTM):
A47-84 .....Ferritic Malleable Iron Castings Revision 1989
A53-89 .....Pipe, Steel, Black And Hot-Dipped, Zinc-coated Revision A Welded and Seamless
A183-83 .....Carbon Steel Track Bolts and Nuts
A312-89 .....Seamless and Welded Austenitic Stainless Steel Pipe
A536-84 .....Ductile Iron Castings

A733-89 .....Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
B32-89 .....Solder Metal
B62-86 .....Composition Bronze or Ounce Metal Castings
B75-86 .....Seamless Copper Tube
D2564-89 .....Solvent Cements for Poly (Vinyl Chloride) (PVC) Pipe Plastic Pipe and Fittings
D4101-82 .....Propylene Plastic Injection and Extrusion Materials

E. American Welding Society (AWS):
A5.8-89 .....Filler Metals for Brazing

F. National Association of Plumbing - Heating - Cooling Contractors (PHCC):
National Standard Plumbing Code – 1990

G. International Association of Plumbing and Mechanical Officials (IAPMO):
Uniform Plumbing Code - 1988
IS6-82 .....Installation Standard

H. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
SP-70-84 .....Cast Iron Gate Valves, Flanged and Threaded Ends.

PART 2 – PRODUCTS

2.1 PIPING AND FITTINGS MATERIAL SCHEDULE

A. Piping systems shall be constructed of the following materials as scheduled below, subject to approval by authorities having jurisdiction.

Systems	Pipe	Fittings	Remarks
Natural gas piping below grade	Schedule 40 black steel pipe	Welded steel fittings	1) Pipe coating and anodes in accordance with gas company requirements 2) Welding to be performed by a certified welder
Natural gas piping above ground outside building	Schedule 40 black steel pipe	Screwed malleable iron for fittings 2 inches and smaller, welded steel for fittings larger than 2 inches	1) Pipe painting and support in accordance with gas company requirements 2) Welding to be performed by a certified welder
Natural gas piping inside building	Schedule 40 black steel pipe	Screwed malleable iron for fittings 2 inches and smaller, welded steel for	1) Pipe painting and support in accordance with

Systems	Pipe	Fittings	Remarks
		fittings larger than 2 inches	gas company requirements 2) Welding to be performed by a certified welder 3) Sleeve and vent for gas pipe in ceiling space and riser per gas company requirements

2.2 PLUMBING PIPING SYSTEM PRESSURE CLASSIFICATION

A. Piping, fittings, components, and equipment for natural gas systems shall have an operating pressure of 4 inches and a component rating pressure of 125 psig.

PART 3 – EXECUTION

3.1 GENERAL

A. The drawings schematically indicate the size and location of piping. Piping system layout shall be modified as required to meet field conditions and facilitate coordination. Piping shall conform to the latest ASA code for pressure piping. Unless otherwise noted, all piping, valves, and associated fittings shall be concealed behind walls, above ceilings, or below floors.

B. Provide adequate provision for expansion and contraction in portions of the piping systems, to prevent undue strains on piping, building anchor points, and connected equipment.

C. Piping connections to plumbing fixtures and equipment shall be provided with offsets and shutoff valves arranged such that equipment can be serviced or removed without dismantling the pipe.

D. Any piping passing through roof construction shall be arranged to provide a minimum of 12 inch clearance from walls or other obstructions so as to permit proper flashing. Set pipe flashing fittings at a suitable level above the roof to permit proper termination of flashing.

E. Converging or diverging Bullheaded Tee’s are not permitted.

F. Provide hose drain connections on water systems downstream of floor main shut-off valves.

3.2 PIPING SYSTEM PRESSURE TESTS

A. The following procedures shall be observed for piping system pressure tests:

1. Preliminary testing, notification of inspectors and other responsibilities as specified in Section 15010, Paragraph 1.9 - CODES, PERMITS AND INSPECTIONS shall be observed.

2. Take all due precautions to prevent damage to the building and its contents that may be incurred by such tests; repair or make good any damage caused by the tests at no additional cost to the Owner.

3. Tests shall apply full test pressure to the piping for a sufficient period of time to detect leaks and defects. Refer to individual piping testing procedures for approved testing of liquids or gases.

4. Tests shall be conducted prior to the installation of any required fitting insulation. If delicate control mechanisms, not including control valves, are installed in the piping, they shall be removed to prevent shock damage.

5. The section of piping to be tested shall be brought up to the specified test pressure. If the test pressure falls more than the specified amount during the test period, the point of leakage shall be found, repaired and the test repeated. This procedure shall be repeated until the piping system has been proved absolutely tight.

6. Leaks shall be repaired by removing the valve, fitting, joint or section that is leaking and reinstalling new materials and joints as specified. Use of mastic of "no-leak" compounds or other temporary means of repairing leaks shall not be permitted.

3.3 NATURAL GAS SYSTEM

A. Installation Procedure

1. Piping shall be installed without pockets, with drips at low points and with valves at each outlet.

2. Final connections shall be made to pieces of equipment.

3. Right and left nipples shall not be used in lieu of unions.

4. Complete gas service connections to existing gas utility mains with service extensions into buildings, piping, valves, metering and pressure regulation in accordance with utility company requirements.

5. Provide plug valves at gas piping risers and main control points.

6. Provide gas cocks at gas equipment and appliances.

B. Natural Gas System Inspection

1. Every third weld in the gas riser piping shall be x-ray inspected in accordance with the gas company requirements. The results of the tests shall be forward to the gas company and to the Architect.

C. Natural Gas System Testing

1. The entire gas piping system shall be tested in accordance with the gas company requirements. At a minimum, piping shall be tested at a pressure of 90 psig for 24 hours using a recording type pressure gauge. Test natural gas sleeves at a pressure of 90 psig for 24 hours using a recording type pressure gauge. Equipment, materials and services required shall be provided.

2. Final tests shall be conducted in the presence of and to the satisfaction of the Architect and inspectors of any and all authorities having jurisdiction, including the gas company, who shall be notified a minimum of 48 hours in advance of same. Preliminary testing shall be completed prior to such notification
3. While subjected to the test pressure, the piping system shall be visually examined for signs of leakage or other defects. Exposed joints shall be checked by means of a soap bubble test or other foaming agent test. Any reduction to test pressure measured by the gauge during the testing period shall be deemed to indicate the presence of a leak unless such reduction can be readily attributable to some other cause
4. Test records shall be maintained during the testing and shall confirm that piping has been pressure tested as specified above.

5. Purging of piping shall be accomplished in accordance with the provisions contained in USAS-Z-83.1.

END OF SECTION

HVAC PIPING

PART 1 – GENERAL

1.1 PIPING SYSTEM STANDARDS OF MATERIALS

A. Piping and fitting materials shall conform to the specification standards of the recognized authorities listed below. References shall be to the latest edition in force at the time of bidding.

B. Materials listed below shall be subject to approval of local governing authorities.

C. Each pipe length shall have the manufacturer's name cast, stamped, or rolled on.

D. Each fitting shall have the manufacturer's symbol and pressure rating cast, stamped, or rolled on.

PART 2 – PRODUCTS

2.1 PIPING AND FITTINGS MATERIAL

A. Piping systems shall be constructed of the following materials as indicated below, subject to approval by authorities having jurisdiction.

B. Refrigerant Piping

1. Type L or type K hard drawn copper tubing with brazed joints

2. Fittings shall be wrought copper solder type brazed with silver alloy equivalent to Sil-Fos. Fitting pressure rating shall be per ASNI B16.22.

2.2 PIPE FLASHING FITTINGS

A. Pipes passing through roof construction shall be provided with roof curb and piping portal.

PART 3 – EXECUTION

3.1 GENERAL

A. The drawings schematically indicate the size and location of piping. Piping system layout shall be modified as required to meet field conditions and facilitate coordination among contractors at no additional cost. Piping shall conform to the latest ASA code for pressure piping. Unless otherwise noted, all piping and associated fittings shall be concealed behind walls, above ceilings, or below floors.

B. Provide adequate provision for expansion and contraction in portions of the piping systems, to prevent undue strains on piping and connected equipment.

C. Converging and diverging bullhead tee's will not be permitted in piping systems.

D. "T" drill type fittings will not be permitted in piping systems.

3.2 REFRIGERANT PIPING

A. Refrigerant Piping Pressure Test

1. Test piping prior to installation of insulation.

2. Purge piping system with nitrogen during installation.

3. Provide nitrogen and pressurize to 125 psig on the high side and 125 psig on the low side. Leak check with bubble solution. If pressure drops or if leaks are detected, provide new piping, fittings, and connections as required. System shall be recharged and purged with nitrogen before brazing. Locate leak in a manner approved by the EPA or other governing agencies.

4. Maintain the required test pressure for a sufficient length of time to enable an inspection of all joints and connections.

5. Tests shall be performed after installation of the piping systems and prior to acceptance of same.

6. Provide appropriate vacuum pump and evacuate refrigerant piping to 500 microns. Allow system to stand under vacuum of 500 microns for four (4) hours. If the vacuum reading remains unchanged, the system is ready to receive its charge of refrigerant.

7. Charge refrigerant systems in accordance with manufacturer's recommendations.

3.3 DRIP PANS FOR PROTECTION OF ELECTRICAL EQUIPMENT

A. Examine the drawings and in cooperation with the Electrical Contractor confirm the final location of electrical equipment to be installed in the vicinity of piping. Plan and arrange overhead piping no closer than 2 feet from a vertical line to electric motors and controllers, switchboards, panel boards, or similar equipment. Piping is not permitted in electric equipment rooms, transformer rooms, switchgear rooms, nor telephone gear rooms.

B. Where the installation of piping does not comply with the requirements of foregoing paragraph, where feasible, the piping shall be relocated.

C. Where piping cannot be relocated, furnish gutters as follows:

1. Provide and erect a gutter of 16 ounce cold rolled copper or heavy galvanized steel, under every pipe which is within 2 feet from a vertical

line to any motor, electrical controllers, switchboards, panel boards, or the like.

2. Each gutter shall be soldered and made watertight, properly suspended and carefully pitched to a convenient point for draining. Provide a 3/4 inch drain, with valve as directed, to nearest floor drain or slop sink, as approved.

3. In lieu of such separate gutters, a continuous protecting sheet of similar construction adequately supported and braced, properly rimmed, pitched and drained, may be provided over any such motor, and extending 2 feet in all directions beyond the motor, over which such piping has to run.

END OF SECTION

DUCTWORK

PART 1 – GENERAL

1.1 GENERAL

A. References to SMACNA-HVAC shall be "SMACNA HVAC Duct Construction Standards, Metal and Flexible" latest edition unless otherwise noted. References to SMACNA-Industrial shall be "SMACNA Industrial Duct Construction Standards" latest edition unless otherwise noted.

B. When the specifications refer to SMACNA Standards, they shall be considered as minimum standards; if local codes or requirements specified herein require more restrictive standards than described in SMACNA, the local codes and requirements specified herein shall govern.

C. Ductwork indicated on drawings is schematic; therefore, changes in ductwork sizes and/or location shall be made when necessary to conform to space conditions. Changes shall be made at no additional cost to the Owner. The engineer shall be consulted for approval of duct size changes which cannot maintain the same equivalent free area dimensions or which require an aspect ratio greater than 4 to 1. Change in duct sizes shall be made with transitions. Transitions shall have not more than a 30° angle parallel to the airflow for a one sided transition or 15° angle for a two sided transition.

D. Duct dimensions indicated on drawings shall be the clear inside dimensions. Provide hat section at turning vanes, dampers, etc., as indicated in SMACNA Figure 2-24.

E. Ductwork shall be constructed true to sizes indicated and shall be airtight with a smooth appearance.

F. Coil frames, damper frames, louver frames, etc., shall be bolted and sealed to ductwork.

G. Provide additional bracing and reinforcing as necessary to prevent buckling and bulging of ductwork.

H. Provide pre-fabricated panel casings for outside air intake plenums and relief air plenums as shown on drawings and as hereinafter specified.

PART 2 – PRODUCTS

2.1 GENERAL

A. Ductwork, fittings, reinforcement, hangers, etc., shall be in accordance with SMACNA-HVAC or SMACNA-Industrial.

2.2 PRESSURE CLASSIFICATION

A. Duct construction for the duct systems shall have a pressure rating of not less than 2 inches for supply and return air ductwork.

B. All exhaust ductwork shall have a pressure rating of not less than -1 inch for all exhaust ductwork.

C. Elbows shall be of radius construction with throat radius equal to or greater than the width of the duct unless otherwise indicated. Square construction with double radius turning vanes may be used where space limitations prohibit radius construction. Radius elbows with square throats are not permitted.

D. Size changes in ductwork should not occur at elbows.

E. Offsets in ductwork shall be 30° unvaned radius elbows.

F. Round elbows shall have a minimum of 5 sections.

2.3 GALVANIZED STEEL DUCTWORK

A. Galvanized construction including sheet metal hangers and miscellaneous materials.

B. Construction shall be in accordance with SMACNA-HVAC.

C. Duct sealing shall meet duct seal Class C. Metal gauge for duct sides shall be the same thickness.

D. Final connections from sheet metal ductwork to diffusers, registers and grilles shall be made with either insulated flexible duct, round ductwork, or rectangular ductwork. Insulated flexible duct shall be Flexmaster Type 3M or approved equivalent. Interior liner shall be trilaminated aluminum foil, fiberglass, and aluminum polyester with a helix encapsulated in the fabric. Insulation shall be 1-1/2 inch fiberglass, compressed to 1 inch thick, and exterior jacket shall be a fire retardant, reinforced aluminum vapor barrier material. Duct shall be UL listed for Class 1 air duct and shall be suitable for operation at up to 12 inches w.g. and velocities to 4,500 fpm. Flexible ducts shall be joined to rigid ducts and box inlets by metal or flexible drawband and duct mastic equivalent to "Ductmate." Flexible ductwork shall conform to SMACNA Duct Performance Standards for flexible duct. Maximum flexible duct length: 5 feet.

2.4 FLEXIBLE DUCTWORK

A. Flexible ductwork shall be factory constructed with a chlorinated polyethylene (CPE) core having a vinyl coated, carbon steel wire helix. Woven fiberglass insulation impregnated with vinyl shall be applied over core with an external metallized polyester film.

B. Ductwork shall have a minimum R-value of 4.2 and have an operating temperature range of -20^{0}F to 250^{0}F continuous. Ductwork shall have a positive

operating pressure of 16”w.g. up to 10” ID and 10” w.g. from 12” to 16” I.D. Ductwork shall have a negative operating pressure of 2” w.g.

C. Ductwork shall meet UL181 and NFPA 90A-90B Fire Codes.

D. Flexible ductwork shall be Thermaflex M-KC or approved equal.

2.5 SLEEVES

A. Provide sleeves for ducts passing through roofs, walls, floors and partitions.

B. Sleeve material shall be 20 gauge galvanized steel except for fire walls and smoke barriers which shall be 16 gauge galvanized steel.

C. Sealant shall be equivalent to Dow Corning 795 Silicone Sealant for general purpose use. Prime sleeves in accordance with manufacturer's recommendations.

D. Sealant in one-hour and two-hour walls and one-hour and two-hour floors shall be equivalent to Dow Corning Fire Stop System Sealants and Foams. Sealants and foams shall be UL listed and installed in accordance with manufacturer's recommendations.

PART 3 – EXECUTION

3.1 GENERAL

A. Ductwork construction shall be in strict accordance with the SMACNA-HVAC Standards including ductwork gauges, bracing, reinforcement, joints, seams, hanging, and construction.

B. The drawings schematically indicate the size and location of ductwork. Ductwork system layout shall be modified as required to meet field conditions and facilitate coordination at no additional cost. Unless otherwise noted, ductwork, dampers, and associated fittings shall be concealed behind walls or above ceilings.

3.2 SLEEVES

A. Provide 1/2 inch clearance between duct or duct insulation and sleeve.

B. Install sleeves in time to permit construction progress as scheduled.

C. Grout sleeves to building for watertight fit.

D. Schedule of Sleeve Lengths

Location	Sleeve Length
Floors	Equal to depth of floor construction and at least 1 inch above finished floor construction. In waterproof floor construction,

Location	Sleeve Length
	sleeves shall extend a minimum of 2 inches above finished floor construction.
Roofs	Equal to depth of roof construction including insulation.
Walls and Partitions	Equal to depth of construction and terminated flush with finished surfaces.

E. Schedule of Sleeve Caulking and Packing Type

Caulking/ Packing Type	Caulking/Packing Requirements
A	Caulking not required.
B	Space between duct or duct covering and sleeve shall be vermin proof sealant.
C	Space between duct and sleeve shall be packed with industrial felt or fiberglass caulked at both ends with sealant according to manufacturer's recommendations. Vermin proofing for ducts with insulation shall be minimum 1 inch thick sections of foam glass as long as sleeve with space between foam glass and sleeve packed with industrial felt or fiberglass caulked at both ends with sealant in accordance with manufacturer's recommendations.

F. Schedule of Sleeve Applications

Location	Sleeve Caulking and Packing Type
Membrane water-proof floor, roof and wall construction	C
Non-membrane waterproof floor, roof and wall construction where flashing is required	C
Interior walls, partitions, and floors	C
Exterior walls	C

3.3 DUCT HANGERS AND SUPPORTS

A. Duct Hanger Support Schedule

Building Construction	Duct Support Method
Poured concrete floor slabs	Galvanized steel inserts, and/or fishplates of sufficient area to support twice the calculated dead load
Building structural steel	Beam attachments and similar devices
Precast concrete floor slabs	Fishplates of sufficient area to support twice the calculated dead load and approve type specialty hanger accessories manufactured for the specific purpose of attaching to precast floors
Metal deck floor slabs with concrete fill	Galvanized steel inserts and/or fishplates of sufficient area to support twice the calculated dead load, and approved type specialty hanger accessories manufactured for the specific purpose of attaching to metal deck floors
Concrete slabs where piping revisions are	"Phillips" or "Hilti" expansion bolts and shields for piping 4 inches and smaller, with main supports

Building Construction	Duct Support Method
required and approved after slabs are poured, or existing concrete slabs	welded to structural steel at maximum 20 feet on center 4 inch x 4 inch x 3/8 inch thick clip knee angles with 3/4 inch expansion bolt in shear (horizontal) and supporting rod at 90° from anchor bolt for piping greater than 4 inches, attached to concrete beams or columns
Concrete floor slabs on grade with ground water condition	Drainage, waste and vent piping to be encased in slab construction

B. Duct Support Spacing

1. Duct supports shall be spaced as per SMACNA. Provide shop drawings of support type and spacing.

END OF SECTION

AIR DUCT ACCESSORIES

PART 1 – GENERAL

1.1 BALANCING DAMPERS

A. Provide manual balancing dampers at each diffuser or register and as shown on the drawings. Dampers at diffusers and registers shall be placed as far as practical from the outlet. Construction of dampers shall conform to SMACNA Standards for the intended operating pressure range.

1.2 FIRE DAMPERS

A. Provide fusible link fire dampers as indicated on the drawings and specified herein.

1.3 DUCT ACCESS DOORS

A. Provide suitable access doors and frames as required to permit inspections, operation and maintenance of fire dampers which are concealed by sheet metal work, access to kitchen hood exhaust ducts, where indicated on the drawings, and where specified.

1.4 FLEXIBLE CONNECTIONS

A. Fan and air supply units, both at inlet and discharge, shall be made with flexible material so as to prohibit the transfer of vibration from fans to connecting ductwork, without air leakage. The flexible material shall have sufficient slack so as to prevent tearing due to fan movement.

PART 2 – PRODUCTS

2.1 BALANCING DAMPERS

A. Balancing dampers for rectangular ductwork shall be opposed blade type, and shall be Ruskin Model MD35 Manual Balancing Damper with Locking Quadrant or equivalent for duct pressure ratings 2 inches w.g. or less, and Ruskin Model CD30AF1 with Locking Quadrant or equivalent for duct pressure ratings greater than 2 inches w.g.

B. Balancing dampers for round ductwork shall be Ruskin Model MDRS25 Round Manual Balancing Damper with Locking Quadrant, or equivalent.

2.2 FIRE DAMPERS

A. Fusible link dampers shall be of the folding blade type, shall meet the requirements of NFPA Bulletin 90A, and shall be UL listed and tested in accordance with UL 555 test criteria. Provide fire dampers UL listed for installation in 1-1/2 hour or 2-hour fire separations or divisions.

B. Fire dampers for vertical installation shall be gravity operated. Fire dampers for horizontal installation shall have closure springs and latches.

C. Fire dampers shall have resettable reusable fire link rated at 165°F.

D. Fire dampers installed in ductwork shall be Ruskin Model IBD2, Style C, CR, or CO to match duct shape, or equivalent. Maximum pressure drop: 0.05 inches w.g. at 1500 fpm face velocity. Alternate styles may be submitted if performance characteristics are met.

E. Equivalent manufacturers: Ruskin, Prefco, National Control Air, Safe-Air, Greenheck, Pottorff.

2.3 DUCT ACCESS DOORS

A. In general, access doors shall be at least 18 inches x 18 inches where physically possible; access doors for fire dampers shall be sized in accordance with the fire damper size.

B. Access doors shall be of double construction and shall be gasketed around the entire perimeter to minimize air leakage between door and frame. Access doors in insulated ducts or casings, and fire damper access doors, shall be fully insulated with rigid fiberglass insulation between the metal panels.

C. In no case shall access to any items of equipment require the removal of nuts, bolts, screws, wedges or any other loose devices.

D. Access doors installed in ductwork 2 inches w.g. class and below shall be Ruskin Model ADH22, or equivalent.

E. Access doors installed in ductwork above 2 inches w.g. class shall be Ruskin Model ADHP-3 High Pressure Access Doors, or equivalent.

2.4 FLEXIBLE CONNECTIONS

A. Flexible connections shall be a minimum of 8 inches long.

B. Flexible connection shall be fabricated from approved flameproofed fabric in accordance with the applicable sections of the NFPA overall fire codes. Asbestos cloth is not permitted.

PART 3 – EXECUTION

3.1 BALANCING DAMPERS

A. Provide balancing dampers where shown on drawings and provide one volume damper at every diffuser. Volume damper shall be placed as far away from outlet as possible.

B. When installing dampers in ducts to be insulated, provide raised bracket for damper quadrant with height equal to the insulation thickness.

C. Locate dampers as far as possible from air outlet to minimize noise generation and transmission.

D. Coordinate access to each damper and provide remote damper actuator if required to facilitate access.

3.2 FIRE DAMPERS

A. Comply with applicable UL recommendations, including those for breakaway connections at maximum distance of 6 inches from wall, and the requirements of local authorities having jurisdiction.

B. Install fire dampers in strict accordance with the SMACNA Fire Damper and Heat Stop Guide for Air Handling Systems, and applicable NFPA standards and local authorities having jurisdiction.

3.3 FLEXIBLE CONNECTIONS

A. Flexible connections shall be held in place with heavy metal bands securely attached to prevent air leakage at the connection points.

B. Seal insulation at both ends to maintain insulation and vapor barrier continuity.

C. Do not kink flexible ducts. Supports ducts with galvanized hangers to avoid sagging.

END OF SECTION

EXHAUST FANS

PART 1 – GENERAL

1.1 GENERAL

A. Provide fans as shown on the drawings and specified herein.

B. Fan performance data shall be AMCA certified for sound and air performance.

C. Fans shall be provided complete with motors and drives. Belt drive fans shall be provided with belt guards meeting OSHA requirements. Belt guards shall allow speed measurement at both fan and motor without removing guard. Each fan shall include an allowance for one pulley and belt change during balancing procedures.

D. Provide appropriate weather covers for motors and belts where fans are exposed to weather.

E. Fans shall be balanced statically and dynamically for maximum rated speed.

F. Submit fan volume-pressure-horsepower curves for approval as indicated under shop drawings.

G. Bearings shall be ball or roller anti-friction type with minimum L_{10} life of 160,000 hours.

H. Fans shall be:

1. Catalog rated for 15 percent greater static pressure than specified at air volume,
2. Selected so that the specified air volume is greater than that at the apex of the fan pressure volume curve, and
3. Selected to provide stable operation down to 85 percent of design volume operating at the required speed for the specified conditions.

I. Brake horsepower for backward inclined bladed centrifugal fans shall not exceed 78 percent of motor nameplate horsepower times the NEMA service factor, and for forward curved bladed centrifugal fans shall not exceed 70 percent at specified duty.

J. Where internal coating is indicated, factory apply Glidden SP24-CE double built epoxy 10 Mil to all metal surfaces including dampers, screens, curbs, in contact with air stream. Prepare steel surfaces by sandblasting per Steel Structure Painting Council Std. SP10-63 (near white). Use Type 316 stainless steel in lieu of coating at supplier's option or where required for component operation.

K. Lubricate bearings for extended shutdown or storage and rotate shafts every four weeks until fans are put into permanent operation.

PART 2 – PRODUCTS

2.1 GENERAL

A. Refer to Section 233113 for component and equipment ratings. All components, equipment, and specialties, etc., shall meet the component pressure rating listed.

2.2 CENTRIFUGAL ROOF FANS

A. Fans shall be centrifugal belt drive roof mounted ventilator as indicated on the drawings.

B. Fan shall have spun aluminum housing, removable for access to fan and drive with wiring channel, backdraft dampers, aluminum birdscreen, and hinged sub-base.

C. Fan shall be non-overloading at all points on performance curve. Fan shall have screw or automatic adjustment of belt tension. Fans shall be provided with shaft seal, electrical disconnect switch, and shall have integral fan and motor vibration isolators.

D. Provide prefabricated 18 gauge galvanized steel roof curb with built-in cant strip, 2 inch minimum thickness internal insulation, inside vapor barrier cover, and isolation pads.

E. Manufacturers: Greenheck, Loren Cook, Ilg.

2.3 KITCHEN CENTRIFUGAL SIDE WALL FANS

A. Fans shall be direct drive type.

B. Fan shall have spun aluminum housing, removable for access to fan and drive with wiring channel. Motors shall be mounted on vibration isolators and out of the air stream. Fresh air for motor cooling shall be drawn through independent tube to prevent introduction of contaminants.

C. Fan drives shall be sized for a minimum of 150 percent of driven horsepower and shall have fully machined cast ion pulleys. Bearings shall be selected for a minimum L_{10} life of 100,00 hours an L_{50} life of 500,000 hours at maximum cataloged operating speed.

D. Fan shall be non-overloading at all points on performance curve. Fan shall have screw or automatic adjustment of belt tension. Fans shall be provided with shaft seal, electrical disconnect switch, and shall have integral fan and motor vibration isolators.

E. Manufacturers: Greenheck, Loren Cook, Ilg.

2.4 CEILING PADDLE FANS

A. Fans shall be designed for spacious areas having low ceilings creating maximum air velocity at lower RPM’s. Fans shall be engineered for continuous use.

B. Fans shall be provided with white 18” downrod and solid state wall mounted motor speed control capable of controlling all indicated fans simultaneously.

C. Motors shall be permanently lubricated, heavy duty type, matched to the fan load.

D. Manufacturers: Marley; Leading Edge.

2.5 IN-LINE CABINET FANS

A. Fans shall be duct-mounted and shall be of the centrifugal direct drive type with insulated galvanized steel housing. Fans shall be AMCA and UL rated. Duct collars with flexible connectors shall be provided on inlet and outlet of fans. The outlet duct shall include an aluminum backdraft damper and shall be adaptable for horizontal or vertical discharge.

B. Fan shall have a cord, plug, and receptacle inside the housing. The fan motor and wheel assembly shall be removable. Fan shall be isolated.

2.6 MANUFACTURERS:

A. Greenheck, Loren Cook, Ilg

2.7 CEILING CABINET FANS

A. Fans shall have insulated galvanized steel housing. Fan shall be AMCA and UL rated. Fan shall have centrifugal wheel or wheels. Face grille shall be provided on ceiling fans. Duct collar with flexible connector shall be provided on in-line fans.

B. Fan shall have a cord, plug, and receptacle inside the housing. The fan motor and wheel assembly shall be removable. Fan shall be isolated.

C. Manufacturers: Greenheck, Loren Cook, Ilg.

PART 3 – EXECUTION

3.1 GENERAL

A. Bolt motors securely to bases or supports.

B. Verify proper rotation of fan.

C. Adjust fan speed to handle the air quantity and pressure listed on the drawings.

D. Measure the fan motor current draw and verify that the fan motor is not overloaded.

END OF SECTION

DIFFUSERS, REGISTERS AND GRILLES

PART 1 – GENERAL

1.1 GENERAL

A. Provide diffusers, registers and grilles as scheduled on the drawings and specified herein. Refer to architectural reflected ceiling plans for exact locations of diffusers, registers and grilles. Make minor modifications to ductwork as required.

B. Diffusers, registers and grilles shall be tested and rated in an ADC Certified Laboratory in accordance with ADC requirements.

PART 2 – PRODUCTS

2.1 CEILING DIFFUSERS

A. Ceiling Diffusers shall be equivalent to Price Series SMD, constructed of steel and having fixed one-, two-, three-or 4-way air discharge pattern as indicated on the drawings for supply. Diffuser shall have a removable core and louver blades.

B. Unit shall be complete with opposed blade damper and enamel finish with color selected by the Architect. Frame shall be suitable for tee-bar lay-in with 24 x 24 module size for use in 24 x 24 or 24 x 48 ceiling grid system. Where used in a non-modular ceiling, an integral one inch surface mounting flange shall be provided.

C. Ceiling diffusers shall be furnished in a baked enamel finish as selected by the Architect.

2.2 SUPPLY AIR REGISTERS

A. Supply Air Registers shall be equivalent to Price Series 520, constructed of steel, double deflection type and provided with opposed blade damper.

B. Registers shall have adjustable horizontal face blades with ¾” spacing of both front and rear blades. A perimeter mounting flange of 7/8” shall be provided.

C. Registers shall be furnished in a baked enamel finish as selected by the Architect.

2.3 RETURN AIR REGISTERS

A. Return Air Registers shall be equivalent to Price Series 535D, constructed of steel, having fixed louvers at 45^0 deflection, ½” blade spacing, and provided with opposed blade damper.

B. Registers shall have a perimeter mounting flange of 7/8”.

C. Registers shall be furnished in a baked enamel finish as selected by the Architect.

2.4 RETURN AND TRANSFER AIR GRILLES

A. Return and Transfer Air Grilles shall be equivalent to Price Series 535, constructed of steel, having fixed louvers at 45^0 deflection with ½" blade spacing.

B. Grilles shall have a perimeter mounting flange of 7/8".

C. Grilles shall be furnished in a baked enamel finish as selected by the Architect.

2.5 PRODUCTS

A. Use products from one of the following manufacturers: Price, Titus, Tuttle & Bailey, Krueger.

END OF SECTION

LOUVERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 Specifications sections, apply to this section.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Requirements: Design louvers to safely withstand dead load and live loads prescribed by governing building code.

B. Thermal Movement: Design to accommodate expansion and contraction resulting from normal air temperature range of minus 20 to plus 110 degrees F, solar heat gain, and nighttime re-radiation without buckling, undue stress on structural elements, reduction of performance, or detrimental effects.

1.3 SUBMITTALS

A. Product Data.

B. Wall Louvers: Louver size, louver type, and material.

C. Shop Drawings: Show elevations, field measurements (if applicable), reinforcement, anchorages, and expansion provisions.

1. Include air supply and pressure drop information.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A company designing, manufacturing, and installing projects of this section which have performed in a satisfactory manner under comparable conditions for a period of 5 years.

1.5 PROJECT CONDITIONS

A. Field Measurements: Where conditions permit, take field measurements and determine actual installed positions of louvers before beginning louver fabrication.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Wall Louver Manufacturers:
1. Greenheck

2. Pottorff
3. Ruskin Manufacturing
4. Airolite Company

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B221, manufacturer's standard alloy and temper for application finish required.

B. Fasteners:

1. For aluminum members: Aluminum, stainless steel, or galvanized steel.
2. For steel or galvanized steel members: Stainless steel of galvanized steel.
3. For stainless steel members: Stainless steel.
4. Finish exposed-to-view fasteners heads to match adjacent surface.

C. Anchors and Inserts: Hot-dip galvanized steel or nonferrous mastic.

D. Bituminous Paint: SSPC-Paint 12; cold-applied asphalt mastic

2.3 FIXED WALL LOUVERS

A. Louver: Drainable blade, standard mullions type.

1. Depth: 4 inches.
2. Fabricate blades and frame from extruded aluminum; minimum thickness: 0.018 inch.
3. Basis of design: Greenheck Model "ESD-403"
4. Finish: Clear anodized.
5. Accessories:
   a. Bird screens
   b. Subsill flashing

B. Performance Requirements

1. Test data for a 4 foot by 4 foot unit. Data given will be considered minimum requirements.
2. Percent free area: 50.0 percent.
3. Air pressure drop: 0.14 inches w.g. at 1,000 fpm through free area.
4. Water penetration: 0.01 oz./sq.ft. at 1007 fpm

2.4 FABRICATION

A. Provide complete. Shop-fabricated units, unless unit size dictates shipment in pieces; mark each component as required for proper field assembly.

B. Minimize the necessity for field assembly and field modifications. Coordinate shop drawings. Field measurements, and shop fabrication.

C. Fabricate frames to indicated profiles with features and clearances to suit installation conditions.

1. Include integral sills of finish and construction to match louver.
   a. At locations indicated or where required to prevent drainage infiltration, provide sill extensions or subsill flashings of same finish and material as louver.
2. Provide clearance or recess3es as required to accommodate sealant between louver and adjacent construction.

D. Provide shop-welded joints between framing components, and between framing components and fixed louver blades, unless otherwise indicated or where field assembly is unavoidable

E. Provide uniform spacing between blades, including gap between blades and exposed face of head and sill members.

F. Provide vertical mullions of type indicated.

2.5 FINISHES

A. Mill Finish: As fabricated, welds cleaned and dressed, exposed welds ground smooth. Remove oil, grease, dirt, and weld spatter from finished units.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that substrates and opening to receive louvers are rigidly set, at proper lines and elevation. Properly sized, and ready to receive louvers.

B. Do not proceed with installation until conditions detrimental to proper installation have been corrected.

3.2 PREPARATION

A. Coat contact surfaces of dissimilar metals with one or more coats of bituminous paint.

1. The following metals are not considered dissimilar: Aluminum, stainless steel, and zinc.

B. Apply one 15-mil dry film thickness coat of bituminous isolation coating to metal surfaces, other than galvanized steel, which will be in contact with cementitious materials.

3.3 INSTALLATION

A. Install louvers in accordance with manufacturer’s instructions and shop drawings.

B. Coordinate louver installation with adjacent elements of building envelope to ensure watertight construction.

C. Set units and flashings in proper location, plumb and true, free of warp or twist.

D. Fit joints tightly; where joint sealers are to be installed, make joints of sizes required.

3.4 CLEANING

A. Wash exposed surfaces using mild detergent; thoroughly clean inside corners.

B. Remove excess sealant by moderate used of mineral spirits or other solvent recommended by sealant manufacturer.

1. Touch up marred or abraded areas of finished elements. If satisfactory touch-up cannot be accomplished, remove and replace element.

END OF SECTION

GAS FURNACES

PART 1 – GENERAL

A. Provide two stage fan assisted, high efficiency gas-fired furnaces as indicated on the drawings. Units shall have components and sections arranged as indicated on the drawings. The gas-fired furnaces shall be designed for upflow or horizontal installation.

B. The gas-fired furnaces shall be provided with proper gas burner orifices to operate on natural gas.

C. The gas-fired furnace design shall be certified by the American Gas Association for both natural gas and L.P. gas. Burners shall be multi-port in-shot type.

PART 2 – PRODUCTS

A. Blower motors shall be direct-drive, ECM variable speed type with “soft start” and “soft stop” for quiet operation.

B. Units shall be equipped to operate on natural gas with a 120 volt power supply. The primary heat exchanger shall be 409 stainless steel with crimped no-weld construction. The secondary heat exchanger shall be constructed of AL29-4C stainless steel. Die-formed burners shall be constructed of aluminized steel and shall include flared ports and a stainless steel insert.

C. Non-prorated lifetime heat exchanger limited warranty shall be provided.

D. The unit shall include a 24-volt transformer, a two stage gas control with a regulated combination redundant gas valve. A 2-speed induced draft motor with stainless steel shaft and steel ball bearings shall be provided. Hot surface ignition system shall be used having silicon nitride ignitor. Microprocessor control system shall retain last five (5) fault codes with push button memory recall, regardless of power interruption.

E. One inch cleanable high velocity filters shall be provided.

F. Provide horizontal or upflow/counterflow direct expansion cooling coil for each gas furnace. Coils shall be constructed of aluminum fins mechanically bonded to 3/8” OD copper tubing. Coils shall be designed to operate on refrigerant R410a and shall be factory pressure and leak tested and shall be provided with factory-installed thermal expansion valve.

G. Provide Little Giant #VCM-20ULS or equivalent condensate pump at each gas furnace. Pump shall deliver 25 GPH @ 15’ head, 93 watt motor, 115/1/60 volts.

H. Approved equivalent manufacturers: Rheem, Trane, Carrier

PART 3 – EXECUTION

A. Mount wall thermostat. Provide wiring to thermostat.

B. Adjust gas furnace fan speeds to handle the air quantity listed on the drawings.

C. Operate gas furnaces through control sequences and measure outlet temperatures to verify proper operation.

D. Measure fan motor current draw of gas furnaces to verify that motor is not overloaded.

E. Extend 3/8” polyethylene discharge tubing from pump to indirect receptor or other suitable location. Interlock pump with condensing unit to de-energize cooling in event of pump failure.

END OF SECTION

GAS-FIRED RADIANT HEATERS

PART 1 – GENERAL

1.1 GENERAL

A. Provide infrared radiant heaters as shown on the drawings and specified herein. Units shall have the capacities scheduled on the drawings and shall be provide with all necessary fittings and accessories.

PART 2 – PRODUCTS

2.1 GENERAL

A. The burner control housing shall be pre-assembled and pre-wired. Unit shall contain single stage gas valve, integral blower with thermal overload protection, combustion and air proving switch, direct spark ignition system, low voltage control wiring, and quick-connect electrical connections.

B. The tube and reflector system shall contain a 4” aluminized steel combustion section and 4” mild steel radiant heat exchanger. A heat economizer baffle shall be provided at the last heat exchanger section to ensure maximum efficiency

C. Optional equipment shall include: side reflectors, 90 degree elbow kits, extension kits, and low voltage thermostats.

D. Manufacturer shall provide 3 warranty from date of shipment from factory.

E. Infrared heaters shall be Sterling, Reznor, or Solaronics.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install infrared heaters in strict accordance with all manufacturers written instructions.

B. Verify proper operation with no gas or flue leaks and that proper voltage has been connected to the unit.

END OF SECTION

AIR COOLED CONDENSING UNITS

PART 1 – GENERAL

1.1 GENERAL

A. Provide air cooled condensing units as shown on the drawings and specified herein. Condensing units shall have the capacities scheduled on the drawings and shall be rated in accordance with ARI Standards.

PART 2 - PRODUCTS

2.1 GENERAL

A. Refer to Section 232113 for component and equipment ratings. All components, fittings, equipment, coils, specialties, etc., shall meet the component pressure rating listed.

2.2 AIR COOLED CONDENSING UNITS

A. Condensing units shall be assembled on a heavy gauge integral steel base. Units shall be weatherproofed and shall include multiple-hermetic scroll compressors, condenser coil, fans and motors, controls and holding charge of R-410a. Units shall have a hinged control access panel and removable panels which allow access to controls and motor components.

B. Unit frame shall be one-piece welded assembly of zinc-coated steel. Exterior surfaces shall be phosphatized and finished with air-dry, gray-green enamel.

C. Units shall have a dual refrigeration circuits. Each refrigeration circuit shall have an integral subcooling circuit.

D. Units shall have direct drive, 3,600 rpm, scroll compressors having only three major moving parts. Motor shall be suction gas cooled. Sensors shall be embedded between the three motor windings to protect against excessive winding temperatures.

E. Condenser fans shall be vertical discharge, direct drive fans, statically and dynamically balanced, with zinc-plated steel blades and hubs. Motors shall be three phase with permanently lubricated ball bearings, built-in current, and thermal overload protection.

F. Condenser coils shall consist of configurated aluminum fin secondary surface mechanically bonded to primary surface of 3/8 inch OD seamless copper tubing, and shall have subcooling circuits and liquid accumulators. Coils shall be factory tested at 450 psig air pressure and vacuum dehydrated. Hail guard shall be provided to protect condenser coil surface.

G. Options shall include factory installed head pressure control damper for operation down to 0 F.

H. Manufacturer shall provide 5 year compressor warranty which shall cover both parts and labor.

I. Condensing units shall be Rheem, Trane, or Carrier.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Air cooled condensing units shall be installed level and plumb on grade mounted on 4 inch high (minimum) concrete pad.

B. Air cooled condensing units shall be installed in strict accordance with manufacturers printed instructions.

C. Verify that proper refrigerant charge has been made and that proper electrical voltage and phase has been connected to the unit.

END OF SECTION

ELECTRIC HEATERS

PART 1 – GENERAL

1.1 GENERAL

A. Units shall be UL listed.

B. Capacities and voltage as scheduled or indicated on the drawings.

PART 2 – PRODUCTS

2.1 ELECTRIC WALL HEATERS

A. Electric wall heaters shall include enclosures, heating elements, fans and motors, controls, and safety devices.

B. Enclosures shall be designed for duty as a recessed rough-in box in either masonry or frame installations. The enclosures shall be 20-gauge galvanized steel and shall contain knockouts for power leads. The front panels shall be of the bar grille type and shall be constructed of 16 gauge cold-rolled steel, welded into a uniform grille and finished in a baked enamel. The front grilles shall be surrounded by a decorative aluminum frame.

C. The heating elements shall be of a non-glowing design consisting of an 80/20 nickel-chromium resistance wire enclosed in a steel sheath to which plate fins are copper brazed.

D. The fans shall be aluminum. The fans motors shall be totally enclosed. Fan controls shall be of bi-metallic, snap-action type and shall activate fans after heating elements reach operating temperature. An individual fan shall continue to operate after the thermostat is satisfied and until the heating element is cool.

E. Tamper-proof thermostats shall be of the bi-metallic type, snap-action type with enclosed contacts. They shall be completely concealed behind the front covers and tamper-proof.

F. Thermal cut-outs shall be built into the system to shut off the heater in the event of overheating. Units shall include a disconnect switch.

G. Heaters and electrical accessories shall be labeled by Underwriters Laboratories, Inc.

H. Approved manufacturers: Q-Mark, Trane, Stabilis/Markel.

2.2 ELECTRIC UNIT HEATERS

A. Electric unit heaters shall be forced air type constructed of 20 gauge die formed steel. Heater shall have individual adjustable louvers to control air flow.

B. The heating element shall consist of aluminum-finned, copper clad steel sheath.

C. An automatic reset thermal overload protector shall run the full length of the heaters and shall turn off heating elements should overheating occur at any point along heating length. Overheat protectors shall restore operation automatically when cause of overheating is removed.

D. Junction boxes shall be pre-wired at each end of the heater with knockouts at end and bottom of each heater end.

E. Heaters and electrical accessories shall be labeled by Underwriters Laboratories, Inc.

F. Approved manufacturers: Q-Mark, Trane, Stabilis/Markel.

G. Provide heater with wall mounted line voltage thermostat and universal wall and ceiling mounting bracket.

PART 3 – EXECUTION

3.1 GENERAL

A. Place unit heaters in operation and check for proper operation of controls.

END OF SECTION

GENERAL ELECTRICAL PROVISIONS

PART 1 – GENERAL

1.1 REFERENCE TO CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplementary and other Conditions) and Division 1 - General Requirements, apply to the work specified in this Division. Unless the specifications contain statements which are more definitive or more restrictive than those contained in the Conditions of the Contract, the specifications shall not be interpreted as waiving or overruling any requirements expressed in the Conditions of the Contract.

B. No claim or additional compensation shall be entertained on behalf of or paid on account of failure to be informed of the above conditions and requirements.

C. Should a bidder find discrepancies in or omissions from the drawings or specifications, or should he be in doubt as to their meaning, he should at once notify the Architect who shall send written instructions to bidders. If these are ignored by the Contractor, he shall be responsible for furnishing the proper or workable equipment as necessary.

D. Before submitting a bid, bidders shall be held responsible to have visited the site of work, attend the Pre-Bid Meeting, and fully inform themselves as to existing conditions and limitations, including rules, rates and fringe benefits, travel pay, affiliation fees and transportation expense prevailing in the local labor market, and no allowance shall subsequently be made on behalf of the bidder by reason of any error on his part.

E. Carefully examine the architectural, structural, heating, ventilating and air conditioning, kitchen, and plumbing drawings and any other contract documents. If any discrepancies occur between the drawings or between the drawings and the specifications, report such discrepancies to the Architect in writing and obtain written instructions as to the manner in which to proceed. No departures from the contract drawings shall be made without prior written approval of the Architect and Owner.

F. Obtain any additional reference drawings and/or information required for installation prior to installing equipment.

1.2 WORK INCLUDED

A. Provide and install a complete and operating electrical installation in accordance with these specifications and accompanying contract drawings. This shall include required labor, material, apparatus and supervision.

B. Without limiting or restricting the volume of work and solely for convenience, the work to be performed will, in general, comprise of the following:

1. Power and/or lighting panels.
2. Branch wiring.
3. Temporary service lighting and power.
4. Wiring of equipment furnished by others and final connections to same.
5. Grounding
6. Lighting fixtures, lamps and controls.
7. Fire alarm system.
8. Installation of equipment supplied by the Owner.

C. Items of labor, material, and equipment not specified in detail or shown on drawings, but incidental to or necessary for the complete installation and proper operation of the several branches of work and described herein, or reasonably implied in connection herewith, shall be furnished as if called for in detail by the specifications or drawings. This includes electrical work associated with mechanical and plumbing work whether indicated on electrical drawings or not.

1.3 WORK NOT INCLUDED

A. The following items of Electrical Construction are not included in this contract:

1. Certain low voltage wiring of mechanical equipment shall be done by the respective Contractor.

2. Certain motors and equipment, such as pumps, fans, etc., shall be provided by others, complete with motor and built-in or separate controllers as covered by such contracts. The extent of work required by this Contractor in connection with the provisions of this equipment is described hereinafter under "Electrical Powered Equipment."

3. Motors connected to driven equipment shall be set by respective Contractor furnishing same.

4. Certain line voltage electrical apparatus such as switches, starters, controllers, transformers, etc., furnished by others shall be delivered to the curb by the Contractor furnishing the equipment, unless specifically noted otherwise. Unload and transport to installation location.

5. Electric heating equipment.

1.4 DEFINITIONS AND ABBREVIATIONS

A. Definitions

1. "Furnish" shall mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
2. "Install" shall be used to describe operations at project site including unloading, packing, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protection, cleaning, and similar operations, as applicable in each instance.

3. "Provide" shall mean furnish and install, complete and ready for intended use, as applicable in each instance.
4. "Directed" shall mean as directed by Owner prior to installation of equipment.
5. "Indicated" shall mean "indicated on Contract Drawings".
6. "Shown" shall mean "shown on Contract Drawings".
7. "Section" shall mean one of the Specification Sections.
8. "Division" shall mean one of the Specification Divisions.
9. "Article" shall mean one of the numbered paragraphs of the Specification Section.
10. "Work" or "Electrical Work" herein includes products, labor, equipment, tools, appliances, transportation and related items, directly or indirectly required to complete the specified and/or indicated electrical installation.
11. "Code" shall mean any and all regulations and requirements of regulatory bodies, public or private, having jurisdiction over the work involved.
12. "Product" used in Division 26 means material, equipment, machinery, and/or appliances directly or indirectly required to complete the specified and/or indicated Electrical Work.
13. "Standard Product" shall mean a manufactured product, illustrated and/or described in catalogs or brochures, which are in general distribution prior to the date of issue of construction documents for bidding. Products shall generally be identified by means of a specific catalog number and manufacturer's name.
14. "Wiring" shall mean fittings, conduits, wires, junction boxes, connections to equipment, splices, and other accessories required to complete the work.
15. Abbreviations and Symbols: See lists for both on drawings.
16. "This Contractor" shall mean the Contractor responsible for Division 16 work.
17. Contract Documents: drawings, specifications, bid forms, addendum, and change orders.
18. Whenever the phrases "approved by the Architect or Owner," "approved equivalent," or "equivalent to" appear in these specifications, they shall be interpreted as meaning "as recommended by the Architect and approved by the Authority."

B. Reference to the following codes and standards shall mean:

Reference	Definition
NEC	National Electrical Code Current Edition
ASTM	American Society for Testing Materials
NEMA	National Electrical Manufacturers Association
ANSI	American National Standards Institute
FS	Federal Specification, US Government
CS	Commercial Standards issued by US Department of Commerce
NESC	National Electrical Safety Code
NETA	National Electrical Testing Association
ADA	Americans with Disabilities Act

1.5 CODES, PERMITS, AND INSPECTIONS

A. Electrical work, equipment, and materials furnished and installed under this contract shall conform to the requirements of the Power Company, the latest edition of the National Electrical Code, the National Fire Protection Association, and any other governmental or local authorities having jurisdiction. Pay any fees required for the installation of Division 26 work. Certificates of approval shall be obtained in duplicate from any department or agency issuing same, and shall be turned over to the Owner at the completion of the work.

B. Provide any labor, materials, services, apparatus and drawings required to comply with applicable laws, ordinances, rules and regulations, whether or not shown on the drawings and/or specified.

C. Obtain certificates of inspection and approval from authorities having jurisdiction and deliver same to Owner as a prerequisite for final acceptance of the work. Provide record copies of permit applications, permits and other items for which certification is indicated.

1.6 SPECIAL ENGINEERING SERVICES

A. In the instance of complex or specialized electrical systems such as fire alarm, or similar miscellaneous systems; the installation, final connections and testing of such systems shall be made under the direct supervision of competent authorized service engineers who shall be in the employ of the respective equipment manufacturer. Provide the Owner with copies of instruction manuals and booklets for each system and piece of equipment installed. Provide any additional instructions to the Owner over and above that listed above in the care, adjustment and operation of parts of the electrical systems.

B. Pay any and all expenses incurred by these equipment manufacturers' representatives.

1.7 SUBMITTALS

A. Shop drawings, product data, and samples shall be submitted to the Architect for approval.

1. Shop drawings shall be new drawings, and not reproductions or tracings of the Contract Documents. In preparing shop drawings, establish lines and levels for the work specified, and check the drawings to avoid interference with structural features and other work. Immediately call to the attention of the Engineer any interferences for clarification in writing.
2. Manufacturer's literature and data sheets shall be submitted indicating the necessary installation dimensions, weights, materials, and performance information. Each piece of literature shall be identified with the specific specification number, paragraph, and equipment schedule identification.
3. Layout and detail drawings shall be submitted in the form of a sepia reproducible and paper prints. Manufacturer's drawings shall be standard

drawings. Equipment shop drawings shall show specific data and other special features required for review consideration.

4. Equipment shop drawings (8-1/2 by 11 inch sheets) shall be bound together in sets, in loose leaf binders, and shall be indexed in accordance with Specification Section. Additional shop drawings may be submitted at a later date for insertion therein, and the original submittal shall note which shop drawings shall be submitted later. Marked-up catalogs are not acceptable, and shall be rejected.
5. Materials and equipment shop drawings shall be submitted within 30 calendar days of Contract receipt.
6. Manufacturers' instruction manuals shall be submitted together with shop drawings. Furnish instruction manuals and parts listed for each piece of electrical equipment, on 8-1/2 by 11 inch sheets, or catalogs, suitable for loose leaf side binding, packaged separately, and clearly identified. Instructions shall include information pertaining to installation, operation, and maintenance of equipment as applicable. Each piece of literature shall be clearly identified with the specific job equipment identification. Literature shall be factory printed and not reproduced copies.
7. Any characteristic of any piece of equipment which deviates from the characteristics of the equipment specified shall be hi-lighted and circled in red.

B. Submit manufacturers' data, and/or shop drawings of the following:

1. Lighting and Power Panels and Cabinets
2. Wiring Devices
3. Lighting Fixtures
4. Fire Alarm System
5. Distribution Equipment

1.8 OPERATING AND MAINTENANCE INSTRUCTIONS

A. After final tests and adjustments have been completed, furnish the services of qualified personnel to fully instruct representatives of the Owner in the operation and maintenance procedures for equipment installed. Operation and maintenance instructions for major items of equipment shall be directly supervised by the equipment manufacturer's representative. Supply qualified personnel to operate equipment for sufficient length of time as required to meet governing authorities' operation and performance tests and as required to assure that the Owner's representatives are properly qualified to take over operation and maintenance procedures.

1. Notify the Architect, the Owner's representatives and equipment manufacturers' representatives, by letter, as to the time and date of operating and maintenance instruction periods at least one week prior to conducting same.
2. Forward to the Architect the signatures of all present for the instruction periods.

B. Furnish three (3) copies of recommended equipment operation and maintenance procedures manuals as specified herein, assembled and bound together in 8-1/2

by 11 inch three-ring binders. The ring binders shall be submitted to the Architect in accordance with procedures established for shop drawing submittals.

1. The operation and maintenance procedures manuals shall include the following:

    a. Project Title
    b. Architect's Name and Address
    c. Date Submitted
    d. Contractor's Name and Address
    e. Index (in alphabetical order, with page numbers)
    f. General Description of Each System
    g. Parts List, identifying the various parts of equipment for repair and replacement purposes.
    h. List of spares recommended for normal service requirements.
    i. Operating instructions outlining step-by-step procedures required for system start-up and operation. The instructions shall include the manufacturer's name, model number, service manual, and brief description of each piece of equipment and its basic operating features.
    j. Maintenance instructions describing routine maintenance and lubrication procedures and schedules, and simplified diagrams which illustrate the systems as installed.
    k. Wiring and control diagrams for each piece of equipment, showing "as installed" conditions.

1.9 SINGULAR NUMBER

A. References made to any item in the singular number shall apply equally to as many identical items that the work may require.

1.10 PROTECTION OF SERVICES

A. Repair, replace and maintain in service any new or existing utilities, facilities or services (underground, overground, interior or exterior) damaged, broken or otherwise rendered inoperative during the course of construction. The method used in repairing, replacing or maintaining the services shall be approved by the Owner and Architect.

1.11 PROTECTION OF FLOORS

A. Protect existing flooring from damage during the construction period. Provide plywood or similar material under equipment or materials stored on floors, and in areas where construction may damage the floor surfaces. Replace floor surfaces (including sealer) damaged during the construction.

1.12 TEMPORARY LIGHT AND POWER SERVICES

A. Refer to the Division 1, General Requirements, of these specifications to determine responsibility for temporary lights, power, water and heat.

B. The Electrical Contractor is responsible for all temporary power and lighting requirements throughout construction. The Electrical Contractor shall review all associated phasing plans and schedules and provide any and all equipment, either temporary or permanent, required to maintain or provide temporary power and lighting to all areas of this facility, throughout the construction process.

In addition to minimal temporary lighting and power needed for construction operations, areas that will be Owner-occupied throughout construction shall be provided with temporary power and lighting services that meet or exceed the existing services that currently serve these areas.

C. The electrical documents indicate the final arrangement for the power/lighting/communication/ signal/data systems and do not reflect equipment, devices, etc., needed to provide the required temporary power and lighting services.

D. At the completion of this project, all temporary lighting, temporary receptacles, and temporary wiring shall be removed in their entirety.

1.13 SUBSTITUTIONS

A. It is the intent of these specifications that wherever a manufacturer or product is specified, and the term "or approved equivalent" is used, the substituted item must conform in respects to the specified item. Consideration shall not be given to claims that the substituted item meets the performance requirements with lesser construction. Performance indicated in schedules, drawings and specifications shall be interpreted as minimum performance.

B. Note that where specific manufacturers' products are indicated in the Contract Documents, the associated systems have been designed on the basis of that product's physical characteristics. Where specific manufacturers' products are indicated in the Contract Documents and other manufacturers' names are listed, the associated systems have been designed on the basis of the first-named manufacturer's product. When products other than those used as the basis of design are provided, pay additional costs related to modifications to the systems and/or structure required by the use of that product.

C. Equipment of one type shall be the products of one manufacturer; similar items of the same classification shall be identical, including equipment, assemblies, parts and components.

D. Materials furnished shall be determined safe by a nationally recognized testing organization, such as Underwriters' Laboratories, Inc., or Factory Mutual Engineering Corporation, and materials shall be labeled, certified or listed by such organizations

E. Where a specific manufacturer is specified and other manufacturers' names are listed as equivalent, the bid shall be based upon the specified or equivalent

manufacturers only. Any substitutions from the specified or equivalent manufacturers shall be offered as a Bidder's Initiative.

F. Final acceptance of substitutions shall be at the discretion of the Architect/Engineer.

1.14 PERFORMANCE OF EQUIPMENT

A. Materials, equipment and appurtenances of any kind, shown on the drawings, hereinafter specified or required for the completion of the work in accordance with the intent of these specifications, shall be completely satisfactory and acceptable in operation, performance and capacity. No approval either written or verbal of any drawings, descriptive data or samples or such material, equipment and/or appurtenance shall relieve the Contractor of his responsibility to turn over the same to the Owner in perfect working order at the completion of the work.

B. Any material, equipment or appurtenances, the operation, capacity or performance of which does not comply with the drawings and/or specification requirements or which is damaged prior to acceptance by the Owner shall be held to be defective material and shall be removed and replaced with proper and acceptable materials, equipment and/or appurtenances or put in proper and acceptable working order, satisfactory to the Architect and Owner, without additional cost to the Owner.

1.15 WEATHERPROOFING LOCATIONS (WP)

A. Electrical apparatus, such as outlet boxes, switches, thermal switches or manual starters, disconnect switches, combination switches and starters, motor control centers, and motor starters shall be weatherproof gasketed type, NEMA Types 3 or 4 in the following instances:

1. On surface of exterior face of building, including areas where not under canopies, cast boxes with threaded hubs must be used and under canopies steel boxes with gasket connections to devices.
2. In any areas where specifically noted "WP" or required by the NEC or Electrical Regulations mentioned herein.
3. Within air conditioning enclosures.
4. In underground splice boxes.
5. On building roof.

1.16 CLEANING, PROTECTING AND ADJUSTING

A. Materials shall be stored in a manner that shall maintain an orderly, clean appearance. If stored on-site in open or unprotected areas, equipment and material shall be kept off the ground by means of pallets or racks, and covered with tarpaulins.

B. Equipment and material, if left unprotected and damaged, shall be repainted or otherwise refurbished at the discretion of the Owner. Equipment and material is subject to rejection and replacement if, in the opinion of the Architect or the

manufacturer's engineering department, the equipment has deteriorated or been damaged to the extent that its immediate use or performance is questionable, or that its normal life expectancy has been curtailed.

C. During the construction period, protect ductwork, raceways, conduit and equipment from damage and dirt. Properly cap ductwork and conduit.

D. Vacuum cabinets, switch boards, distribution panels, lighting and power panels, etc., after completion of work.

1.17 ACCESSIBILITY

A. Coordinate to ensure the adequacy of the size of shafts and chases, and the adequacy of clearances in hung ceilings and other areas required for the proper installation of this work.

B. Locate equipment which must be serviced, operated or maintained in fully accessible positions. Equipment requiring access shall include, but is not necessarily limited to, motors, junction boxes, fire dampers, controllers and switchgears.

C. Provide, as required, the exact locations of access doors. Provide access doors in finished construction for installation by others. Locations of access doors in finished construction shall be submitted in sufficient time to be installed in the normal course of the work. Keep conduit and other electrical devices clear of access door openings to allow adequate space to work in or enter the concealed space.

D. Access panels shall not be smaller than 12 inches by 16 inches and shall be all-steel construction with a No. 16 gauge wall or ceiling frame and a No. 14 gauge panel door with not less than 1/8 inch fireproofing secured to the inside of the door. Doors shall be provided with concealed hinges and be secured with suitable clips and countersunk screws. Outside of access panels shall finish flush with finished wall or ceiling surfaces. Covers shall be factory primed with two (2) coats of primer.

1.18 GUARANTEE

A. Guarantee material, equipment and workmanship for a period of one (1) year from date of final acceptance by Architect and Owner. Replace defective material and workmanship furnished and installed and other work and equipment damaged thereby.

B. In addition to the one (1) year guarantee, furnish any warranties or guarantees that normally come with specific pieces of equipment that exceed the one (1) year guarantee. These additional warranties shall be given to the Owner for the time period specified.

1.19 OWNER COORDINATION

A. Coordinate any and all activities with the designated Owner's representative, which involves a tie to existing electrical systems or which, in any way, may interfere with or interrupt existing electrical systems. Where there are scheduled ties or interruptions or where there is a reasonable chance of interruption, written notice must be obtained from the Owner prior to work commencing.

1.20 COORDINATION

A. Coordinate and furnish in writing to others, including the Architect, any information necessary to permit the work of all contractors to be installed satisfactorily and with the least possible interference or delay.

B. Because of the complexity of the construction of this project, each Contractor shall participate in the preparation of coordination drawings. The procedure shall be supervised by the Construction Manager. No installation of permanent systems shall proceed until the coordination drawings are approved by the Construction Manager and the Architect. No extra charges shall be allowed for changes required to accommodate installation of system by other contractors.

C. Coordination drawings shall be prepared for each floor level and shall be of a scale not less than 1/4 inch - 1 foot. Coordination drawings shall include equipment, lighting, conduit and raceway plans, and elevations with dimensions. Coordination drawings shall also include required access points through ceiling panels, access doors, cover plates, etc.

D. Devices and appurtenances which are to be installed in finished areas shall be coordinated with the Architect for final approval as it relates to location, finish, materials, color, and texture.

E. When work is installed without proper coordination, changes to this work deemed necessary by the Architect shall be made to correct conditions without any extra cost to the Owner.

1.21 PRE-BID SITE VISIT

A. Bidders shall visit the site and become completely familiar with existing conditions prior to submitting their bid. No extra charges shall be allowed as a result of existing conditions.

PART 2 – PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. Equipment shall be so built and installed as to deliver its full rated capacity at the efficiency for which it was designed. Equipment shall meet the detailed requirements indicated, and shall be suitable for the installation shown.

B. Where two or more units of the same class of equipment are furnished in same Section of Specifications, provide each from the same manufacturer. Furnish equipment and materials new and free from defects of size, make, type and quality herein specified, or as reviewed. Work shall be installed in a neat and workmanlike manner.

C. Capacities, dimensions, or sizes specified or indicated are minimum, unless otherwise stated. Tolerances used in rating or testing standards specified shall not be allowed in determining capacities of equipment.

D. Materials shall be listed by the Underwriters' Laboratories, Inc. where applicable and shall be manufactured in accordance with applicable standards established by ANSI, NEMA, ASTM, and IEEE.

E. Any products judged not in accordance with the Specifications either before or after installation shall be rejected.

F. Where products are specified with no reference to a particular manufacturer's product, the product used shall meet or exceed industry construction and testing procedure standards applicable to the product, for life expectancy, performance and safety.

G. Where electrical products are a fabricated assembly, the fabricator shall assume responsibility for correct operation of the entire assembly and of its individual components.

H. Tools: Provide special tools for proper operation and maintenance of the equipment.

2.2 IDENTIFICATION

A. Switchgear, panels, relays, terminal control cabinets, junction boxes, contactors, circuit breakers, safety switches, motor starters, and similar items shall be identified with a single plastic nameplate made up of two laminated black plastic sheets bonded with a middle sheet of white plastic and characters engraved in one black sheet to the depth of the white plastic. Nameplate shall read as follows:

1. First line shall be 1/2 inch letters stating panel/equipment name.
2. Second line (if applicable) shall be 1/4 inch letters stating the existing panel name in parentheses ( ).
3. Third line shall be 1/4 inch letters stating voltage/phase.
4. Fourth line shall be 1/4 inch letters stating breaker number, panel number, and room name/room number (Owner’s room number) from which it is fed.
5. Fifth line shall be1/4 inch letters stating function and/or equipment which it controls.

B. A typewritten list of nameplates shall be submitted to the Owner and the Architect for approval before ordering same.

C. Label receptacle plates with identification showing panel and breaker number from which it is fed. Labels shall be made using the Dymo Posiprinter System.

D. Label junction boxes and pull boxes, showing circuit numbers contained in the enclosure. Use an approved marking device.

E. Label wire with an identification tag showing panel and breaker number from which it is fed at splices, junctions, and terminations as explained in this specification.

F. Label fire alarm device bases with identification showing device address number assigned by fire alarm system manufacturer. Labels shall be made using the Dymo Posiprinter system.

2.3 ANCHOR BOLTS

A. Provide and set in place, at the time of pouring of concrete foundations, necessary anchor bolts as required for the equipment called for under these specifications. Anchor bolts shall be of the hook type, of proper size and length to suit the equipment. Anchor bolts shall be set in pipe sleeves of approximately twice the bolt diameter and one half the embedded length of the bolt. Assume full responsibility for proper emplacement of the bolts.

2.4 INSERTS

A. Provide inserts of an approved metallic type for hangers. Where two or more parallel conduits are installed, continuous inserts may be used. Where required to distribute the load on the inserts, a piece of reinforcing steel of sufficient length shall be passed through the insert.

2.5 SLEEVES

A. Provide sleeves in all roofs, floors, and any fire-rated walls. Each sleeve shall extend through its respective floor, wall or partition and shall be cut flush with each surface unless otherwise required.

B. Sleeves in bearing and masonry walls, floors and partitions shall be standard weight steel pipe finished with smooth edges. For other than masonry partitions, through suspended ceilings, and for concealed vertical piping, sleeves shall be No. 22 USG galvanized iron.

C. Sleeves shall be properly installed and securely cemented in place.

D. Floor sleeves shall extend 1 inch above the finished floor, unless otherwise noted. Space between floor sleeves and passing conduit shall be caulked with graphite packing and waterproof caulking compound.

E. Where conduits pass through waterproofed floor or walls, design of sleeves shall be such that waterproofing can be flashed into and around the sleeves.

F. Where conduits pass through roofs, sleeves shall be installed and flashed and made watertight by the General Contractor unless otherwise specified or shown on the drawings.

G. Sleeves through exterior walls below grade shall have the space between conduit and sleeve caulked watertight using an approved method.

2.6 FIREPROOFING

A. Where sleeves or other penetrations pierce floors or walls having specific fire ratings, the space between the sleeve and passing conduit shall be fireproofed using 3M Series 7900 Penetration Fire Stop putty. Where a cable tray passes through fire-rated walls, use seal bags as manufactured by International Protection Coatings Company. Installation method shall be per manufacturer's recommendations and approved by the Architect/Engineer.

2.7 WIRE GAUGE

A. The sizes of conductors and thickness of metals shown on the drawings or mentioned herein shall be understood to be American Wire Gauge.

2.8 MISCELLANEOUS METAL AND STRUCTURAL STEEL

A. Scope of Work: Furnish labor, materials, equipment and services necessary for the installation of miscellaneous metal and structural steel work required to complete this contract. Erect structural steel required for the proper support of equipment required under this contract.

B. Supports, brackets, and clamps and other items specified herein shall be installed in strict accordance with the best practices and recognized code.

C. Materials: Structural steel members required under this part shall conform to ASTM Standard Specification A-7. Other materials shall be as specified hereinafter.

D. Priming: steel and iron work shall be primed with Rust-Oleum 769 or approved equivalent. Before priming, metal shall be thoroughly cleaned free from scale, rust and dirt.

E. Anchors: Provide anchors, bolts, screws, dowels and connecting members, and do cutting and fitting necessary to secure the work to adjoining construction. Build in connecting members to masonry, concrete and structural steel as the work progresses.

F. Supports and Brackets: shall be neatly constructed to structural shapes to adequately support the equipment intended. Supports must be approved prior to installation. Attention is directed to the proper rigid support required for conduit. Field conditions shall regulate the type of support required.

2.9 VIBRATION ISOLATION MOUNTS

A. Provide vibration isolation mounts for all substations, power centers, transformers, etc. All vibration isolation mounts shall be Amber-Booth spring type applicable for the size and weight of the equipment.

2.10 GRADING, FERTILIZING, AND SEEDING

A. Provide labor, materials, equipment, and services required to strip and store topsoil, replace topsoil, and rough and finish grade and fertilize and seed areas disturbed beyond the work area of the General Contract. Topsoil must be stored where directed on the site.

2.11 BITUMINOUS PAVING

A. Provide labor, materials, equipment, and services necessary to repair pavements disturbed under the Contract.

B. Materials, methods, and workmanship shall conform with the requirements of the NJ Department of Highways, as published in its specifications Form 408, as amended to date.

C. All patching of existing areas shall match existing materials.

2.12 MOTORS

A. Motors shall be built in accordance with the latest standards of NEMA and as specified. Motors shall be tested in accordance with ASA C50 and conform thereto with respect to insulation resistance and dielectric strength.

B. Each motor shall be provided with conduit terminal box and adequate starting and protective equipment as specified or required. The capacity shall be sufficient to operate associated driven devices under conditions of operation and load and without overload, and shall be at least the horsepower indicated or specified. Each motor type shall be for quiet operation.

C. Motor starting equipment must be selected so that starting currents or transients do not have an adverse effect on lighting or other electrical equipment. No open transition wye-delta starting of motors shall be permitted.

PART 3 – EXECUTION

3.1 GENERAL

A. Provide information to the General Contractor for any chases or openings required under this Contract. No cutting shall be done which may affect the building structurally or architecturally without the prior approval of the Architect. Damaged construction shall be restored to its original conditions and finished to

match the surrounding work. Refer to "Supplementary General Conditions" for the disposition of Cutting and Patching.

B. Grades, elevations, and dimensions shown on the drawings are approximately correct; however, field check and otherwise verify such data at the site before proceeding with the work. Make necessary survey equipment available at all times and make use of such equipment wherever necessary to properly install equipment.

C. The Contractor shall be entirely responsible for apparatus, equipment, and appurtenances furnished by him or his subcontractors in connection with the work and special care shall be taken to protect parts thereof in such manner as may be necessary or as may be directed. Protection shall include covers, crating, sheds or other means to prevent dirt, grit, plaster or other foreign substances from entering the working parts of machinery or equipment. Special care shall be taken to keep open ends of pipes closed while in storage and during installation. Where equipment must be stored outside the building, it shall be totally covered and secured with heavy weatherproofing tarps and kept dry at all times. Where equipment has been subjected to moisture, it shall be removed from the site and replaced with new equipment. Protect open excavating until covered over.

D. Due to the schematic nature and small scale of the electrical drawings, it is not possible to indicate exact locations, offsets, fittings, access panels, pull boxes, and miscellaneous parts which may be required to form a complete system. The drawings are generally indicative of the work to be installed. Arrange work accordingly furnishing necessary parts and equipment as may be required to meet the various conditions and to provide a complete circuit from end use device to circuit protective device in panel.

E. The Contractor shall include in his bid price, the cost to furnish and install twelve (12) additional 20 amp circuits For each panel shown on the drawings. Each circuit shall include up to eight (8) receptacles along with circuit breakers, conductors, ground, and conduits.

F. Within thirty (30) days after acceptance of bids, submit to the Architect for approval, a complete list of equipment and materials to be furnished under this contract, giving names and addresses of manufacturers and material they intend to furnish. This source of supply shall be listed on forms available from the Architect.

3.2 CLEARANCES

A. Take caution when on routing conduit and location of equipment. In many cases, clearances in ceiling plenums is limited due to ductwork and other mechanical lines and systems and steel. The Contractor shall be responsible for routing around mechanical equipment and ducts in order that everything can remain concealed in finished areas.

3.3 CUTTING AND PATCHING

A. Provide cutting and patching necessary to install the work specified herein. Patching shall match adjacent surfaces. Refer to Section 01045, Cutting and Patching, for specific direction.

B. No structural members shall be cut without prior approval of the Architect, and such cutting shall be done in a manner directed by the Architect.

C. Provide ceiling removal and replacement where work above ceilings is required. Replace ceiling components damaged in the process.

D. Provide patching where electrical devices are removed from walls, ceilings or floors as required under demolition.

3.4 PAINTING

A. Finished painting shall be performed by others except for standard factory finishes.

B. Electrical motors, pump casings, and other similar items shall be provided with three coats of machinery enamel at the factory, and shall be carefully cleaned, rubbed down, and oiled after installation.

3.5 LOCATIONS

A. Apply for detailed and specific information regarding the location of equipment as the final location may differ from that indicated on the drawings. Outlets, equipment or wiring improperly placed because of failure to obtain this information shall be relocated and re-installed without additional expense to the Owner. Determine the actual direction of door swings, so that local switches and other controls shall be installed at the lockside of doors, unless otherwise noted. Improperly located switches shall be relocated without additional expense to the Owner.

B. The design shall be subject to such revisions as may be necessary to overcome building obstructions. No changes shall be made in location of outlets or equipment without written consent of the Architect and Owner.

C. Unless otherwise mentioned or indicated, mounting heights of outlets are shown on the drawings or in the specification. Dimensions given shall be considered to be from center of outlet to finished floor.

D. Coordinate the exact location and elevation of all electrical devices and fixtures with the architectural interior elevation plan and reflective ceiling plan prior to installation.

E. Properly rough for the electrical conduit and equipment under this contract and modify as required for coordination during the construction period.

3.6 DUST, DIRT AND NOISE

A. Carry out new work and make changes, relocations, and installations with a minimum of noise. Site areas and new equipment, floors and walls, shall be adequately protected from dust and dirt caused by the work. Protection shall include suitable temporary barriers or coverings. The exterior and interior premises of each building shall be kept clean as possible during construction. Damages to surfaces or equipment as a result of negligence shall be replaced or corrected as required.

3.7 RECORD DRAWINGS

A. During the construction period, maintain in good order a complete set of blue line electrical contract drawings. Record the actual electrical installation as the work progresses. Include changes to the contract and to equipment sizes and types. Keep these drawings available at the site at all times for inspection.

B. Take proper caution against the use of superseded drawings. Check such copies and mark "void." Where drawings have been corrected by memorandum, assume the responsibility for marking all drawings so affected with the changes; such marked drawings shall remain in use until revised drawings are issued.

C. At the conclusion of the work, obtain a set of sepias from the Architect. Incorporate "as built" data in a clearly legible manner. Return such marked prints or sepias within 30 days to the Architect.

D. At the conclusion of the work, provide to the Architect a complete set of drawings which indicate precisely how the electrical single line and riser diagram equipment has been installed. Return such reproducible drawings within 30 days to the Architect.

3.8 EQUIPMENT, FOUNDATIONS, SUPPORTS, PIERS AND ATTACHMENTS

A. Provide necessary foundations, supports, pads, bases and piers required for equipment specified in this division; submit drawings in accordance with Shop Drawing Submittal requirements prior to the purchase, fabrication or construction of same.

B. Provide concrete pads for base-mounted transformers and rotating equipment, and for floor-mounted equipment located in equipment rooms and as indicated on the drawings. Pads shall be extended 6 inches beyond matching base in all directions with top edge chamfered. Inset 6 inch steel dowel rods into floors to anchor pads.

C. Construction of foundations, supports, pads, bases and piers, where mounted on the floor, shall be of the same materials and same quality of finish as the adjacent and surrounding floor material.

D. Equipment shall be securely attached to the building structure in an approved manner. Attachments shall be of a strong and durable nature and any attachments that are, in the opinion of the Architect, not strong and durable shall be replaced as directed.

3.9 SCAFFOLDING

A. Furnish and erect scaffolding and ladders required in the installation of wiring, equipment and fixtures.

3.10 ENVIRONMENTAL AIR PLENUMS

A. In spaces over hung ceiling which are used for environmental air handling purposes as defined by Article 300.22C of the National Electric Code, power data and communications cable must be in conduit or of the type cable rated for air plenum use. Cable type and/or raceway is generally indicated on the electrical drawings and specifications although the Contractor shall be responsible to clearly define ceiling space used for environmental air purposes.

END OF SECTION

WIRES AND CABLE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide wires and cables in accordance with the Contract Documents.

B. This section includes cable requirements for systems below 600 volt insulation.

C. Conductors shall be soft drawn copper having conductivity not less than 98 percent.

D. No aluminum conductors or lugs or splicing devices shall be permitted.

E. All wiring and cables shall be installed in raceway unless otherwise noted.

PART 2 – PRODUCTS

2.1 600 VOLT WIRE

A. Insulation and conductor types shall be as follows:

1. Conductors shall have a 600 volt insulation 90°C heat resistant type THHN.
2. All wire shall be stranded, unless otherwise noted.

B. Manufacturers:

1. Cablec Continental Cable Company
2. Pirelli Cable Corporation
3. Southwire Corporation
4. The Okonite Company

2.2 TYPE MC CONDUCTOR CABLE

A. Conductors connecting receptacle and switch circuits in partitions to lighting and power grid boxes in finished areas only, in accordance with the NEC, may be 3-, 4-, or 5-wire, Type MC, consisting of #12 AWG copper THHN insulated phase conductors and one full size green insulated conductor, where acceptable to the authority having jurisdiction. Ground conductor shall be terminated to grounding system as required by NEC and authority having jurisdiction. All conductors shall be stranded, unless otherwise noted, and shall be enclosed in the flexible steel armored cover.

B. Manufacturers:

1. AFC/A Nortek Company
2. Rome Cable Company

C. Permitted Uses

1. From building wiring junction box to each light fixture in lengths not to exceed 6 feet.
2. Branch circuit wiring to room electrical devices.

2.3 PLENUM CONDUCTOR CABLE

A. Plenum conductor cable may be used for NEC Class 2 or 3 wiring if conductor cable is UL listed in accordance with UL 910 and UL 1820 and is installed in accordance with the NEC and is acceptable to the Authority having jurisdiction. Insulation types, UL listing, and written acceptance by the local authority shall be submitted for review.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Provide circuit wiring complete as shown on the drawings, and as hereinafter specified or required. The minimum size of wire for branch circuits shall be No. 12, except 120 volt circuits over 100 feet in length shall be No. 10; 120 volt circuits over 150 feet in length shall be No. 8. Wiring shall be increased in size if so demanded by wattage of load.

B. 600 volt wiring shall be color coded. Consistent phase identification of wires from service feeders to branch circuit wires shall be maintained as follows:

1. 120/208 volts - Normal - Phase A ..... Black
2. 120/208 volts - Normal - Phase B ..... Red
3. 120/208 volts - Normal - Phase C ..... Blue
4. 120/208 volts - Neutral ..... White
5. 120/208 volt - Ground Wire ..... Green

C. Fire alarm wiring color coding shall be per manufacturer's recommendation or as directed by the Owner to match existing.

D. Do not pull wires into raceways until raceways are permanently in place and termination points are not subject to damage.

E. Do not use uninsulated wire conductors.

F. Provide excess free conductor end length at termination points, adequate to make up splices and terminations, permitting neatly training conductors, and in any case not less than:

1. No. 14 through 10 AWG - 6 inches
2. No. 8 or 6 AWG - 10 inches
3. Larger than No. 6 AWG - 18 inches

G. Support vertical cables as required by Code. Use lock type cable support bushings having internal wedges and retaining collars. Locate support points in readily accessible pull boxes sized to code requirements.

H. Circuit wiring in cabinets, panels, pull boxes, etc., shall be tied and held with Thomas & Betts Nylon Self-Locking Ty-Raps, or approved equal.

I. Equip large pull, junction or terminal boxes with suitable racks to support, arrange, and retain wire and cable in an orderly manner.

J. Equip conductors smaller than No. 4 AWG, in wireways, gutters, pull boxes, terminations, etc., with Thomas & Betts E-Z-code wire markers. Designate panel and circuit number on each individual marker.

K. Equip conductors No. 4 AWG or larger size, and feeder conductors with metal, fibre or fireproof linen tags or with wrap around markers. Designate panel circuit number on each individual marker. In addition, designate use of each set of conductors on a common tag or on each individual conductor marker. Tagging shall include panel source and feeder size of equipment supply.

L. Where the single pole work is used on branch circuits, circuit wiring may be grouped in accordance with the NEC. The drawings are schematic and diagrammatic and indicate the general method of installing circuit wiring and the outlets which are to be supplied.

M. Lighting and convenience outlet circuiting are indicated on the drawings separately as single pole work for clarity; however, grouping circuits in accordance with the NEC and connecting to circuit boxes at any convenience point as required by the NEC, providing a minimum of 20 percent spare future capacity in each raceway, is permitted.

N. The minimum sizes of wire on an installation shall be as follows:

Lighting and Power Circuits	12 AWG
Signal Circuits - with common or individual leads	14 AWG
Remote Control Leads	As recommended by manufacturer
Low Voltage Light Control, Intercom, Nurse Call, and Fire Alarm Systems	Twisted Pair, Non-Shielded or Shielded as shown on drawings or recommended by manufacturer
Fixtures	14 AWG Min. and as required by Underwriters Laboratories

O. Install in each empty interior conduit, one nylon measuring fish line for the future installation of wire and cable.

P. Great care shall be exercised in pulling wires into the conduits so as not to injure the insulation. Only UL approved lubricants shall be used to assist in the pulling in of wires with an outer covering or braid.

Q. Where switch boxes are used as the termination of the "home runs" in addition to the switch legs, not less than a two-gang box shall be used, in order to provide ample room for wiring.

R. Branch lighting circuits feeding exterior yard lights and parking lot lights shall be direct burial cable type UF moisture resistant with 600 volt insulation. Where drawings indicate use of conduit, the cable feeding these lights shall be pulled in rigid steel conduit and shall utilize standard type THHN wire. This conduit shall not require a concrete envelope, however, it shall have each joint sealed watertight with a suitable mastic and sealing compound. Install the cable feeding exterior in PVC conduit with a concrete envelope as described elsewhere in the specifications in "Underground Raceways."

S. The size and general location of the various feeders are shown on the drawings; however, determine the exact location and routing of feeders at the site.

T. Communications, sound and other low voltage wiring shall be of size and insulation recommended by the manufacturer of the equipment being served.

U. In every pull or splice box and all other places where wires and cables may not be readily identified by nameplate on the equipment to which they connect, each circuit shall be identified with a permanent identification tag securely fastened to the conductors. Conductors of a feeder or branch circuit shall be laced together prior to tagging. Identification tags shall have the number of conductors, gauge and circuit identification stamped thereon in 1/4 inch high letters. Tags shall be made of a non-metallic material and shall be approved before installation.

V. Where Type MC conductor cable is used, provide proper support from building structure or install in "power" section of cable tray.

W. Each 120 volt designated circuit shall have its own individual full size neutral and insulated equipment ground throughout the circuit.

END OF SECTION

GROUNDING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide all system equipment and static grounding in accordance with the Contract Documents and in full compliance with Article 250 of the National Electric Code 2017 Edition, and local codes.

B. Ground every device and metal part of the electrical system.

C. Maintain continuity of system and equipment grounds throughout the electrical installation unless specifically shown otherwise. Provide ground bushings and jumpers where normal metallic ground paths are interrupted.

D. Grounding shall be accomplished by means of a grounding triod as indicated on the drawings and generally outlined in the subsequent paragraphs. In addition, grounding shall be connected to the city water feed.

E. All electrical equipment, cabinets, boxes, conduit and metal raceways shall be grounded in accordance with the NEC, NFPA 99 and as shown on the drawings and as specified herein.

F. All connections to apparatus and conduits shall be made with an approved type of solderless connector. Connectors shall be securely bolted or clamped to the equipment. All contact surfaces shall be thoroughly cleaned and bright before connections are made in order to insure a good metal-to-metal contact.

G. All underground cable splicing shall be thermite welded.

H. Tie all grounding systems together at their origins as shown on the Drawings and as called for by the NEC.

I. Provide an insulated ground wire sized in accordance with the NEC in every conduit carrying 100 amps or over, whether or not it is shown on Drawings.

J. A solid ground shall be provided for the complete conduit system, feeder neutrals, motor frameworks, transformer cases, neutral of 480 volt and 208 volt building service, heating equipment enclosures, and other items as required.

1.2 GROUNDING TRIOD

A. Driven rod assembly shall consist of four (4) ground rods with three (3) spaced 6 feet apart forming an equilateral triangle and one (1) in the center.

B. One of the rods shall be equipped with a clamp at the top to accommodate a No. 4/0 bare stranded copper ground cable to the system ground base. A No. 4/0 bare stranded copper cable shall circle the three rods and be brazed to each rod. Cable shall tie into system neutrals and switchgear cases, and other metallic parts as required.

C. Upper portions of the ground rods shall be located near the surface. Cables connecting ground rod assemblies shall be installed 2 feet below grade. Grounding conductors shall be installed in such a manner as to allow the shortest and most direct path between equipment and ground.

1.3 CITY WATER PIPE CONNECTION

A. The supplemental grounding system shall be comprised of a common ground bus cable interconnected to an acceptable metallic cold water service pipe. The water pipe connection shall be made with a clamp type ground fitting that bonds the cable to the water pipe. Around the water meter, a bonding jumper shall be installed and connected by means of approved ground clamps.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Ground conductors shall be of size indicated or required by code and type/manufacturer as listed in Section 16120, Wires and Cables.

B. Ground rods shall be copper-clad steel, 3/4 inch diameter and 10 feet long.

C. Connectors shall be as manufactured by Burndy, O.Z. Gedney, or Erico.

D. Exothermic welding shall be Erico, Burndy, or O.Z. Gedney.

E. Accessible connections shall be made with multiple bolt silicon bronze connectors specifically designed and approved for the connection to be made.

PART 3 – EXECUTION

3.1 INSTALLATION

A. The neutral wire for the electrical system shall not be used to ground miscellaneous conduits.

B. Ground wires required by the National Electrical Code and/or the utility company.

C. The resistance between the grounding system and absolute earth shall not exceed 10 ohms and shall be measured in the presence of the Architect's representative.

D. The equipment grounding terminal bars of the normal and essential electrical system panel boards shall be bonded together with an insulated continuous copper bonding jumper not smaller than No. 4 copper.

3.2 EQUIPMENT GROUNDING

A. Cable shielding, metallic conduits, wireways, metal enclosures of busways, cable boxes, electrical equipment housings and all noncurrent carrying metallic parts shall be grounded. Run a separate ground wire to all equipment.

B. All conduit stub-ups shall be grounded and where multiple stub-ups are made within an equipment enclosure, such as a switchboard, they shall be equipped with grounding bushings and bonded together and to the enclosure and the enclosure ground bus.

C. Provide bonding devices, fittings or jumpers at expansion fitting, isolation sections or wherever continuity of ground is broken.

D. Install all grounding conductors with sufficient slack, to avoid breaking due to settlement or movement of conductors or attached points.

E. Motors shall be grounded by means of a grounding conductor in the same raceway with the motor feeder connected to a grounding bushing at the motor terminal box and the ground bus in the motor control center or to the incoming conduit grounding bushing of an individually mounted motor starter.

F. Where flexible conduit is used for all or part of a conduit run, except lighting branch circuits, a grounding conductor shall be provided in the conduit and connected to grounding bushings at each end of the run.

G. Under no circumstances shall a neutral conductor or neutral bar in an enclosure be grounding.

3.3 FEEDER GROUNDING

A. Run a separate insulated ground for feeders.

B. Size grounds in accordance with the NEC or as noted on the drawings.

END OF SECTION

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide products to suspend, attach, support and otherwise retain in location, electrical work.

1. The specified requirements herein include support and hardware information of a general nature. Where additional requirements are stated elsewhere in the specification related to specific products and conditions, such additional requirements shall supersede these general specifications.

B. Approvals: Obtain approval before cutting, drilling, or welding to, structural members. Where cutting, drilling, or welding is permitted, this work, as required for product support, is a part of product installation electrical work.

C. Welding: Use certified welders for welded installation. Steel in weld area shall be cleaned before and after welding operations, and refinished after welding.

1. Do not weld raceway pipe straps to structure.

D. Use electrically driven MG set for welding. No solid state welders shall be permitted.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Use expansion shield anchors or toggle bolts of the following manufacturers.
1. Phillips Drill Company, Inc. "Red Head Self Drilling"
2. Rawl Products Company "Saber Tooth"
3. McCulloch Industries "Kwik Bolt"

PART 3 – EXECUTION

3.1 INSTALLATION

A. Provide common support trapezes for parallel raceways.

B. Use manufactured preformed U-Channel system having accessory connecting and clamping devices available where parallel raceways are to be supported. Load channel system not to exceed manufacturer's recommendation.

C. Fabricate supports for transformers, panel boards, cable tray, lighting fixtures, cabinets, pull and junction loads, and similar electrical products from preformed U-Channel systems. Load channel system not to exceed manufacturer's recommendations.

D. Use preformed U-Channel concrete inserts preset into forms to secure hangers suspended from slabs.

E. Use concrete expansion shield anchors or preformed U-Channel cast-in-place concrete inserts for attaching electrical products to concrete walls.

F. Support loads from stud anchors or concrete inserts at not to exceed manufacturer's live loading recommendations.

G. Do not use powder-charge driven fasteners.

H. Do not drill holes or install driven fasteners in concrete at less than 12 inches from prestressed steel.

I. Do not use nylon or similar concrete inserts without prior approval, except for supporting 1 inch or smaller individual runs of conduit or tubing.

J. Use toggle bolts to attach supports for electrical products to hollow masonry walls. Do not attach products weighing more than 50 pounds to hollow masonry walls, without prior approval.

K. Use toggle bolts in hollow tile.

END OF SECTION

PANEL BOARDS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide electric service with capacity as shown on the drawings.

B. Power Company Coordination: coordinate service arrangements and pay associated fees necessary to provide a complete operating system. Provide meter socket and/or CT cabinet of size and type dictated by the power company.

C. Interrupting Capacities: Panel boards to have interrupting capacity capable of handling fault current which is available at the point in the circuit where the panel is installed.

D. Interrupting ratings are listed in the Schedule of Panels on the drawings or in Appendix A of these specifications. These capacities are based on feeder sizes and panel locations shown on drawings. If major changes are made, these ratings must be adjusted.

PART 2 – PRODUCTS

2.1 120/208 PANEL BOARDS

A. 120/208 volt panel boards shall be of the dead front type and have branch circuit protectors in the quantity and of ratings indicated on the drawings and panel schedules. Panel boards shall be designed for use on a 3 phase, 4 wire, 120/208 volt system. Panel boards shall be provided with ground bar bonded to the steel cabinet, separate neutral bar, and main lugs or breaker as noted.

B. 120/208 panel boards, unless otherwise noted, shall be Square D Type NQOD 120/208 volts, 3 phase, 4 wire, s/n with main breaker or main lugs only as noted with single pole, individual trip and 2 and/or 3 pole common trip bolt-on type branch circuit breakers and as per drawings and panel schedules. Certain panels may be double with feed through lugs as indicated.

C. Bus bars and current carrying parts of panel boards exclusive of circuit breaker, shall be hard drawn copper sized in accordance with the requirements of the Underwriters' Laboratories, Inc.

D. The branch circuit portions of each panel board shall comprise the required and indicated number of interchangeable bolt-on non-combustible thermal-magnetic circuit breaker sections; single or multiple pole, rated not less than 20 amperes, 125 volts and higher as noted. Breakers as required to provide I.C. sym. amp as shown on the panel schedule(s).

E. Circuit breakers shall be readily removable from the front of panel board without disturbing adjacent units. They shall have quick-make and quick-break toggle mechanisms, non-fusible contacts, with inverse time, short circuit characteristics. Breakers shall trip free on overload. They shall indicate clearly whether they are

in the open, tripped or closed position. Multipolar units shall have thermal element in each pole and shall have a single handle. Closely grouped circuit breakers and thermal tripping devices mounted in a common cabinet shall be de-rated when necessary in accordance with NEMA standard recommended practices for high ambient temperatures.

F. Panel boards with breakers larger than 100 amp., shall be Square D Type I-Line panel with breakers of the rating and frame size as noted on plan.

G. Circuit breakers protecting circuits supplying receptacles, signaling devices, clocks, special equipment and other similar circuits not requiring switch control shall be equipped with an approved locking device.

2.2 PANEL BOARD CABINETS

A. Panel boards shall be mounted in a sheet steel enclosing cabinet designed for surface or flush mounting as indicated on the drawings. Cabinets shall be fabricated of code gauge, galvanized sheet steel. The rear of the cabinets shall be provided with a suitable means of supporting the panel board in such a manner that adjustments may be made in all directions.

B. Cabinets shall have suitable lugs for mounting and be provided with hinged steel trims and doors. Doors and trim shall be hung with heavy flush butt hinges. Doors and trims shall be of integral door-in-door construction or piano hinge trim and so designed that doors shall close without a rabbet. Doors 48 inches high or less shall be equipped with spring locks and catches. Doors larger than 48 inches in height shall be provided with a vault type handle having 3-point shoot bolts. Doors shall be finished with factory coat of baked enamel.

C. In general, cabinets shall be installed so that the operating handle of the top branch circuit protector shall not exceed 78 inches above finished floor and the bottom of the cabinet be not less than 12 inches above finished floor.

D. Fronts of cabinets shall have adjustable indicating type clamps and angle iron rests near the bottom to aid in installation and removal.

E. Cabinets shall be provided with proper number and size openings for conduits installed. No openings shall be permitted which are not to be activated.

F. In instances where it is necessary to group install cabinets, a common trim shall be employed.

G. Circuit directory holders shall be attached to the inside of each cabinet door and have transparent cover under which shall be placed a neatly typed schedule outlining circuit control. Schedule shall use Owner-designated room numbers, not drawing room numbers.

H. Extend two (2) spare empty 1 inch conduits from each recessed panel in finished areas to space above ceiling for future use.

2.3 LOCKS AND KEYS

A. Locks for lighting, power, and miscellaneous panel boards, telephone cabinets and other electrical systems having locked apparatus shall be similarly keyed to institutional keying system. Panel door to have keyed metal latch and lock. Plastic locks are not acceptable.

2.4 SHUNT TRIP BREAKERS

A. Panels in certain areas where shown on plan shall be equipped with main breakers with shunt trip devices with 120 volt coils. Connect emergency stop buttons in parallel to the shunt trip devices so that pushing any of the stop buttons in a given area shall de-energize the power feeding the panel mains. Power restoration shall be made at the panel by resetting the main breaker. Extend an independent local source of 120 volt power to each shunt trip coil. Switch shall be an integral part of the panel and shall be ASCO #920 mechanically held switch or approved equal. Size as indicated on panel schedule(s).

B. The emergency stop buttons shall be momentary contact, NEMA I, heavy duty, red, mushroom head, 1 N.O. pushbutton. Provide pilot light in pushbutton box to indicate when panel is energized.

2.5 CIRCUITING

A. Each and every outlet, device, box and system requiring power shall be circuited to the respective panels as shown on plan. Refer to plan and schedules for sizes of wire, conduit and breakers. In instances where a specific circuit has not been assigned to a box requiring same, a circuit shall be provided for the load served as directed by the Architect at no additional cost to the Owner.

2.6 MAIN SWITCHBOARD

A. Provide where indicated, a dead front type, completely metal enclosed, self-supporting structure independent of wall supports. It shall consist of the required number of vertical sections bolted together to form one rigid switchboard 90-3/8 inches high incorporating switching and protective devices of the number, ratings and type noted herein or shown on the drawings with necessary interconnections. Switchboard construction shall be of the universal frame type using die-formed members bolted and braced through the exclusive use of self-tapping bolts which shall not loosen during shipment. Ventilation openings shall be provided where required. Covers shall be secured by self-tapping screws. Properly anchor to floor.

B. The bus shall be tin plated copper of sufficient size to limit the temperature rise to 55°C based on UL tests, and adequately braced and supported to withstand mechanical forces exerted during short circuit conditions when directly connected to a power source having the indicated available short circuit current. Connections shall be tightly bolted.

C. A ground bus and lug shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard.

D. Switchboard shall be provided with adequate lifting means and shall be capable of being rolled or moved into installation position and bolted directly to the floor without the use of floor sills.

E. A-B-C type bus arrangement, left-to-right, top-to-bottom, and front-to-rear, as viewed from the front, shall be used throughout.

F. Record drawings shall be furnished providing the following information: switchboard voltage/current rating; overall outline dimensions including available conduit space; switching and protective device ampere ratings; and one line diagram.

G. Adequate conduit space shall be provided to meet NEC requirements.

H. Each switching and protective device shall be provided with visible means of ON-OFF identification. Terminals shall be of the anti-turn solderless type suitable for copper cable of sizes indicated.

I. Exterior and interior steel surfaces of the switchboard shall be properly cleaned and finished with two-toned gray baked enamel over a rust-inhibiting phosphatized coating. Two-toned gray shall be ANSI 61 and ANSI 49.

J. Switchboard shall be of construction Square D Type QED, 3 phase, 4 wire, voltage as specified on drawings, in which:

1. Sections of the switchboard shall be 30 inches deep except service sections containing large ampacity main circuit breakers.

2. Construction shall allow maintenance of incoming line terminations, main device connections and main bus bolted connections to be performed without rear access.

3. The feeder or branch devices shall be removable from the front and shall be panel mounted with the necessary device line and load connections front accessible.

4. The main horizontal bus bars shall be mounted on glass polyester insulators with all three phases arranged in the same vertical plane. The main bus shall have a maximum ampacity and shall be braced for short circuits as indicated on the drawings. Main bus splices shall be supplied between adjacent distribution sections.

5. Vertical sections shall be completely factory assembled, wired and tested before delivery and shall bear UL labels where qualified. Design shall meet NEC and NEMA standards as well as OSHA requirements. Individual vertical sections shall be designed for bolting together at installation site.

6. All interconnecting wires for connecting of vertical sections shall be field installed.

K. Provide switchboard with solid state, digital metering with KW, KWH, voltage, amperage, power factor, and THD capability.

L. Provide switchboard with integral service entrance (Category C) transient voltage surge suppressor (TVSS). See Section 16650.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install new service feeders, panel boards and switch boards as required to provide a complete operating system.

B. Unless otherwise stated, install equipment in accordance with manufacturer's recommendations.

C. Completely vacuum and clean all panels before energizing and before covers are permanently installed.

END OF SECTION

WIRING DEVICES

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section covers power-related devices such as receptacles, switches, and plug strips.

B. Devices listed in this section may or may not be used on this project. Specifications for devices not included in the Contract Documents are included in case they are needed during construction phase.

1.2 LOCATION OF DEVICES

A. The approximate schematic location of devices is given on the drawings. The exact location shall be determined at the building as the work progresses. Refer to Architectural plans for any special details, elevations, and reflective ceiling plan. Verify door swings at job site. In no case shall switches be located behind door swings. Any switch so located shall be changed. Field verify equipment locations and adjust device and outlet locations to avoid inaccessibility. Relocate inaccessible outlets.

B. Unless otherwise indicated, or otherwise decided at the site, outlet boxes in walls shall be located with centerline at elevation above the finished floor as shown on table.

Fire Alarm Strobe Light	6 feet 8 inches
Fire Alarm Pull Stations	3 feet 6 inches (to activation handle)
	3 feet 8 inches (to top of device)
Fire Alarm Horn	8 feet or 6 inches below ceiling in low-ceiling (wall mounted) areas
Wall Switch Outlets	4 feet
Convenience Outlets	1 foot 6 inches
Counter Outlets	8 inches above countertop

C. The Architect and the Owner reserve the right to change the location of any outlet, before it has been installed.

1.3 DESCRIPTION

A. Wiring Device Requirements

1. Use the products of a single manufacturer for each type of wiring device.

2. Use the products of a single manufacturer of all device plates. Obtain prior approval for any variations from this requirement, except that plate variations are allowed for the following devices:
   a. Where the selected plate manufacturer does not manufacture a suitable finish plate.
   b. For clock receptacles.

c. For heavy-duty receptacles rated at more than 30 amperes.
d. Where the raceway system enclosure employs a non-standard finish plate.
e. Where non-standard plates are specified or indicated.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Representative general purpose wiring devices and device plates as listed herein are intended to indicate type, function, and quality of the products. Provide the products specified.

2.2 SWITCHES

A. General

1. Switches mounted vertically shall have the "ON" position at the top and horizontal-mounted switches shall have the "ON" position at the left.

2. Tumbler switches shall be the AC heavy-duty, specification grade, 120/277 volts, flush toggle type switch rated at 20 amperes, Underwriters' approved and meeting NEMA Standard WD-1 1965 and Federal Specifications W-S-896d (Type III). The operating mechanism shall be totally enclosed in a high-heat, non-inflammable, non-hygroscopic molded compound case with terminal screws located on the side of the switch. Operating handles shall be made of high heat phenolic compound. Switches shall have wide plaster ears.

B. Manufacturers

1. Single pole toggle switch, 20 ampere, 120/277 volt, specification grade, Hubbell Catalog No. 1221-I, Pass & Seymour Catalog No. 20AC1-W, or Bryant Catalog No. 4621-I.

2. Three-way toggle switch, 20 ampere, 120/277 volt, specification grade, Hubbell Catalog No. 1223-I, Pass & Seymour Catalog No. 20AC3-W, or equal of Bryant.

3. Four-way toggle switch, 20 ampere, 120/277 volt, specification grade, Hubbell Catalog No. 1224-I, Pass & Seymour Catalog No. 20AC4-W, or equal of Bryant.

4. Double pole toggle switch, 20 ampere, 120/277 volt, specification grade, Hubbell Catalog No. 1222-I, Pass & Seymour Catalog No. 20AC2-W, or equal of Bryant.

5. Single pole key lock switch, 20 ampere, 120/277 volt, specification grade, Hubbell Catalog No. 1221-L, Pass & Seymour Catalog No. 20AC1-L, or equal of Bryant.

C. Miscellaneous Switch Appurtenances

1. Weatherproof cover - Hubbell 1795

2. Locking cover - Hubbell 96061

2.3 CONVENIENCE RECEPTACLES

A. Receptacles shall be specification grade receptacles in all locations.

B. Receptacles for convenience outlets shall be duplex self-aligning grounding type rated for 20 amperes at 125 volts. Contacts shall be made of heavy spring copper or bronze so designed as to securely grip both sides of each receptacle blade and shall be enclosed in high heat, non-inflammable, non-hygroscopic molded compound case, provided with wide plaster ears. Each terminal shall be provided with two (2) binding screws located on the side of the receptacle.

C. Manufacturer(s)

1. Duplex receptacle, 20 ampere, 125 volts, 2 pole, 3 wire grounding type, NEMA 5-20R; Hubbell Catalog No. 5362-I, Pass & Seymour Catalog No. 5362-AW, or Bryant Catalog No. 5362-I.

2. Emergency duplex receptacle, 20 ampere, 125 volt, 2 pole, 3 wire grounding type, NEMA 5-20R, and connected to the normal/emergency system; Hubbell Catalog No. 5362-R, Pass & Seymour Catalog No. 5362-ARED with smooth finish red cover plate. The cover plate shall have the word "emergency" engraved at the top with white filled lettering.

3. Ground fault interrupter type duplex receptacle, 20 ampere, 125 volt, 2 pole, 3 wire grounding type, NEMA 5-20R; Hubbell Catalog No. GF-5362-I, Pass & Seymour Catalog No. 2091 W.

4. Single receptacle, 20 ampere, 125 volt, 2 pole, 3 wire grounding type, NEMA 5-20R ("EWC" denotes electric water cooler--coordinate mounting height with the equipment supplier.); Hubbell Catalog No. 5361-I, Pass & Seymour Catalog No. 5361-I.

D. Appurtenances

1. Weatherproof covers - use Hubbell WP26 or WPSF26, Pass & Seymour Catalog No. WPH8 or Bryant Catalog No. 4510D for GFI-WP locations; or Hubbell 5205WO or 5206WO, Pass & Seymour Catalog No. WPH26 for non-GFI-WP locations.

2.4 COVER PLATES

A. Unless otherwise specified, switch, receptacles, special purpose outlets, telephone, and other outlet plates shall be Bureau of Standards No. 302-18.8 brushed or satin stainless steel with beveled edges so as to lie flat against the wall. Where more than one (1) switch occurs at one point, gang plates shall be used.

B. Zinc-coated plates may be used in unfinished spaces.

C. Plates shall be set true and plumb and shall fit tight against finished wall surfaces and outlet boxes.

D. Manufacturers: Hubbell 97000 Series, Pass & Seymour SL1 Series, or Bryan 5600 Series.

E. Narrow jamb switch to have Leviton 1794 plate.

2.5 WALL SWITCH SENSORS

A. General

1. Wall switch sensors shall be installed as shown on the drawings to control light fixtures in toilet rooms, corridors, mechanical rooms, electrical rooms, etc., that are less than 1200 square feet in size.

B. Manufacturers

1. Wall switch sensors shall have a field adjustable time delay from one (1) to twenty (20) minutes, cover a maximum of 1200 square feet, have a 180 degree field of view, have a three (3) position override switch (off-auto-on) and have a LED system test.

2. Wall switch sensors, 20 ampere, 120/277 volt 1500 watt, shall be Bryant Catalog No. MSFL1200I.

2.6 CEILING MOUNT SENSORS AND LOW VOLTAGE CONTROL PACKS

A. General

1. Ceiling mount sensors and low voltage control packs shall be installed as shown on the drawings to control light fixtures in corridors, mechanical rooms, electrical rooms, stairways, etc., that are larger than 1200 square feet in size.

B. Manufacturers

1. Ceiling mount sensors shall cover 600 square feet of area and shall be Bryant Catalog No. MSCM-600.

2. Low voltage control panels shall be rated at 20 ampere, 120/277 volt and shall be Bryant Catalog No. CP120-277.

2.7 OCCUPANCY SENSORS

A. Provide occupancy sensor devices in accordance with Contract Documents.

B. Wall Mounted Switch / Occupancy Sensor

1. Switch shall fit in standard wallbox and be gangable with other units. Unit shall have manual on/off pushbutton light switching which shall operate at any time.

2. Passive infrared occupancy sensor devices shall have a 180° field of view with a maximum coverage of 2100 square feet. The maximum sensing distance in front of the sensor is 40 feet and at each side is 30 feet.

3. Sensors shall have self-adjusting delayed-off time interval for real-time occupancy patterns.

C. Ceiling Mounted Occupancy Sensor

1. Sensor shall be all-digital with passive infrared technology designed for ceiling mounting.

2. Sensor shall have 360° pattern sensing with coverage area of 530 square feet.

3. Sensor shall have self-adjusting delayed-off time interval for real-time occupancy patterns. Manual time adjustment shall be 20 seconds -15 minutes with ambient override ON.

4. Input voltage shall be 120 volts AC and shall have a load rating of 1000 watts.

D. Manufacturers:

1. Wall Mounted: Leviton #ODS15-ID or equivalent.

2. Ceiling mounted: Leviton #ODC0S-I1W or equivalent

2.8 GFI PROTECTED RECEPTACLES

A. Receptacles shall be GFI protected via GFI receptacle or GFI breaker in the following locations
1. Where shown on the drawings.

2. In toilet and bathrooms.

3. Exterior receptacles within 15 feet of ground level or on roof.

B. Receptacles installed above any counter within 6 feet of sink.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Devices shall be flush mounted unless otherwise noted. Properly align and plumb devices and plates. Plates shall fit flat against wall and tight against device surface without strain on plate.

B. Code sized (#12 minimum) bonding jumper shall connect grounded outlet box to receptacle grounding terminal on flush-mounted units.

C. Where receptacles are indicated as split-wired and half of the receptacle is on a wall switch, the top receptacle shall be switched and bottom shall be on normal power.

D. Circuits to wiring devices feeding data processing equipment shall have a dedicated neutral for each 120 volt circuit. No common neutrals for data processing equipment shall be permitted.

E. Mount occupancy sensors according to manufacturer's recommendations.

F. Switches mounted vertically shall have the "ON" position at the top and all horizontal-mounted switches shall have the "ON" position at the left.

G. Where receptacles are mounted in the vertical position, the ground terminal shall be on the top, and where receptacles are mounted in the horizontal position, the ground terminal shall be on the left.

END OF SECTION

FUSES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide fuses in accordance with the contract documents in motor starters, switchgear assemblies, panel boards and disconnect switches.

B. Fuses in equipment shall be furnished by the respective contractor supplying the device and installed under this Division.

C. Provide a complete set of three (3) spare fuses for each fuse size and type used.

D. All fuses provided shall be of the indicating type, employing either an indicating window or a mechanical indicator striker pin.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Fuses shall be of the high interrupting rating, current limiting type and manufactured by the Bussman Company, Chase Shawmut, or Littelfuse.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Ensure that fuses are firmly and completely inserted into fuse holders and that mechanical joints are tightened.

END OF SECTION

MOTOR AND CIRCUIT DISCONNECTS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide motor and circuit disconnect switches in accordance with the Contract Documents.

B. Switches shall be of proper horsepower rating as applicable for the load served and have dual interlocks designed to interlock the switch box door with the switch operating mechanism. Unit shall be provided for locking the operating handle in the "ON" or "OFF" position.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Disconnect switches shall comply with the following requirements, unless otherwise indicated or specified:

1. Enclosure: NEMA 1, surface type in dry locations. Use NEMA-3R for exterior locations and wet locations where walls are washed.
2. Ratings: Voltage, ampacity, horsepower and inductive ratings complying with power source voltage and characteristics of load controlled.
3. Mechanism: Heavy duty, quick-make, quick-break, with voidable interlock to prevent opening enclosure in "ON" position. External lockable handle operation with provision for not less than two padlocks.
4. Poles and Fusing: Comply with load requirements. Provide unfused switches except where fusing is indicated or required to comply with Code requirements. Where fuses are installed, use dual-element fuses.
5. Poles and Overcurrent Protection: Comply with load requirements. Provide unfused switches except where overcurrent protection is indicated or required to comply with Code requirements. When required, install breaker type disconnects. Breaker shall be designed and rated for motor load protection specifically.
6. NEMA Standard: Comply with KSI-1969, Part Four.
7. Switches in hazardous areas shall be in enclosure bearing UL label for installation in class and division of hazard.
8. Finishes: Light gray ANSI-61.

B. Provide power disconnect switches of the following manufacturers with characteristics complying with load and power source indicated:

1. Square D: Type HU.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Provide the number of poles necessary to include a pole for each ungrounded conductor. Equip switch with neutral terminal point where neutral is present. Do not switch neutral.

B. In finished areas, disconnect switches shall be flush mounted. Use circuit breaker type if switch type is not available for flush mounting.

C. In areas remote from the distribution panel board necessary to meet code provide non-fused disconnect switches for motors and equipment not already shown to be furnished by others.

END OF SECTION

LIGHTING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide a complete complement of luminaires and required appurtenances including lamps, mounting hardware, and accessory wiring.

B. Fixture manufacturer and numbers as specified on the Fixture Schedule, have been taken from the catalogs of fixture manufacturers. Fixture numbers and descriptions are intended to denote a standard of quality and type. Fixtures of other manufacturers that meet or exceed the photometric data of specified fixtures may be used provided a complete comparable schedule is submitted to and approved by the Architect in accordance with the Instructions to Bidders and Supplementary Conditions. Fixture types shown on the Schedule are keyed to the fixture type letters shown on the drawings adjacent to the light fixture.

C. Fixture manufacturers and catalog numbers on the fixture schedule have been selected with respect to their photometric output, design construction, and applicability. Approved equal manufacturers' fixtures must meet or exceed the above referenced standards as determined by the Architect/Engineer. Any deviation from these or other pertinent standards shall result in rejection of the lighting fixture package.

PART 2 – PRODUCTS

2.1 LIGHTING FIXTURES

A. All fixtures are to be new LED type with high efficiency drivers as schedule on plans.

B. All fixtures located within any single room shall be provided with the same lamp color. Mixed lamp colors will not be acceptable.

C. Acrylic diffusers shall be 100% virgin acrylic .125 inch thick minimum. Furnish certificate from the lighting fixture manufacturer certifying same.

D. Fixtures shall be furnished complete with suitable pendants, canopies, cover, ceiling roundels, opening flanges, hangers, plaster rings or frames if recessed, and necessary rubber cords, chains.

E. Integral outlet boxes factory mounted on recessed fixtures are preferred, but not specifically required.

F. Finish: metal parts of fixtures shall be painted. Interior reflective surfaces shall be of baked on white enamel unless fixture specified is normally furnished with another finish type.

PART 3 – EXECUTION

3.1 GENERAL

A. Every lighting outlet shall have a lighting fixture unless otherwise directed. In instances where a specific type of fixture has not been assigned to an outlet, provide a complete fixture of the type and wattage designated for outlets of similar function and/or type as directed by the Architect at no additional cost to the Owner.

B. At completion of work, lighting equipment shall be dusted and washed and left in condition ready to use.

3.2 FIXTURES

A. Verify with the room finish schedule as to the type of surface construction. Order the proper fixture with hardware for installation in or on the specified surface. Recessed fixtures in plaster ceilings shall include a plaster frame and a matte white trim finish.

B. Properly size the openings for recessed fixtures and provide all-wood or metal frames properly set in place and anchored.

C. Fixtures shall be installed at mounting heights as shown on the drawings or indicated in the specifications. Coordinate mounting heights of wall-mounted fixtures with the Architect.

D. Unless otherwise directed, pendant fixtures within the same room or area shall be installed plumb and at a uniform height from the finished floor. Adjustment of height shall be made during installation. Make arrangements to meet mounting heights.

E. Fixtures mounted on outlet boxes shall be rigidly secured to a fixture stud in the outlet box. Hickies or extension pieces shall be installed where required to facilitate proper installation. Surface mounted incandescent fixtures shall have the base slotted where required to receive the "T" bar tile and fit snug against ceiling.

F. Flush mounted recessed fixtures shall be installed so as to completely eliminate light leakage between the frame and the finished surface. Fixture housing, frame or canopy shall provide a suitable cover for the fixture outlet box. Where sloping ceilings occur, recessed fixtures shall be of a type designed for the application and shall be mounted to provide proper lighting.

G. Fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the fixture. Design of hangers and method of fastening other than shown on the drawing or specified shall be submitted to the Architect for approval.

H. Suspended ceiling construction alone shall not satisfactorily support luminare, provide and install appropriate and adequate auxiliary steel supports. Supporting methods shall be as directed by the Architect/Engineer. Auxiliary supports shall be rigidly attached to substantial building construction. Additional wires shall be provided so that supports shall not deflect more than 1/360 of the span with twice the fixture weight. Provide "scissor clips" on the "T" bar construction for installation of surface mounted fluorescent fixtures.

I. Furnish necessary additional auxiliary supporting steel for fixtures not mounted on building framework, and where necessary to span the ceiling channels of hung ceiling construction.

J. In areas where other means are inadequate, fixtures shall be installed on "Kindorf" System as manufactured by Steel City Company, or equivalent of B-Line. This system shall be suspended from the structural steel members and shall have vibration resistant assembly connections. Rods used for suspension shall be galvanized and surface raceway suspension shall have corrosion resistant paint.

K. In mounting troffers mount fixtures with lamps oriented in the same direction.

L. Primary supports for all light fixtures shall be from building structure (separate from ceiling system).

M. Use Type MC cable in length not to exceed 6 feet from building wiring junction box to each light fixture.

N. Direct wiring between light fixtures shall not be permitted.

END OF SECTION

FIRE ALARM SYSTEM

PART 1 – GENERAL

1.1 GENERAL

A. This specification document provides the requirements for the installation and extension of the existing fire alarm system installed within the building. The work shall include, but not be limited to, manual pull stations, smoke detectors, heat detectors, audio/visual and visual only notification devices.

B. All new components shall be equivalent to Silent Knight and shall in every respect be compatible with the existing fire alarm system installed with the building. Any new device installed but in any way incompatible with the existing system shall be removed and replaced with a suitable device in order to provide a complete and proper operating fire alarm system.

C. All fire alarm system equipment shall be listed for its intended purpose and be compatibility listed to assure the integrity of the complete system.

1.2 STANDARDS

A. The fire alarm equipment and installation shall comply with the current provisions of the following standards and shall be listed for it's intended purpose and be compatibility listed to insure integrity of the complete system.

B. National Electric Code, Article 760

C. National Fire Protection Association Standards:
NFPA 70 National Electrical Code
NFPA 72 National Fire Alarm Code
NFPA 101 Life Safety Code

D. Local and State Building Codes

International Building Code, International Mechanical Code, and International Fire Code.

E. All equipment shall conform with the requirements of the State and the local fire marshall.

F. All equipment shall be approved by Underwriters Laboratories, Inc. for it's intended purpose, listed as power limited by Underwriters Laboratories, Inc., for the following standards as applicable:

UL 864 UOJZ Control units for Fire Protective Signaling Systems
Local Signaling Unit
Central Station Signaling Protected Premises Unit
Remote Signaling Protected Premises Unit.
Water Deluge Releasing Unit
UL 268 Smoke Detectors for Fire Protective Signaling systems

UL 268A Smoke Detectors for duct applications
UL 217 Smoke Detectors for Single Stations
UL 521 Heat Detectors for Fire Protective Signaling systems
UL 228 Door Holders for Fire Protective Signaling systems
UL 464 Audible Signaling appliances
UL 1638 Visual Signaling appliances
UL 38 Manually Activated Signaling Boxes
UL 346 Waterflow indicators for Fire Protective Signaling systems
UL 1481 Power Supplies for Fire Protective Signaling systems

G. All visual Notification appliances and manual pull stations shall comply with the requirements of the Americans with Disabilities Act.

1.3 GENERAL REQUIREMENTS

A. The following supervision shall be provided by a factory trained service technician from the distributor of the fire alarm equipment. The technician shall be trained and shall have a minimum of two (2) years of service experience in the fire alarm industry. The technicians name shall appear on equipment submittals and a copy of his manufactures trained shall be sent to the project engineer. The technician shall be responsible for the following items:

1. A pre installation visit to the job site to review equipment submittals and to verify the method by which the system is to be wired.
2. During the installation the certified technician shall be on site or make periodic visits to verify installation and wiring of the system. He shall also supervise the completion of conduit rough, wires pulled into conduit and wiring rough, and ready for trim.
3. Upon completion of wiring, final checkout and certification of the system shall be made under the supervision of this technician.
4. At the time of the formal checkout, technician shall give operational instructions to the owner and or his representative on the system.

1.4 SUBMITTALS

A. The contractor shall submit three (3) complete sets of documentation within thirty (30) calendar days after award of the purchase order. Indicated in the document will be the type, size, rating, style, catalog number, manufacturers names, photos, and /or catalog data sheets for all items proposed to meet these specifications. The proposed equipment shall be subject to the approval of the Architect/Engineer and no equipment shall be ordered or installed on the premises without that approval.

B. Submittal of shop drawings shall contain at least six (6) copies of original manufacturer specification and installation instruction sheets. Subsequent information may be copies. All equipment and devices on the shop drawings to be furnished under this contract shall be clearly marked in the specification sheets.

C. Suppliers qualifications shall be submitted indicating years in business, service policies, warranty definitions, NICET certification, and completion of factory training program and a list of similar installations.

D. Contractor qualifications shall be supplied indicating years in business and prior experience with installations that include the type of equipment that is to be supplied.

E. The contractor shall provide hourly Service Rates, performed by a factory trained technician for this installed Life Safety System with the submittal. Proof of training and authorization shall be included with the submittal. These hourly service rates shall be guaranteed for a 1-year period.

F. Deliver two (2) copies of the following to the owner's representative within Thirty (30) days of system acceptance. The closeout submittals shall include:

1. Installation and Programming manuals for the installed Life Safety System.
2. Point to point diagrams of the entire Life Safety System as installed. This shall include all connected Smoke Detectors and addressable field modules.
3. All drawings must reflect device address as verified in the presence of the engineer and/or end user.

1.5 WARRANTY

A. Warranty all materials, installation and workmanship for a one (1) year period, unless otherwise specified. A copy of the manufacturer warranty shall be provided with the close out documentation.

1.6 PRODUCT

A. This Life Safety System Specification must be conformed to in its entirety to ensure that the installed and programmed Life Safety System will accommodate all of the requirements and operations required by the building owner. Any specified item or operational feature not specifically addressed prior to the bid date will be required to be met without exception.

B. Submission of product purported to be equal to those specified herein will be considered as possible substitutes only when all of the following requirements have been met:

1. Any deviation from the equipment, operations, methods, design or other criteria specified herein must be submitted in detail to the specifying Architect or Engineer a minimum of ten (10) working days prior to the scheduled submission of bids. Each deviation from the operation detailed in these specifications must be documented in detail, including page number and section number, which lists the system function for which the substitution is being proposed.
2. A complete list of such substituted products with three (3) copies of working drawings thereof shall be submitted to the approved Architect

and/or Consulting Engineer not less than ten (10) working days prior to the scheduled submission of bids.

3. The contractor or substitute bidder shall functionally demonstrate that the proposed substitute products are in fact equal in quality and performance to those specified herein.

1.7 GENERAL EQUIPMENT AND MATERIALS REQUIREMENTS

A. All equipment furnished for this project shall be new and unused. All components shall be designed for uninterrupted duty. All equipment, materials, accessories, devices and other facilities covered by this specification or noted on the contract drawings and installation specification shall be best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided under this specification is provided by different manufacturers, then that equipment shall be “Listed” as to its compatibility by Underwriters Laboratories (UL), if such compatibility is required by UL standards.

1.8 SATISFYING THE ENTIRE INTENT OF THESE SPECIFICATIONS

A. It is the contractor’s responsibility to meet the entire intent of these specifications.

B. Deviations from the specified items shall be at the risk of the contractor until the date of final acceptance by the architect, engineer, and owner’s representative.

C. All costs for removal, relocation, or replacement of a substituted item shall be at the risk of the electrical contractor.

PART 2 – PRODUCTS

2.1 SYSTEM WIRING

A. The Signaling Line Circuit (SLC) and Data Communication Bus (S-BUS) shall be wired with standard NEC 760 compliant wiring, no twisted, shielded or mid capacitance wiring is required for standard installations. All FACP screw terminals shall be capable of accepting 14-18 AWG wire. All system wiring shall be in accordance with the requirements of NFPA 70, the National Electrical Code (NEC) and also comply with article 760 of the NEC.

2.2 SIGNALING LINE CIRCUITS

A. Each SLC shall be capable of a wiring distance of 10,000 feet from the SLC driver module (5815XL) and be capable of supporting 127 devices. The communication protocol to SLC devices must be digital. Any SLC loop device, which goes into alarm, must interrupt the polling cycle for priority response from the FACP. The FACP must respond consistently to a device that goes into alarm on an SLC in under 3 seconds. The auxiliary 5815XL SLC loop module must be capable of being located up to 6000 feet from the FACP on an RS-485 bus, which is separate from the SLC bus. The SLC shall be capable of functioning in a class A or class B configuration.

2.3 SLC LOOP DEVICES

A. Devices supported must include analog photoelectric, ionization smoke detectors, analog heat detectors, addressable input modules, relay output modules or addressable notification modules. There is to be no limit to the number of any particular device type up to the maximum of 127, that can be connected to the SLC.

2.4 ANALOG DETECTOR FUNCTIONS

A. The products of combustion detectors must communicate analog values using a digital protocol to the control panel for the following functions:

1. Automatic compliance with NFPA 72 standards for detector sensitivity testing
2. Drift compensation to assure detector is operating correctly
3. Maintenance alert when a detector nears the trouble condition
4. Trouble alert when a detector is out of tolerance
5. Alert control panel of analog values that indicate fire.

2.5 ADDRESSABLE NOTIFICATION MODULE

A. The contractor shall furnish and install where indicated on the plans, addressable notification modules, Silent Knight model #SD500-ANM. The modules shall be U.L. listed compatible with Silent Knight's IFP-1000 fire alarm control panel. The notification module must provide one class A (Style Z) or class B (Style Y) notification output with one auxiliary power input. The notification module must be suitable for mounting in a standard 4 square electrical box and must include a plastic cover plate. The notification module must provide an LED that is visible from the outside of the cover plate. The notification module must be fully programmable for such applications as required by the installation. The ANM shall reside on the SLC loop and can be placed up to 10,000ft. from the control or 5815 SLC loop module.

2.6 DISTRIBUTED POWER MODULE

A. The contractor shall supply a power module #RPS-1000 compatible with the IFP1000 fire alarm control panel. The power module must have 5 amps of output power, six flexput circuits rated at 3amps each, and two form C relay circuits rated at 2.5 amps at 24 volts DC. The fire system shall be capable of supporting up to eight (8) RPS-1000 power modules. The six flexput circuits shall have the same functionality as the flexput circuits on the main panel. The Distributed Power Supply shall be capable of being connected via an RS-485 system bus (SBUS) at a maximum distance of 6000ft. from the main control panel. The power module shall contain an additional RS-485 bus that is completely compatible with all IFP-1000 add on modules; including 5815XL SLC expanders, RA-1000-SK5865-SK5880 annunciators, 5824 serial/parallel module and addressable devices. The power module will also act as a bus repeater so that additional RS-485 (modules) devices can be connected at a maximum distance of 6000ft. from the power module.

B. The power module's RS-485 bus shall be electrically isolated providing ground loop isolation and transient protection.

2.7 MANUAL FIRE ALARM STATIONS

A. Manual Fire Alarm Stations shall be non-coded, break glass, Single or double action type, with a key operated test-reset lock in order that they may be tested, and so designed that after actual Emergency Operation, they cannot be restored to normal except by use of a key. The reset key shall be so designed that it will reset Manual station and open FACP without use of another key.

B. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of fifty feet, front or side. Manual Stations shall be constructed of die cast metal with clearly visible operating instructions on the front of the stations in raised letters.

C. Stations shall be suitable for surface mounting on matching backbox, or semi-flush mounting on a standard single-gang box, and shall be installed within the limits defined by the Americans with Disabilities Act (ADA) dependent on Manual Station accessibility or per local requirements. Manual Stations shall be installed in conjunction with an Addressable Input Module (AIM) or Mini Input Module (MIM). Manual Stations shall be Silent Knight Model PS-DATK or PS-SATK and Underwriters Laboratories listed.

2.8 REMOTE POWER SUPPLIES

A. The Remote Power Supplies for Notification appliances shall be the Silent Knight Model RPS 1000. The Model RPS 1000 Intelligent Power Supply shall hang on the main S-Bus and be programmed through the IFP 1000 control. It will support 5amps of 24 volt DC power, with 6 Flexput circuits, rated at 3amps each. Two additional 5815 SLC loop expanders shall be capable of be install in the cabinet, to allow an additional 254 points. The power supply will also regenerate the S-Bus for an additional 6000'.

B. The remote power supply model 5499 or 5495 may also be used on the system. These power supplies are activated by the SD500-ANM module and support 6amps of 24VDC power, with 4 notification circuits, rated at 3amps each. These power boosters may also be activated from another notification circuit from either the fire alarm control, a distributed power supply (RPS-1000). An AIM device shall be needed to monitor the power booster for trouble.

2.9 NOTIFICATION DEVICES

A. The visible and audible/visible signal shall be Silent Knight Model ST and HS series signal devises and be listed by Underwriters Laboritories Inc. per UL 1971 and/or 1638 for the ST and also UL464 for the HS.

B. The notification appliance (combination audible/visible units only) shall produce a peak sound output of 90dba or greater as measured in an anechoic chamber. The signaling appliance shall also have the capability to silence the audible signal while leaving the visible signal energized with the use of a single par of

wires Additionally, the user shall be able to select either continuos or temporal tone output with the temporal signal having the ability to be synchronized.

C. The visible signaling appliance shall maintain a minimum flash rate of 1Hz or greater regardless or power input voltage. The appliance shall also be capable of meeting the candela requirements of the blueprints presented by the Engineer and ADA. The appliance shall have an operation current of 57ma or less at 24VDC for the 15/75Cd

D. The appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount to a single gang or double gang box or double workbox with the use of an adapter plate. The unit shall have an input voltage range of 20-30 volts with either direct current or full wave rectified power.

2.10 SMOKE DETECTORS

A. Smoke detectors shall be Silent Knight model SD505-APS ceiling mounted, Analog/Addressable photoelectric smoke detectors. The combination detector head and twist lock base shall be U.L. listed compatible with the Silent Knight IFP-1000 fire alarm control panel.

B. The base shall permit direct interchange with Silent Knight's SD505-AIS ionization smoke detector or the SD505-AHS heat detector. The base shall be the appropriate twist lock base SD505-6AB.

C. The smoke detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. The detector may be reset by actuating the control panel's reset switch. The sensitivity of the detector shall be capable of being selected and measured by the control panel without the need for external test equipment.

D. The vandal security-locking feature shall be used in those areas as indicated on the drawing. The locking feature shall be field selectable when required. It shall be possible to perform a sensitivity test of the detector without the need of generating smoke. The test method shall simulate the effects of products of combustion in the chamber to ensure testing of the detector circuits.

E. Detectors shall have completely closed back to restrict entry of dust and air turbulence and have a 30 mesh insect screen. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

F. Provide audible bases, where indicated on the drawings, for local annunciation. Detector shall activate trouble at annunciator upon activation.

2.11 HEAT DETECTORS

A. Furnish and install analog/addressable heat detectors, Silent Knight model SD505-AHS. The combination heat detector and twist lock base shall be U.L. listed compatible with the Silent Knight IFP-1000 fire alarm control panel.

B. The base shall permit direct interchange with the Silent Knight SD505-AIS Ionization smoke detector and the SD505-APS photoelectric smoke detector. The base shall be appropriate twist lock base SD505-6AB.

C. The heat detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. The detector may be reset by actuating the control panel's reset switch. The vandal security-locking feature shall be used in those areas as indicated on the drawings. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

D. Provide audible bases in dormitory room kitchens for local annunciation. Detector shall activate trouble signal at annunciator upon activation.

PART 3 – EXECUTION

3.1 SYSTEM COMPONENTS

A. The system cabinet shall be red and can be either surface or flush mounted. The cabinet door shall be easily removable to facilitate installation and service.

B. An audible system trouble sounder shall be an integral part of the control unit. Provisions shall also be provided for an optional supervised remote trouble signal.

C. The entire system shall operate on 24 VDC, filtered switch mode power supply with the rated current available of 5 Amps. The FACP must have a battery charging circuit capable of complying with the following requirements:

1. Twenty-four (24) hours of battery standby with five (5) minutes of alarm signaling at the end of this twenty-four (24) hour period (as required per NFPA 72 central station signaling requirements) using rechargeable batteries with automatic charger to maintain gel-cell batteries in a fully charged condition.

D. The power supply shall comply with U.L. Standard 864 for power limiting.

E. The FACP will indicate a trouble condition if there is a loss of AC power or if the batteries are missing or of insufficient capacity to support proper system operation in the event of AC failure. A "Battery Test" will be performed automatically every minute to check the integrity of the batteries. The test must disconnect the batteries from the charging circuit and place a load on the battery to verify the battery condition.

F. In the event that it is necessary to provide additional power one or more of the model RPS-1000 Distributed Power Modules shall be used to accomplish this purpose.

G. Connections to the light and power service shall be on a dedicated branch circuit in accordance with the National Fire Alarm Code NFPA 72, National Electrical Code (NEC) NFPA 70, and the local authority having jurisdiction (AHJ).

H. The circuit and connections shall be mechanically protected.

I. A circuit disconnecting means shall be accessible only to authorized personnel and shall be clearly marked “FIRE ALARM CIRCUIT CONTROL”.

3.2 WIRING

A. The installer shall coordinate the installation of the fire alarm equipment.

B. All conductors and wiring shall be installed according to the manufacturer’s recommendations.

C. It shall be the installer’s responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any conduits or conductors.

D. System components shall be installed in accordance with the latest revisions of the appropriate NFPA pamphlets, the requirements contained herein, National Electrical Code, local and state regulations, the requirements of the fire department and other applicable authorities having jurisdiction (AHJ).

E. All wire used on the fire alarm system shall be U.L. Listed as fire alarm protection signaling circuit cable per National Electrical Code, Articles 760.

3.3 WARRANTY AND FINAL TEST

A. The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for one year (365 days) from the date of final acceptance.

B. Before the installation shall be considered completed and acceptable by the awarding authority, a test of the system shall be performed as follows:

1. The contractor’s job foreman, a representative of the owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.

C. At least one half of all tests shall be performed on battery standby power.

D. Where application of heat would destroy any detector, it may be manually activated.

E. The communication loops and the indicating appliance circuits shall be opened in at least two (2) locations per circuit to check for the presence of correct supervision circuitry.

F. When the testing has been completed to the satisfaction of both the contractor’s job foreman and owner, a notarized letter cosigned by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.

G. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority.

H. Prior to final test the fire department must be notified in accordance with local requirements.

I. A complete set of reproducible “as-built” drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system.

3.4 OPERATING AND INSTRUCTION MANUALS

A. Operating and instruction manuals shall be submitted prior to testing of the system. Three (3) complete sets of operating and instruction manuals shall be delivered to the owner upon completion. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with U.L. Standard 864.

END OF SECTION

EARTHWORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY:

A. The Contractor shall furnish all supervision, labor, materials, tools and equipment to complete clearing, grubbing, excavation, filling, grading, fine grading, and backfilling as indicated, specified herein, including, but not limited to complete restoration and rehabilitation of all areas disturbed by contractors within and without the “Contract Limits”. All areas included in the “Contract Limits” shall be fine graded as specified in this section.

B. This Contractor shall include:

1. Excavation for all foundations as detailed on the drawings or as required.
2. Backfill as required around foundations, pits, and walls.
3. Placement and compaction of structural fill as required to raise existing subgrade to required elevation for slabs.
4. Excavation for utilities, mechanical, plumbing and electrical work is a part of this contract. If these excavations are done by the specific trade or by the General Contractor, all work shall comply with these specifications.
5. Pumping and removal of water from any source.
6. Removal from site and disposal of excavated materials unsuitable for fill or backfill, excess excavation, trees, brush.

C. The Geotechnical Investigation for this project is for informational purposes only. The Architect and Owner assume no responsibility for the conclusions drawn therefrom.

1.03 RELATED WORK:

A. Reserved.

1.04 REFERENCE DOCUMENTS:

A. The following publications are incorporated in this specification by reference and have the same force and effect as if bound herein.

B. American Society for Testing and Materials (ASTM).

1. D1556 – Test Method for Density.

2. D1557 – Standard Test Method for Moisture-Density Rotations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 in. Drop.
3. D2167 – Test Method for Soils In Place.
4. D2487 – Standard Test Method for Soils Classification.
5. D2937 – Density of Soil in Place by the Drive-Cylinder Method.

C. All applicable state and local code and other jurisdictional requirements.

1.05 SUBMITTALS:

A. Material Test Reports:

1. As compaction of materials progress, conduct and report results from a qualified geotechnical testing agency indicating and interpreting test results for compliance with the compaction requirements indicated, based on comprehensive testing of current work.
2. Testing shall be for each 20 C.Y. material placed but not less that one for each day's work.

1.06 QUALITY ASSURANCE:

A. Employ a qualified independent geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations, conduct tests, analyze and report results.

B. Employ workman, equipment, materials and methods of accepted practice as regularly engaged in this type of work.

PART 2 PRODUCTS:

2.01 BACKFILLING & FILL:

A. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, natural or crushed sand, as required and as acceptable to the Geotechnical Engineer.

B. Drainage Fill: Bank-run gravel, naturally occurring material from the pit uniformly graded from 1” gravel down to no more than 10 percent non-plastic fines passing the 200 sieve.

C. Controlled Fill and Fill Material: Selected material without high clay content and free of rubbish, large stones, masses of masonry and other objectionable materials to permit obtaining a high degree of compaction and avoidance of future settlement. Fill shall include between 5 and 15 percent fines. All material shall be approved by the Geotechnical Engineer.

D. All shall be compacted in 8 inch layers to 95 percent modified maximum dry density, ASTM D1557. Rollers, bulldozers or vibratory compactors shall not be used in the compaction of earth directly against foundation walls or pipe or conduit trenches. Compaction tests shall be made by Geotechnical Testing Laboratory.

E. Furnish all gravel and any other additional fill material that may be required to complete the work.

F. Remove any excavated material not suitable or not required for fill or backfill from the premises and dispose of same.

G. Excavated earth may not be used for backfill without the permission of the Geotechnical Engineer.

H. No fill material shall be placed when either fill or subgrade is frozen, or thawing or during unfavorable weather conditions.

2.02 WATER:

A. Provide water and transport water to and on the site, as required to assure proper moisture content for completion as specified.

PART 3 EXECUTION

3.01 SITE PREPARATION:

A. After clearing and removal of surface debris, strip topsoil no deeper than existing material. Stockpile on site where directed by Architect for future use by the Contractor to complete the project.

B. During a dry and favorable weather period, and under the technical supervision of the Geotechnical Engineer, proofroll and compact the resulting subgrades with a heavy static drum, kneading type roller. The roller shall be operated without vibration when within 8 feet of existing building. Additional passes may be required until the grade offers a relatively yielding surface or until the specific degree of compaction has been achieved, as directed by the Geotechnical Engineer.

C. Undercut any zones of instability disclosed by the proofrolling and replace the undercut material with controlled fill.

D. Raise the site to proposed subgrade elevation with controlled fill.

3.02 EXCAVATION:

A. Excavate to proper depths with allowances for floor slabs, walls, forms, center, shoring, waterproofing, and inspection of foundation.

B. Footing Bottom: Firm, level, clean and clear of loose material. Protect bottom of excavation from frost.

C. Trenches: Sharp and true to dimensions.

D. Grade areas under floor slabs that rest on earth to a smooth firm surface.

E. No work excavated to greater depth than required by plans and specifications. Deeper excavations shall be filled with concrete at contractor's expense.

F. Excavation for Footings, Walls, etc.: Extend sufficiently to permit the setting of forms, installation of sheet piling or the safe raking of banks.

G. Excavate for utilities, ducts and pits as required.

1. Use proper size backhoe or other appropriate excavating equipment. Cut narrowest trench practical.
2. If walls of excavation will not retain, provide and construct shoring as required.

3.03 BACKFILL & COMPACTION:

A. After pipe, conduit, or other underground equipment is installed, graded and secured, carefully backfill in 8 inch layers, compacting each layer to 95 percent optimum density, according to ASTM D1557.

1. Use clean excavated friable material, free of stones or organic materials. If excavated material is not suitable, provide sand or other granular material as specified.

B. After deep excavations have been completed, backfilled and compacted, prepare the site for floor construction.

1. The entire site within the perimeter walls shall be proof rolled to assure compaction of not less than 95 percent optimum density.
2. Fill any low areas and recompact as necessary to provide a level, even surface for application of floor.
3. Shape floor areas to slope 1 inch to floor drains as indicated on the drawings.
4. Backfill any trenches extending outside the building parameter and return surface to original grade.

3.04 PREPARATION OF BASE:

A. All subgrades to be improved shall be brought to uniform depths required below finished grades and evenly and highly compacted as follows:

1. In excavations use controlled fill that has been tested and approved by the Geotechnical Engineer.
2. Under grassed areas over 5 feet from the building use excavated material (if approved) or borrow material.
3. Under walks, pavements, and steps provide minimum of 4 inch subbase material.
4. Under building slabs use controlled fill and drainage fill material. Use drainage fill for the top layer.

B. Hard Materials: Removed to a depth of one foot below top of subgrade and be replaced by bank run gravel or other approved fill material to permit subgrade to be properly compacted.

C. Soft spots in subgrade: Excavated or re-excavated to a depth required for removal of unsatisfactory material and work or reworked to proper compaction.

D. Subgrade: Compacted by means of machine tampers, vibrators, and such other means as may be required to obtain unyielding subbase to support the base course, slabs, and superimposed loads, without settlement. Compaction tests shall be made by the Geotechnical Testing Laboratory as specified under Division 1- Testing & Inspection.

3.05 GRADING:

A. Rough and finish grade to indicated finished grade. Finish grade at grass areas with topsoil (minimum thickness 6 inches). Existing grade, new grades, and contours are shown on Site Plan. Furnish all necessary subsoil to establish finish grades when 6 inch layer at topsoil is disturbed to elevations shown. At completion, finish grades shall be smooth and to within 1 inch tolerance.

B. Provide additional topsoil as may be required. New topsoil as required shall be fertile, natural soil, typical of the locality, free from stones, clay and weeds. Prepare topsoil to receive seed by removing stones, and grading to eliminate the low spots and irregularities.

C. All indicated grading is intended to drain surface water away from the building. If it appears that this intent does not exist in some portion of the work, notify the Civil Engineer and Architect of such condition before proceeding with work affected by this condition.

D. Remove all stones from topsoil, whether existing or new topsoil.

3.06 DEWATERING:

A. Water from any source shall be diverted and/or pumped out of excavations until completion of foundation work. Water is not to be conducted onto adjacent property. Precautions shall be taken to protect uncompleted work from flooding during storms or from other causes.

B. Soil at the bottom of the footing excavations shall be exposed to the weather for no more than two days.

3.07 SHORING & BRACING:

A. The use of sheet piling, shoring and bracing to retain earth banks and prevent caving-in shall be used as required.
B. Design of sheeting, shoring and bracing shall be subject to the approval of local and state authority. Braces: Adequate in size and stiffness and have proper bearing to sustain the loads to which they may be subjected.

C. Sheeting, where required shall be driven far enough away to permit the proper construction of any work as indicated by the drawings and far enough below to give adequate safety against toe displacement by lateral earth thrusts.

D. No sheeting shall be driven on any adjacent property.

E. Shoring and bracing shall be removed before backfilling.

3.08 FIELD QUALITY CONTROL:

A. Testing Agency: Contractor will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2922 and ASTM D2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet (30 m) or less of wall length, but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet (46 m) or less of trench length, but no fewer than two tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.09 CLEANING:

A. After completion of the building, all surplus materials, rubbish and debris **SHALL BE REMOVED FROM THE SITE.** No dumping permitted on the site. Leave site in clean and neat condition.

END OF SECTION

TRENCHING, BACKFILL AND COMPACTING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide all labor, superintendence, materials, tools, transportation, and equipment and all means of construction necessary and reasonably incidental to complete the work as specified herein and as shown on the Contract Drawings.

B. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated on the Contract Drawings and/or in the Specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

C. The work of this section includes, but is not limited to, the following: excavation, shoring, sheeting, dewatering, trenching, stabilization, pipe bedding, backfilling, roadway repaving, and surface restoration for all piping systems shown on the Contract Drawings.

D. Contractor shall obtain all permits for work in or along roads. Work materials and methods shall conform with all requirements of the governing body having jurisdiction over the roadway.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe as shown on Drawings.

B. Granular backfill used for trench stabilization and pipe bedding shall conform to the following gradation requirements. Existing grade shall be brought up to the desired elevations with a granular type soil that complies with the following sieve size and percent by weight:

SEIVE SIZE	PERCENT BY WEIGHT PASSING MESH SIEVE
2”	100
¾”	70-100
#4	30-80
#50	10-35
#200	5-12

C. Broken stone or washed gravel shall have clean, hard, strong, durable, uncoated particles free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious matter. When subjected to the ASTM C-88 soundness test, there shall be no signs of checking, cracking, or disintegrating.

D. Select materials shall be the native soil excavated from the trench free of rocks, foreign materials and frozen earth.

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. Excavation:

1. Topsoil shall be scrapped from all areas of excavation and placed in stockpiles where designated by the Engineer.

2. Pipe trenches shall be excavated along lines shown on the Contract Drawings and to require depths, the width at the trench bottom being equal to the diameter of the pipe, plus twenty-four inches (24"). When required, the trench width can be increased, but shall not be greater than necessary for proper installation. Excavation shall allow for the placing of a layer of granular backfill (clean fill dirt or sand) free of debris and containing no large stones or rocks. Maximum particle size of stones shall be one-half inch (1/2") in diameter.

3. The Contractor shall carefully support and protect from injury all existing water pipes, electric conduits, sanitary and storm sewer lines and other structures, which do not have to be changed in their location. In case of injury or temporary removal, these facilities shall be restored to as satisfactory conditions as that in which they were found, at the Contractor's expense.

B. Materials Excavated:

1. The excavated materials shall be laid compactly on the side of the trench and at a distance from the centerline of the trench and at a distance from the centerline of the trench so as not to cause a failure of the trench wall or trench bottom, and shall be kept trimmed up so as to be of as little inconvenience as possible. Concrete and asphalt paving material shall be stripped ahead of the trench excavation, loaded onto trucks, and removed from the work area prior to full excavation of the trench. Roads shall be kept open for travel unless otherwise directed by the Engineer.

2. The Contractor shall not remove from the line of work any sand, gravel, or earth excavated there from which may be suitable for backfilling the trench, until the same has been refilled. All materials excavated shall be considered as property of the Owner.

3. Surplus excavation shall be deposited at locations shown on the Contract Drawings or designated by the Engineer. The locations to which the excavated material is delivered shall be known as the "Owner's Stock Pile".

C. Removal of Water:

1. The Contractor shall at all times during the construction, provide and maintain ample means and devices with which he shall promptly remove and properly dispose of all water or sewage entering the excavation or other parts of the work, and keep the excavation and structures dry until all

work is completed.

2. The Contractor shall dispose of the water from the trenches and excavations in a suitable manner without damage to adjacent areas. The Contractor shall furnish all necessary machinery, power and labor to pump, bail or otherwise remove water which may be found or shall accumulate in the trenches or other excavations and shall perform all work necessary to keep them clear of water while work is under construction.

3. Groundwater and subsoil conditions along the line of work are such that the Contractor cannot successfully control the water and provide a stable hard trench bottom for the pipe lines by ordinary pumping and bailing, the Contractor shall furnish and provide the necessary equipment, power and labor to employ the well point method of trench dewatering, without additional cost to the Owner.

D. Pipe Bedding:

1. In the even a trench is excavated below the specified grade, it shall be backfilled to grade with selected materials and shall be thoroughly compacted, without additional compensation.

2. Excavated materials may be reused, if approved by the Engineer.

3. In wet or unstable locations where the trench bottom is unsuitable for laying pipe, the excavation shall be carried to a greater depth and backfilled as shown on the pipe bedding details of the Contract Drawings. Unless indicated otherwise by the Engineer, all concrete pipe bedding shall be ASCE (Class "B"), ductile iron pipe bedding per AWWA C-600 type 4 and plastic sewer pipe per ASTM D2321.

E. Pipelaying:

1. Inspection and Quality of Pipe. Each pipe, branch, or special fitting shall be carefully inspected, and those not meeting the Specifications, or which have been broken or damaged in handling or transportation, or which are otherwise defective, shall be rejected and removed from the work. In addition to the inspection to be made by the Engineer, the Contractor shall carefully examine, for himself, all pipe and special fittings before placing the same in the trench. Such inspection shall carry with it full responsibility, on the part of the Contractor, for the removal of all pipe, branches, or special fittings found to be defective.

2. Grade and Alignment. Pipe shall be set at the grade and alignment shown on the Contract Drawings or as approved by the Engineer.

3. Protection of Work. Care shall be exercised in the protection of finished work. The Contractor shall take such precautions as may be necessary while in the act of laying the pipe, in backfilling, or in the passage of workmen up and down the trench. At all times during which pipe is not being laid, the end of the pipe shall be sealed, except where special

permission has been given for the drainage of trench water.

F. Backfilling:

1. Backfilling shall be accomplished in the following manner, causing no damage to the pipe.

   a. Backfill material shall be granular material free from debris containing no large stones or rocks.

   b. Backfill and bedding in the pipe zone shall be as indicated on the Embedment Details.

   c. The balance of the trench shall be backfilled, in layers not exceeding eight inches (8") in thickness, and carefully compacted with mechanical tampers, to the satisfaction of the Engineer.

   d. All trenches under pavement, sidewalks or roads shall be backfilled and compacted to not less than 95% proctor density, as determined by AAHTO method T99 for compaction and density of soils.

2. The Contractor shall be responsible for the acceptable compaction of all trench areas. As settlement occurs, the Contractor shall refill and regrade, with suitable material, and maintain same.

3. Backfilling shall include all backfilling, ramming or rolling as required, the regrading of adjacent disturbed areas, the replacing of drains and other surface and subsurface structures, the placing and maintaining of temporary walkways and driveways.

4. It is the intent of the previous requirements for the backfilling of trenches to specify methods which will: (1) result in thorough compaction of the backfilled material without displacement of the grade or alignment of all utility lines and appurtenances, (2) minimize settlement of the backfilled material, and (3) assure a sound foundation.

G. Compaction:

1. All backfill and fill materials should be compacted to the degree noted in the following table in accordance with ASTM D-698 latest standard.

BUILDING AREA	%MAXIMUM DRY DENSITY (ASTM D-698)
Supporting Foundations	98%
Supporting Floor Slabs	95%
Pavements	95%
Site (Non Loading Bearing)	90%

H. Cleaning:

1. As soon as the trenches have been refilled and trench surfaces restored, construction debris, or other refuse material of whatever description, deposited and left by the Contractor on the rights-of-way shall be removed.

2. The Contractor shall thoroughly flush such pipes as may be designated by the Engineer, to remove all foreign material which may have entered during construction. The expense of flushing shall be borne by the Contractor.

END OF SECTION

SITE CLEARING

PART 1 GENERAL

1.1 WORK INCLUDED

A. Provide all labor, superintendence, materials, tools, transportation, and equipment and all means of construction necessary and reasonably incidental to complete the work as specified herein and as shown on the Contract Drawings.

B. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated on the Contract Drawings and/or in the Specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

C. Work includes site preparation including tree protection, preparation for removal of existing utilities, temporary erosion and sedimentation control, and general site improvements as well as clearing, grubbing, and stripping of the construction site of all vegetation, trees, rubbish topsoil and other surface materials as shown on the Contract Drawings, as designated necessary by the Engineer, or as required by the Contractor to perform the work.

D. In order to control dust, as often as required during each working day, and particularly prior to the conclusion of each working day, areas under immediate construction (including access roads and other areas affected thereby) shall be swept and wet down with water sufficiently to lay dust. In addition, these areas shall be wet down during non-working hours (including weekends) as often as required to keep the dust under control. The use of calcium chloride or petroleum products or other chemicals for dust control is prohibited.

E. In order to install stormwater drainage piping as required by the Contract Documents, several interfering items shall temporarily be removed during construction and replaced following construction. Whether indicated by the Contract Documents or not, these items include the removal of interfering fencing, the demolition of interfering concrete pavement, and the relocation of interfering sheds. These items are to then be replaced following construction of the stormwater drainage pipe.

F. Site Clearing shall also be in accordance with New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications), Section 201 including the following:

Clearing Site shall also include removal and/or resetting of lawn decorations; minor yard structures; or similar obstructions at the site of work. If there should be no separate item provided for in the proposal, Clearing Site shall also include removal and/or resetting and/or replacement of any fences, decorative shrubs, hedges or trees at the work site. Clearing Site shall also include the removal of

tree stumps, underbrush, clearing of wooded areas as shown on the Drawings or any unsuitable or undesirable obstructions in the area of any of the scheduled items or work.

Clearing Site shall also include resetting of monuments, meters, boxes, and any other work not actually listed in the schedule of items in the proposal which is required for the completion of work as described by the Drawings and the contract documents.

Clearing Site shall also include resetting roof drains at curb locations if the proposed roadway gutterline grade is higher than the roof drain invert elevation.

Responsibility for resetting gas valves and boxes shall lie with the respective utility company, however it shall be the Contractor’s responsibility to coordinate this work.

Clearing Site shall also include the removal and resetting of all obstructions, either standing or felled, within the limits of construction and for which payment is not otherwise provided in the contract but which is described for removal and resetting on the Drawings by the Engineer during construction.

Clearing Site shall also include Relocation of Sewer Vent/Lateral and Relocation of Water Meter. Relocation of Sewer Vent/Lateral and Relocation of Water Meter shall not apply to resetting vertical grade, but when lateral relocation is required due to road widening.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

a. Section 201: Clearing Site

1.4 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing. Refer to site utility Plan.

D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Provide all equipment, materials labor and transportation necessary to perform the work of clearing, grubbing and stripping the construction site.

PART 3 EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE PROTECTION

A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Engineer.

3.4 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Engineer not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Engineer’s written permission.

3.5 CLEARING

A. The construction site shall be cleared within the limits of clearing (construction) as shown on the Contract Drawings. The ground surface shall be cleared of all trees, brush, weeds, roots, debris and other unsuitable matter.

B. The Contractor shall remove only those shrubs and trees as designated by the Engineer. All remaining shrubs and trees shall be fully protected by the Contractor and, if damaged or destroyed, shall be replaced in kind at the Contractor's expense.

C. When or where any direct or indirect damage or injury is done to public or private property by, or on account of, any act, omission, neglect or misconduct on the part of the Contractor in the execution of the work, such property shall be restored by the Contractor, at his expense, to a condition equal to that existing before such damage or injury was done or he shall make good such damage or injury in such other manner as may be acceptable to the Engineer.

D. If a separate item is not provided for the removal and/or relocation of hedges fences, and privately owned signs, the Contractor shall be responsible to contact the owner of said hedge, shrub, fence or sign to determine if the owner desires to reclaim it. If the owner should desire to reclaim the item, the Contractor shall then use reasonable care and relocate and reset the item beyond the work limits.

E. Should any construction methods that are required for the work included under Clearing Site not specifically described, they shall comply with the applicable provisions of the previously cited Standard Specifications.

F. All materials accumulated during the clearing of the site described above, or any excess materials, shall be disposed of by the Contractor at a New Jersey Department of Environmental Protection approved landfill site, to be provided by the Contractor.

G. Burning of debris at the project site, or in the vicinity thereof, will not be allowed.

3.6 GRUBBING

A. Grubbing shall be performed in all construction areas and/or where indicated on the Contract Drawings.

B. Stumps shall be removed in their entirety.

C. Roots and matted roots shall be grubbed out to not less than eighteen (18) inches below the existing surface or eighteen (18) inches below the bottom of all excavations, whichever is lower.

3.7 STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.8 DISPOSAL

A. Cleared materials declared unsuitable for use in the project, by the Engineer shall

be promptly removed from the site by the Contractor, and at the Contractor's expense.

B. All off-site disposal shall be in accordance with local and State regulations. Burning of cleared materials will not be permitted on site.

C. Contractor shall secure Engineer's written approval of disposal site or sites prior to the removal of any material from the site of the work.

D. Excess excavated material which is not considered to be solid waste pursuant to N.J.A.C. 7:26-1.6 shall be graded on-site only to the extent needed to achieve preconstruction grade, unless otherwise specifically approved by the Department. The project sponsor shall ensure that the contractor removes the remainder from the site and disposes of it at a site approved by the project sponsor in accordance with the following:

1. Disposal sites selected by the contractor shall be evaluated and approved by the project sponsor prior to their use. Disposal sites may also be selected by the project sponsor. The project sponsor shall conduct periodic inspection of disposal sites to ensure compliance with the requirements of this subsection during the off-site disposal operation.

2. The disposal of excess excavated material in wetlands, stream corridors and floodplains is strictly prohibited, even if the permission of the property owners is obtained. The contractor shall be responsible to remove and fill improperly place by the contractor at the contractor’s expense and restore the area impacted.

3. If excess excavated material is placed on private property, a hold harmless release in favor of the project sponsor and the Department shall be obtained form the property owner.

4. Prior to approval of a site for excess excavated material disposal, where the site exceeds 5,000 square feet, the project sponsor shall obtain, or shall ensure that the contractor or property owner has obtained, the appropriate certification of the soil erosion and sediment control plan in accordance with the State’s standards for soil conservation (N.J.A.S. 4:24-1 et seq, also refereed to as Chapter 251). Where the site is less than 5,000 square feet, the project sponsor shall advise the property owner of the need for erosion and sediment control and obtain a statement that the property owner accepts complete responsibility for implementations of appropriate methods to prevent erosion and sedimentation.

3.9 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

3.10 TEMPORARY SITE CLEARING

A. Temporarily remove all structures interfering with the construction of the stormwater drainage pipe, including the removal of fencing, the demolition of concrete pavement, and the relocation of sheds.

B. These items shall be replaced following completed construction of the relevant section of stormwater drainage piping. Item replacement includes replacing the removed fencing, replacing the demolished concrete, and moving the relocated sheds back to their original locations.

C. Following construction, the Contractor shall restore the site to a condition equal to at least the existing condition.

END OF SECTION

SELECTIVE CLEARING

PART 1 GENERAL

1.1 SUMMARY

A. Selective Clearing shall be performed by the Contractor in the area designated in the Contract Drawings corresponding to the 50’ wetlands buffer.

B. The designated selective site clearing area is reserved only for the clearing of dead trees as directed by the Engineer and as permitted by N.J.A.C. 7:13-2.5(a)1. regarding exemptions for normal property maintenance. The Contractor shall not clear past the limit of clearing unless otherwise directed to do so by the Engineer.

C. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the Selective Clearing

C. All materials and labor obviously a part of the work, and as necessary for proper selective clearing, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 QUALITY ASSURANCE

A. Comply with governing codes and regulations.

B. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 802.03.02: Removing Existing Trees
    b. Section 804: Topsoil Spreading

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil, where required for restoration, shall conform to shall conform to NJDOT Specification Section 804.

PART 3 EXECUTION

3.1 CONSTRUCTION

A. Selective Clearing, Tree Removal shall conform to NJDOT Specification Section 802.03.02.

B. Where overhead wires exist in the area of trees to be removed, the Contractor shall coordinate his work with the utility companies having jurisdiction.

C. Any damage to other vegetation, structures, utility wires or other property shall be repaired without additional compensation.

D. All branches, limbs, trunks and other debris resulting from tree removal shall be disposed of in accordance with Section 311000.

END OF SECTION

EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, pavements, and walks.
3. Excavating and backfilling for buildings and structures.
4. Drainage course for concrete slabs-on-grade.
5. Subbase course for concrete walks.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Sections:

1. Section 033000 "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.

2. Section 310000 "Earthwork" for site stripping, grubbing, stripping [and stockpiling] topsoil, and removal of above- and below-grade improvements and utilities.

1.3 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

D. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

H. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

J. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 FIELD CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

1.5 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 698 or ASTM D 1557.

1.6 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Contractor to retain services of an agency qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Section 312500 "Erosion and Sedimentation Controls" are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D2487, or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

F. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and zero to 5 percent passing a No. 8 (2.36-mm) sieve.

G. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

H. Sand: ASTM C 33; fine aggregate.

I. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No

changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit unless otherwise indicated.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches (150 mm) in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

2. For pipes and conduit 6 inches (150 mm) or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.

3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.

4. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 SUBGRADE INSPECTION

A. Notify Testing Agency when excavations have reached required subgrade.

B. If Testing Agency determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slab with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Testing Agency, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 033000 "Cast-in-Place Concrete."

D. Initial Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Final Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.

3.13 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.16 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch (25 mm).
2. Walks: Plus or minus 1 inch (25 mm).
3. Pavements: Plus or minus 1/2 inch (13 mm).

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Shape subbase course to required crown elevations and cross-slope grades.
2. Place subbase course 6 inches (150 mm) or less in compacted thickness in a single layer.
3. Place subbase course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
4. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698

3.18 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Place drainage course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.

2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D698.

3.19 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified geotechnical engineering testing agency to perform tests and inspections. Testing performed by Owner’s agency does not supersede requirement for Contractor to engage an independent testing agency to confirm compliance with project requirements.

B. Allow Owner’s testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed by Contractor’s agency to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. When Contractor’s or Owner’s testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION

GRADING

PART 1 GENERAL

1.1 WORK INCLUDED

A. Provide all labor, superintendence, materials, tools, transportation, and equipment and all means of construction necessary and reasonably incidental to complete the work as specified herein and as shown on the Contract Drawings.

B. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated on the Contract Drawings and/or in the Specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

C. The work includes, but is not limited to:

1. Excavation, grading, backfilling and compaction for construction required to complete the work of this contract. Contractor shall be responsible for making excavations in a safe manner, and shall provide as necessary all shoring and sheeting.

2. Construction and maintenance of Owners' stockpiles including soil erosion and sediment control measures.

3. Dewatering materials and work including temporary site and roadway drainage necessary for construction, drainage of access roads, and adjacent areas affected by the Contractor's operations.

4. Backfills, as required to backfill construction excavations.

5. Compaction of backfills as specified and including compaction tests.

D. Work for Rough Grading for Site Improvements consists of, but is not limited to, the following:

1. Perform onsite cutting and filling work, keying and benching, underdrain construction, earth moving and land balance required to approximate sub-grades.

2. Compaction of site areas in native soil, cut, fill, or topsoil.

3. Removal from the site of any excess material, if applicable.

4. Obtain and transport to the site any needed borrow material, if applicable.

5. Excavation and disposal from the site of any unacceptable rock, organically contaminated, deleterious and unsuitable material, as applicable.

E. Work for Fine Grading for Site Improvements consists of, but is not limited to, the following:

1. Perform fine grading and compaction to meet indicated sub-grades.

1.2 QUALITY CONTROL

A. Contractor shall provide supervision, inspection, sampling, testing and other work of similar import as required to insure meeting all requirements of the specifications.

B. Approval shall be obtained before delivery of materials or equipment to the project site.

C. The Engineer has the authority to halt all work until measures are taken by the Contractor to meet the specified standards.

Applicable Standards:

ASTM - D1557	Moisture-Density Relationship of Soils
ASTM - T27	Sieve Analysis
ASTM - D1556	Test for Density of Soil in Place by the Sand-Cone Method
ASTM – D698	Maximum Dry Density

D. The Owner may engage the services of an approved testing laboratory to sample, analyze and provide reports of materials, and to perform soil compaction tests as Owner deems necessary to satisfactorily demonstrate that compaction requirements of the Specifications have been met. The Contractor shall fully cooperate with the Engineer and the Owner in this regard. Contractor shall pay for all tests.

1.4 SUBMITTALS

A. Samples of all materials proposed to be used for backfill, including excavated Owner's material shall be submitted to, and the material as well as its use approved by the Engineer before the backfill work begins.

B. Contractor shall submit to the Engineer for approval the name of laboratory he proposes to employ for testing purposes, and shall obtain approval before starting the work of this section.

C. Catalog and Manufacturers data sheets shall be submitted for all compaction equipment.

PART 2 PRODUCTS

2.1 MATERIALS

A. Backfill material shall be clean granular soil free from organic impurities and other objectionable materials.

B. Material used for backfill when compacted shall produce a strong and relatively incompressible soil mass free of detrimental voids.

C. Backfill shall be performed using excavated material which has previously been approved by the Engineer as suitable for use as backfill.

D. Borrow material required for Site Improvements shall be Soil Aggregate designation I-5 and conform to Section 901.11 of the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 (NJDOT Specifications).

PART 3 EXECUTION

3.1 EXCAVATION

A. Top soil shall be scraped from all areas of excavation and deposited at locations as directed by the Engineer. The locations to which the topsoil is delivered shall be known as the "Owner's Stockpile".

B. Excavations shall be kept free from water while construction therein is in progress.

C. All sloughage shall be removed and shall not be allowed to become mixed with the backfill. All cavities caused by slope sloughage shall be refilled and compacted as herein specified to at least 98 percent dry density in accordance with ASTM – D698, all at no cost to the Owner.

D. Excavations deeper than five feet (5') shall have the sides sheeted or shored, or shall have the sides sloped back to the angle of repose of the materials, in accordance with applicable OSHA and New Jersey Department of Labor and Industry requirements.

E. Excavation adjacent to existing roadway structures, utilities, or existing underground piping shall be properly sheeted and braced. The Contractor shall protect and support, in a suitable manner, all piping and aerial or underground utilities affected by his operations. Any damage to said piping or utilities shall be repaired by the Contractor, at his expense.

F. Contractor shall consider all excavations as unclassified and shall complete the excavation regardless of the type, nature or condition of the materials encountered.

G. The bases of excavation shall be compacted in the same manner as backfills.

3.2 COMPACTION

A. All backfill and fill materials should be compacted to the degree noted in the following table in accordance with ASTM D-698 latest standard.

BUILDING AREA	%MAXIMUM DRY DENSITY (ASTM D-698)

Supporting Foundations	98%
Supporting Floor Slabs	95%
Pavements	95%
Site (Non Loading Bearing)	90%

3.3 DEWATERING

A. Provide and maintain, through the use of dewatering wells, at all times during construction, ample pumping equipment ready for immediate use to pump, or otherwise promptly remove and dispose of water entering or accumulating in excavations, and to keep same clear of water.

B. Should groundwater and subsoil conditions be such that removal of water from the excavation cannot be successfully handled by ordinary means of pumping and bailing, and where directed by the Engineer, other methods of dewatering shall be employed and adequate equipment, pumps and labor provided to dewater and maintain the excavations in dry condition without additional compensation. When water is removed from the trenches, it shall be discharged through pipes, troughs, gutters or other artificial means to a point of proper disposal such as catch basins, or approved locations adjoin the Work. Water shall not be directly discharged to streams or other watercourses.

C. To allow sediment to settle out of water that interferes with construction before such water enters any surface waters, dewatering operations shall direct pumpage as far from the surface waters as possible. Care should be taken not to damage or kill vegetation by excessive watering or by damaging silt accumulation in the discharge area. Settling basins shall be constructed and used as necessary to protect vegetation and to achieve environmental objectives.

D. Upon completion of the section wherein the operations have been performed, the Contractor shall remove from the catch basins, sumps, ditches, or watercourses, all mud, silt, debris and other accumulations discharged to these various locations. The Contractor is responsible for leaving them in a condition similar to that which existed prior to his operations. Proper control measures shall be employed, so as to minimize siltation and erosion in and adjacent to the area of the Work.

E. Dewatering shall continue on a 24 hour per day basis as required to avoid flotation danger to the structures until completed.

3.4 BACKFILL PLACEMENT

A. Backfill shall be accomplished using material from the Owner's stockpiles.

B. Materials shall be placed to sufficient height and width so that after full shrinkage, sloughing of slopes or subsidence of the filled area, and completion of paving or landscaping the elevation and width shall conform to the elevation, grades and cross sections shown on the Drawings, or that existed before the start of work under this Contract.

C. Backfill material shall be placed in layers not more than eight (8") inches thick, loose measurement, and each layer compacted as described herein.

D. Before placing materials, the ground shall be broken to bind the fill.

E. Frozen materials shall not be placed.

F. When any fill which has obtained settlement requires additional material to bring it to required elevation, it shall be scarified before additional material is placed.

G. The Contractor shall be responsible for the stability of all fill and shall replace all sections damaged or displaced due to carelessness or neglect on the part of the Contractor, or due to natural causes.

H. The perimeter banks of newly placed fill shall be stabilized to prevent the fill from spoiling the adjacent area.

3.5 BACKFILL AT STRUCTURES

A. Upon completion and final inspection of subgrade and concrete construction, all debris shall be removed from the excavation and same backfilled with select material.

B. Old wood, old forms, etc., shall be removed before backfilling is started.

C. Backfilling shall be performed as required around all work. Backfilling shall be done as soon as other work will permit, with the approval of the Engineer. It shall be deposited in layers of earth no more than eight (8") inches in depth and each layer shall be compacted to 98% of optimum density of ASTM D-698 standard.

D. Contractor is responsible for all damage to any structures or facilities due to backfilling.

3.6 WORKMANSHIP

A. Excavated materials shall be placed, as designated, by the Engineer. Ingress and egress to existing roads and buildings must be maintained at all times.

B. The Contractor shall be aware that all areas shall be restored to their original conditions, unless changed by the Contract Drawings or the Specifications.

END OF SECTION

DEWATERING

PART 1 GENERAL

1.1 SUMMARY

A. Provide dewatering for construction activities.

1.2 SUBMITTALS

A. Shop Drawings: Submit for approval plan showing layout of dewatering system.

B. Test Reports: Submit observation well reports recording groundwater levels.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Use experienced workers.

PART 2 PRODUCTS

2.1 MATERIALS

A. Dewatering Systems:
   1. Manufacturers:
      American Drainage Systems Inc.
      Ashbrook Corp.
      Crumpler Plastic Pipe, Inc.
      McLanahan Corp.
      US Filter Dewatering Systems Group
   2. Application: Dewatering of excavated areas.
   3. Service: Systems for groundwater control and disposal.

PART 3 EXECUTION

3.1 DEWATERING ACTIVITIES

A. Dewatering Applications:

   1. Lowering and controlling groundwater levels during excavation and construction.
   2. Control of hydrostatic pressures during excavation and construction.
   3. Control of surface and subsurface water, ice, and snow related to dewatering.
   4. Standby equipment for system back-up.
   5. Establishment and monitoring of observation wells
   6. Legal disposal of water removed from excavations
   7. Removal of observation wells when no longer required.

B. Observation Wells:

1. Provide, take measurements, and maintain observation wells indicated and additional observation wells as may be required by governing authorities.
2. Remove observation wells when dewatering is completed.

C. Dewatering:

1. Provide a system to lower and control groundwater in order to permit construction activities. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, and other excavations.

2. Operate dewatering system continuously until dewatering is no longer required. Dispose of water removed from excavations in a manner to avoid endangering public health, property, and portions of work under construction or completed. Provide flow control devices as required by governing authorities.

END OF SECTION

EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Complete soil erosion and sedimentation controls as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of erosion control and sedimentation controls.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 WORK INCLUDED

A. The Contractor shall be responsible for the construction, implementation, and maintenance of all soil erosion and sediment control measures necessary to minimize damage to surface waters and wetlands.

B. Soil erosion and sediment control measures shall be constructed in accordance with "Standards for Soil Erosion and Sediment Control in New Jersey," latest revision. The soil erosion and sediment control measures indicated are the minimum control measures to be instituted during the term of the project.

C. Additional control measures as may be required by the Certified Soil Erosion and Sediment Control Plan, as well as those which may be imposed by Federal, State and local construction permits, shall apply. Fees for this permit(s) shall be the responsibility of the Contract and shall be included in the total price bid.

D. All construction debris, excess excavated material and refuse incidental to this project shall be removed entirely from the site by the Contractor and properly disposed of in a legal manner. Insofar as practicable, existing vegetation shall be preserved and site preparation activities shall be planned to minimize the area and duration of soil disruption.

E. Costs associated with other work of this Section shall be included in the price bid for the item of which it is a component.

F. Sewer inlets within construction areas shall be provided with inlet protection in the form of a perimeter crushed stone collar and perforated wooden boards held together by hinges, or other appropriate siltation control measures.

PART 2 PRODUCTS

2.1 MATERIALS

A. Crushed Stone shall be three (3) to four (4) inch angular stone with sharp edges, clean and free of clay, stone dust or other objectionable materials.

B. Fertilizer shall be 10-20-10 or equal.

C. Filter Fabric for low point inlets shall be Laurel Erosion Control Cloth Type II by advanced Construction Specialties Company of Memphis, Tenn., or Poly Filter-X by Carthage Mills of Cincinnati, Ohio or other approved equal.

D. Filter-Gravel shall be washed gravel, free of clay organic and other objectionable foreign material.

E. Limestone shall be pulverized dolomitic.

F. Mulch materials shall be unrotted salt hay, hay, or small grain straw.

G. Mulch Binders shall be synthetic or organic such as Curasol DCA-70, Petro-set or Terra-Tack I or other approved equal.

H. Seed Mixtures shall be labeled to show compliance with the requirements of the New Jersey State Seed Law and shall have been tested within six (6) months preceding the date of sowing. The kinds and amounts shall be as indicated on the contract drawings.

I. Silt Fence metal fence mesh six (6) inches or smaller, with a filter fabric such as ProPex Silt Stop, or approved equal fastened to fence posts.

J. Stone Berms shall be constructed of six (6) inch nominal diameter stones (150 lbs/cu. ft.) which are free of sediment, organic and other objectionable foreign matter.

K. Topsoil shall be friable and loamy, free of debris objectionable weeds, stones and toxic substances that may be harmful to plant growth.

L. Erosion Control Mats shall consist of mats or blankets held together by stakes and staples, and overlapping to provide full coverage of the underlying soil.

M. Construction Entrances shall consist of minimum six (6) inches of ASTM C-22 No.2 or No.3 stone atop a geotextile fabric and must be cleaned or replaced as needed.

N. Scour Holes shall be lined with rip-rap with stone size (d50) of six (6) inches, and constructed in accordance with discharge demands.

PART 3 EXECUTION

3.1 GENERAL

A. On-site Traffic Control. The Contractor shall establish control for on-site construction traffic in order to minimize land disturbance in any area where vehicular traffic disturbs the land to the extent of reducing protective vegetation, compacting soil or otherwise deteriorating the environment.

B. Vegetative Cover. Stabilization with vegetative cover shall be performed only during the periods February 15 to May 1 and August 15 to October 15. In the event that seeding cannot occur during these periods, the Contractor shall temporarily stabilize disturbed areas with anchored mulch.

1 Temporary Vegetative Cover: In the event the construction is halted for periods greater than 14 days, areas disturbed by construction shall be stabilized by seeding in accordance with N.J.A.C. 7:22-10.11(e)3. Prior to the seeding operation, disturbed areas shall be graded as needed and feasible to permit the use of conventional equipment for seedbed preparation.

2. Permanent Vegetative Cover: The Contractor shall be responsible for the establishment of permanent vegetative cover on all areas where the soil has been disturbed by construction activities. Permanent vegetation is to be seeded or sodded on a completed project area within seven (7) days after final grading in accordance with N.J.A.C. 7:22-10.11(e)3.

3. Seed Application: Seeding shall be performed by hand, cyclone seeder, drill cultipack type seeder, or hydro-seeder. For seed applications other than by hydroseeder, normal seed depth shall be from one-fourth (1/4) inch to one-half (1/2) inch. Hydroseedings which are mulched may be left on the soil surface. Following all seeding, mulch shall be placed and anchored.

4. In the event that construction will be halted for periods greater that thirty (30) days

C. Tree Protection During Construction. The Contractor shall be responsible for marking the trees to be saved. Trees within 25 feet of the construction site shall be boxed or fenced at the drip line of the branches. Boards are not to be nailed to trees during construction nor are feeder roots to be cut inside the drip line of the branches. Damaged trunks, exposed roots, and areas where limbs have been removed shall be promptly painted with a good grade of "tree paint". Removal of limbs shall be done flush to the trunk or main branch.

D. Structural Measures. Contractor shall construct, silt fence sediment barriers; stone berms and inlet filters as required to prevent the flow and/or erosion of soil from the site.

3.2 TOPSOILING

A. Following completion of construction activities, the Contractor shall prepare areas to be permanently stabilized with grass by applying topsoil to a uniform depth of four (4) to six (6) inches. Topsoil shall be as herein specified. Immediately prior to topsoil applications, the soil surface should be scarified to provide a good bond with the topsoil.

B. The cost for installing topsoil includes importing Borrow Topsoil if there is an inadequate supply of natural topsoil on site.

3.3 SEEDBED PREPARATION

A. Contractor shall sample soils to determine the soil pH and will maintain a soil pH of 6, 8 to 7. Any soil having a pH 4 or less or containing iron sulfides must be covered with a minimum of 12 inches of soil having a pH of five or more before seedbed preparation.

B. Immediately following application of topsoil, the Contractor shall apply pulverized dolomitic limestone at a rate of two (2) tons per acre, and fertilizer (10-20-10) at a rate of 500 pounds per acre. The Contractor shall then work lime and fertilizer into the soil to a depth of four (4) inches with a disc. springtooth harrow, or other suitable equipment.

C. If seeding is to be performed with a hydroseeder, lime and fertilizer may be applied in the hydroseeding slurry with seed and water. Mulch shall be applied after applying the slurry mixture as specified herein.

D. Following application of lime and fertilizer, the area shall be rolled to firm the seedbed and all stones two (2) inches or larger and any other unsuitable material shall be removed. If traffic has compacted the soil, the area shall be retilled and firmed.

3.4 SEEDING

A. Seed application shall be made during optimum planting periods and immediately following preparation of the seedbed.

B. Seed mixtures shall be applied uniformly.

3.5 MULCHING

A. The Contractor shall apply straw mulch to all newly seeded areas immediately following seeding and to all disturbed areas if stabilization by seeding cannot occur as herein specified.

3.6 LOW POINT INLET PROTECTION

A. The Contractor shall protect all Low Point Storm Drain Inlets with temporary Low Point Inlet Filters to remove sediment from storm runoff. Construction of the Low

Point Inlet Filters shall be as shown in the Contract Drawings.

B. The Contractor shall wrap any existing or new grates which can receive runoff from the site at the storm water inlet with filter fabric (40 EOS).

C. The filter and grate shall then be covered with pea gravel filter material to a thickness of at least six (6) inches at the grate center, gradually thinning out to the margin of stone placement, as specified and shown.

D. The Contractor shall be responsible for maintaining the Low Point Inlet Filters in good condition. The Contractor shall also be responsible for removing the Low Point Inlet filters after, in the opinion of the Engineer, stabilization of upstream contributory areas is achieved.

3.7 CURB INLET PROTECTION

A. The Contractor shall protect all existing curb and storm drains with temporary curb inlet filters to remove sediments from storm runoff. Construction of the Curb Inlet Protection Filters shall be as shown in the Contract Drawings.

B. Hardware cloth or comparable wire mesh with 1/2 inch openings shall be placed over the existing curb inlet opening so that a minimum of twelve (12) inches of the wire mesh extends across the inlet cover and at least twelve (12) inches of wire extends across the concrete gutter from the inlet opening. Two (2) to three (3) inch, coarse aggregate stone shall be piled against the wire so as to anchor it against the gutter and inlet cover, and to completely cover the inlet opening. If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stone must be pulled away from the inlet, cleaned and replaced.

C. The Contractor shall be responsible for maintaining the gravel curb inlet sediment filters in good condition. The Contractor shall also be responsible for removing the curb inlet protection filters after, in the opinion of the Engineer, stabilization of upstream contributory areas is achieved.

3.8 STONE BERMS

A. Where it is necessary to dewater the pipe trench during the installation of the sewer line or during the construction of the pumping station, the contractor will be responsible for constructing temporary stone berms to filter the effluent groundwater. The effluent discharge is to be directed towards the most well defined drainage area (swale where possible) away from any wetland areas where possible. The stone berms are to be temporarily constructed not more than ten (10) feet downstream from the effluent discharge point.

B. The stone berms are to be constructed of six (6) inch nominal diameter stones (150 lbs./cu. ft.) and shall have a minimum height of two (2) feet and a top width of not less than four (4) feet. The slopes of the stone berms are not to exceed three (3) horizontal to one (1) vertical (3:1).

C. The contractor shall be responsible for maintaining the stone berms in good condition. The contractor shall also be responsible for removing the stone berms upon the completion of dewatering activities.

3.9 STOCKPILE PROTECTION

A. The Contractor shall construct silt fence sediment barriers around all stockpiles of fill, topsoil and excavated overburden that are to remain exposed for periods greater than one (1) week.

B. The silt fence shall be constructed as shown on the Contract Drawings.

C. Silt fences shall be maintained in good operating condition by the Contractor until said stockpiles are brought to final grade and stabilized with permanent vegetative cover.

D. Where applicable, stockpiling areas shall be stabilized by permanent vegetative measures. Stabilization of stockpiling areas following stockpile removal shall be through the use of permanent vegetative measures as specified.

E. Stockpiles of topsoil, fill and excavated overburden shall be located a minimum of 50 feet from wetlands and surface waters.

3.10 SEDIMENT BARRIERS

A. The Contractor shall construct silt fences at all locations indicated on the Contract Drawings. Silt fences shall be constructed down slope of construction activities to intercept and detain sediment from disturbed areas.

B. Silt fence sediment barriers shall be constructed as shown and shall be maintained in good operating condition by the Contractor until stabilization of upstream contributory areas is achieved.

C. Silt fences shall be constructed so that water cannot bypass them around the ends.

D. The Contractor shall remove silt build up as required to maintain the silt fence in good operating condition, and shall remove the silt fence when it is no longer needed.

3.11 EROSION CONTROL MATS

A. The Contractor shall install erosion control mats in accordance with Contract Documents to provide soil stabilization.

B. Erosion control mats shall be installed as shown by the Contractor in compliance with the installation instructions as detailed in the Contractor Documents.

3.12 CONSTRUCTION ENTRANCES

A. The Contractor shall construct construction entrances at points necessary to prevent the transportation of sediment onto the surrounding roadways.

B. Construction entrances shall be constructed as shown and shall be maintained in good operating condition by the Contractor until construction is complete.

C. Construction entrances shall be cleaned or replaced as needed by the Contractor to maintain good operating condition and to bet prevent the transportation of sediment onto the surrounding roadways.

3.13 SCOUR HOLES

A. The Contractor shall construct scour holes in each proposed stormwater basin in locations designated in the Contract Documents.

B. Sour holes shall be constructed by the Contractor with slopes, lengths, widths, and depths in accordance with Contract Documents.

3.14 MAINTENANCE OF CONTROL MEASURES

A. Maintenance of all soil erosion and sediment control measures shall be the responsibility of the Contractor during construction. The Contractor shall maintain structural and non-structural measure such that soil erosions is minimized throughout the construction period.

B. When complete site stabilization is achieved, the Contractor shall be responsible for removal of remaining temporary control structures.

END OF SECTION

TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Soil treatment with termiticide.

B. Related Sections include the following:

1. Division 06 Section "Rough Carpentry" for wood preservative treatment by pressure process.

2. Division 07 Section "Flashing and Sheet Metal" for custom-fabricated metal termite shields.

1.3 PERFORMANCE REQUIREMENTS

A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective for not less than 10 years against infestation of subterranean termites.

1.4 SUBMITTALS

A. Product Data: For termiticide borate and metal mesh barrier system.

1. Include the EPA-Registered Label for termiticide and borate products.

B. Product Certificates: For termite control products, signed by product manufacturer.

C. Qualification Data: For Installer of termite control products.

D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:

1. Date and time of application.

2. Moisture content of soil before application.

3. Brand name and manufacturer of termiticide.

4. Quantity of undiluted termiticide used.

5. Dilutions, methods, volumes, and rates of application used.

6. Areas of application.

7. Water source for application.

8. Areas of application.

E. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located, and who employs workers trained and approved by bait-station system manufacturer to install manufacturer's products.

B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.

C. Source Limitations: Obtain termite control products from a single manufacturer for each product.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination" to schedule application of termiticide products.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

1.7 COORDINATION

A. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

B. Apply borate treatment after framing, sheathing, and exterior weather protection is completed but before electrical and mechanical systems are installed.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Continuing Service: Beginning at Substantial Completion, provide 12 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, and terms for agreement period; and terms for future renewal options.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

1. Termiticides:

a. Aventis Environmental Science USA LP; Termidor.
b. Bayer Corporation; Premise 75.
c. Dow AgroSciences LLC; Dursban TC Equity.
d. FMC Corporation, Agricultural Products Group; Talstar Prevail FT Torpedo.
e. Syngenta; Demon TC.

2.2 SOIL TREATMENT

A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control.

1. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous

sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION, GENERAL

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.

1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.

2. Foundations: Adjacent soil including soil along the entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and chimney bases; also along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.

3. Crawlspaces: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.

4. Masonry: Treat voids.

5. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.

B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

D. Post warning signs in areas of application.

E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

1. Service Frequency: Inspect monitoring stations no fewer than once every three months.

END OF SECTION

EXCAVATION SUPPORT AND PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Provide excavation support and protection.

1.2 SUBMITTALS

A. Shop Drawings: Layout of shoring and bracing and other data, acceptable to local authorities having jurisdiction, prepared by a qualified professional engineer.

1.3 QUALITY ASSURANCE

A. Survey of Adjacent Structures and Levels: Registered land surveyor prior to excavation.

B. Engineer: A professional engineer licensed in the jurisdiction of the project.

C. System Design: Prevent cave-ins, loss of ground, or damage to people and property. Maintain shoring and bracing during construction activities, and remove shoring and bracing if practical when construction and filling is complete.

D. Comply with codes and ordinances of governing authorities having jurisdiction. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Excavation Support and Protection:
   1. Type: Heavy gauge steel sheeting.
   2. Type: Steel H-beams.
   3. Type: Treated heavy timbers.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in proper relation with adjacent construction to permit forming and finishing of concrete surfaces. Coordinate with work of other sections. Monitor during work progress.

B. Locate shoring and bracing to avoid permanent construction. Anchor and brace to prevent collapse.

END OF SECTION

AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SUMMARY

A. Excavate as indicated and install aggregate base course as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of aggregate base course.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. The quality of materials and performance of work specified in this section shall be in accordance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications). Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Construction Tolerances to be in accordance with NJDOT Specifications

C. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 301: Subbase

    b. Section 302: Aggregate Base Course

PART 2 PRODUCTS

2.1 MATERIALS

A. Dense Graded Aggregate Base Course:

1. Materials: Section 302

2. Dense Graded Aggregate. Subsection 901.10

PART 3 EXECUTION

3.1 INSTALLATION

A. All construction methods shall conform to Section 301 and 302 of the NJDOT Specifications.

B. All subbase and base compacting shall include the following: the in-place dry density of each compacted layer will be determined according to AASHTO T 191 or T 310 (Direct Transmission Method) except that only one method will be used throughout the Project

C. Remove loose material from compacted subbase. Proof roll and check for areas requiring additional compaction. Report unsatisfactory conditions in writing. Beginning of work means acceptance of subbase.

D. Aggregate Mixture: Dense Graded Aggregate Base Course, 6” Thick. Comply with NJDOT Specifications. Class as required by loading and use.

E. Apply prime coat to prepared subbase. Apply tack coat to previous laid work and adjacent in-place concrete surfaces.

F. Dense Graded Aggregate Base Course, 6” Thick shall be furnished, placed, and compacted prior to the placement of Hot Mix-Asphalt 19M64 Base Course.

END OF SECTION

ASPHALT PAVING

PART 1 GENERAL

1.1 SUMMARY

A. Complete asphalt paving as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of asphalt paving.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. The quality of materials and performance of work specified in this section shall be in accordance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications). Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Construction Tolerances to be in accordance with NJDOT Specifications.

C. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 401: Hot Mix Asphalt (HMA) Courses

PART 2 PRODUCTS

2.1 MATERIALS

A. Hot-Mix Asphalt Surface Course and Base Course:

1. Materials: NJDOT Specifications Section 401

2. Mixture: HMA 9.5M64, Subsection 902.02, mix shall contain maximum allowable amount of Reclaimed Asphalt Pavement (RAP).

3. Mixture: HMA 19M64, Subsection 902.02, mix shall contain maximum allowable amount of Reclaimed Asphalt Pavement (RAP).

B. Prime Coat: Subsection 902.01.02.

C. Tack Coat: Emulsified asphalt, Subsection 902.01.03.

D. Herbicide Treatment: EPA registered chemical for weed control.

E. Marking Paint: Alkyd-resin type, lead and chromate free, white or yellow.

PART 3 EXECUTION

3.1 INSTALLATION

A. Method of construction to include Hot Mix Asphalt plant and equipment, Hot Mix Asphalt pavers, vehicles for transporting Hot Mix Asphalt, rollers, and all construction methods shall conform to Section 401 of the NJDOT Specifications, as amended by the NJDOT Special Provisions for State Aid Projects, current revision.

B. Asphalt Mixture: Comply with NJDOT Specifications. Class as required by loading and use.

C. Remove loose material from compacted subbase. Proof roll and check for areas requiring additional compaction. Report unsatisfactory conditions in writing. Beginning of work means acceptance of subbase.

D. Apply prime coat to prepared subbase. Apply tack coat to previous laid work and adjacent in-place concrete surfaces.

E. Begin rolling when pavement can withstand weight of roller. Roll while still hot to obtain maximum density and to eliminate roller marks.

F. Any asphalt work deemed defective for thickness and smoothness shall be removed and replaced and patched to eliminate evidence of patching at no cost to the Owner.

END OF SECTION

CONCRETE CURB

PART 1 GENERAL

1.1 SUMMARY

A. Complete concrete curb as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of concrete curb.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. The quality of materials and performance of work specified in this section shall be in accordance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications) and the American Association of State Highway and Transportation Officials and all amendments thereto (AASHTO Specifications). Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Construction Tolerances to be in accordance with NJDOT and AASHTO Specifications

C. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 607: Curb

2. American Association of State Highway and Transportation Officials and all amendments thereto (AASHTO Specifications).

    a. AASHTO Spec M 33

    b. AASHTO Spec M 213

D. Causes for Rejection of Curb

1. Concrete curb shall be rejected and ordered replaced by the Engineer at no cost to the Owner if any, or all, of the following should occur, or exist:

a. Staining or discoloration of curb.

b. Curb is out of horizontal alignment more than 0.20’.

c. Curb is out of vertical alignment more than 0.10’.

d. Expansion joints are not perpendicular to roadway.

e. Joints and surfaces are improperly finished.

f. Expansion joints protrude from curb.

g. Cracks, chips, or other damage occur in construction of maintenance period.

h. Settlement of curb.

i. Inspection of form work not asked for by Contractor prior to pouring of curb.

j. Improper vibration of concrete.

k. Vandalism during initial setup of concrete.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete Curb:

1. Materials: NJDOT Section 607

2. Mixture: Class B Concrete, NJDOT Subsection 903.03.

3. Dense Graded Aggregate. NJDOT Subsection 901.10

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractor shall have adequate equipment to perform the work necessary under this Contract.

B. Method of construction shall conform to Section 607 of the NJDOT Specifications.

C. All concrete curbs shall be cured in accordance with subsections 607.03.01 and

405.03.02 of the NJDOT Specifications. All section lengths shall conform to subsection 607.03.01 and 607.03.02

END OF SECTION

CONCRETE SIDEWALK AND DRIVEWAYS

PART 1 GENERAL

1.1 SUMMARY

A. Complete concrete sidewalk as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of concrete sidewalks and driveways.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. The quality of materials and performance of work specified in this section shall be in accordance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications) and the American Association of State Highway and Transportation Officials and all amendments thereto (AASHTO Specifications). Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Construction Tolerances to be in accordance with NJDOT and AASHTO Specifications

C. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 606: Sidewalks and driveways, Driveways, and Islands

2. American Association of State Highway and Transportation Officials and all amendments thereto (AASHTO Specifications).

    a. AASHTO Spec M 33

b. AASHTO Spec M 213

D. Causes for Rejection of Concrete Sidewalks, Driveways, and Islands

1. Concrete sidewalks, driveways, and islands shall be rejected and ordered replaced by the Engineer at no cost to the Owner if any, or all, of the following should occur or exist:

a. Staining or discoloration of concrete sidewalk, driveway, or island.

b. Concrete sidewalk, driveway, or island is out of alignment.

c. Concrete sidewalk, driveway, or island is out of grade.

d. Joints and surfaces are improperly finished.

e. Expansion joints protrude from concrete sidewalk, driveway, or island.

f. Cracks, chips or other damage occur during the construction or maintenance period.

g. Settlement of concrete sidewalk, driveway, or island.

h. Inspection of form work not asked for by Contractor prior to pouring of concrete sidewalk, driveway, or island.

i. Improper vibration of concrete.

j. Vandalism during initial set-up of concrete.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete Sidewalks and driveways:

1. Materials: NJDOT Section 606

2. Mixture: Class B Concrete, NJDOT Subsection 903.03.

3. Dense Graded Aggregate. NJDOT Subsection 901.10

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractor shall have adequate equipment to perform the work necessary under this Contract.

B. Method of construction shall conform to Section 606 of the NJDOT Specifications.

C. All concrete sidewalks and driveways shall be cured in accordance with subsections 606.03.02 and 405.03.02 of the NJDOT Specifications.

END OF SECTION

ACCESS DRIVEWAY

PART 1 GENERAL

1.1 SUMMARY

A. Complete access driveway as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of access driveway.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1.3 QUALITY ASSURANCE

A. The quality of materials and performance of work specified in this section shall be in accordance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications). Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Construction Tolerances to be in accordance with NJDOT Specifications.

C. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 901.11: Soil Aggregate

PART 2 PRODUCTS

2.1 MATERIALS

A. Materials: NJDOT Specifications Section 901.11

B. Access driveway: Refer to Contract Drawings. Select backfill material to be Soil Aggregate designation I-13 and conform to Section 901.11 of the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 (NJDOT Specifications).

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractor shall have adequate equipment to perform the work necessary under this Contract.

B. Shop drawings shall be submitted for approval detailing the access driveway prior to installation.

C. All materials shall be installed in accordance with NJDOT Specification Section 901.11.

END OF SECTION

PAVEMENT MARKINGS AND SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

A. Complete pavement stripes, markings, regulatory signs, warning signs, and street signs as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of pavement markings and signage.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. The quality of materials and performance of work specified in this section shall be in accordance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications) and the Manual on Uniform Traffic Control Devices (MUTCD Specifications). Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Construction Tolerances to be in accordance with NJDOT and MUTCD specifications.

C. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications)

    a. Section 610: Traffic Stripes, Traffic Markings, and Rumble Strips

2. Manual on Uniform Traffic Control and all amendments thereto (MUTCD Specifications)

    a. Chapter 2B: Regulatory Signs
    b. Chapter 2C: Warning Signs

c. Chapter 3B: Pavement and Curb Markings

PART 2 PRODUCTS

2.1 MATERIALS

A. Traffic Stripes and Markings, Thermoplastic and Epoxy Resin as applicable should comply with NJDOT Specifications Section 610.02 and include the following added to Section 610.02.02 Equipment:

The epoxy resin striping and liquid system striping equipment shall be so designed, equipped, maintained, and operated that the material is properly applied in variable widths at a consistent temperature. The striping equipment shall include a tachometer and a pressure gauge and a calibrated holding vessel for each component. The holding vessels for all pigments and hardeners shall have thermometers for measuring the temperature of the vessel contents. The striping equipment shall be equipped with a separate power unit for the pumps used in the mixing and distribution of the components. The following shall be furnished with each striping equipment:

1. A calibration sheet that shows the number of the truck body, the capacity thereof, and an outage table in increments of not over ½ inch. This calibration sheet must be certified by the manufacturer or testing agency.

2. A metal rod for each holding vessel, with accurate divisions marked and consecutively numbered starting at the bottom. The rod shall be not less than 1 foot longer than the depth of the vessel.

3. Slip-proof steps with handrail to reach ground level.

4. Slip-proof catwalk with handrail, running along the top of the vessel.

5. Fire extinguisher in working order.

The equipment for applying thermoplastic material shall be capable of providing continuous mixing and agitation of the material. The parts of the equipment conveying the material between the main reservoir and the shaping die shall be so constructed to prevent accumulation and clogging. The mixing and conveying parts and the shaping dies or spray gun shall be capable of maintaining the material at optimum plastic temperature. The equipment shall be so constructed to ensure continuous uniformity in the dimensions of the entire stripe or marking. The kettle provided for the melting and heating of the thermoplastic material shall be equipped with an automatic thermostat control device and heated by a controlled heat-transfer liquid rather than by a direct flame. The heating kettle and applicator shall be equipped and arranged to meet the National Board of Fire Underwriters and State and Federal regulations. The parts of the equipment that come in contact with the material shall be easily accessible for cleaning and maintenance.

All equipment for applying traffic stripes or traffic markings shall be equipped with glass bead dispensers of a type that will mechanically and automatically dispense beads uniformly on wet stripes or markings at the rates specified.

Equipment for removing the various types of traffic stripes or traffic markings shall be designed with a vacuum system to remove all millings from the pavement surface and prevent airborne residue from escaping into the atmosphere.

All equipment including traffic marking tape applicator and retrometer shall be duly calibrated and shall conform to manufacturer's requirements.

B. Warning and Regulatory Sign should comply with NJDOT Specifications Section 612.02.

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractor shall have adequate equipment to perform the work necessary under this Contract.

B. Shop drawings shall be submitted for approval detailing the aggregate base course prior to installation.

C. Subgrade preparation shall be performed in accordance with manufacturer's recommendations.

D. All materials shall be installed in accordance NJDOT Specifications Section 610.03 and 612.03 including amendments to these sections as described under the NJDOT Special Provisions for State Aid Projects, current revision.

END OF SECTION

SITE IMPROVEMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Site improvements and amenities must cover the entire area of the contemplated construction and installation as illustrated on the drawings and in the manner and detail described in the specifications.

B. Contractor shall provide all labor, superintendence, materials, tools, transportation, plant and equipment and all means of construction necessary and reasonably incidental to the complete the site improvements specified herein and as indicated on the Contract Drawings.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated on the Contract Drawings and/or in the Specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Deliver, handle, and store materials in accordance with manufacturer's instructions. Use experienced installers.

PART 2 PRODUCTS

2.1 MATERIALS

A. Products shall be as specified herein and as indicated on the Contract Drawings.

B. If a product is not specifically called out, provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

B. Restore damaged finishes and test for proper function. Clean and protect work from damage.

END OF SECTION

WOOD FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Complete wood split rail fences and gates as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of wood split rail fences and gates.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions

PART 2 PRODUCTS

2.1 MATERIALS

A. Wood fences and gates:

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractor shall have adequate equipment to perform the work necessary under this Contract.

B. Shop drawings shall be submitted for approval detailing the wood split rail fence with black PVC coated WWF prior to installation.

C. All materials shall be installed in accordance with manufacturer’s recommendations.

END OF SECTION

MANUFACTURED METAL BOLLARDS

PART 1 GENERAL

1.1 SUMMARY

A. Complete manufactured metal bollards as detailed or referenced on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of manufactured metal bollards

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. The quality of materials and performance of work specified in this section shall be in accordance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications) and the American Society of the International Association for Testing and Materials and all amendments thereto (ASTM Specifications). Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Construction Tolerances to be in accordance with NJDOT and manufacturer specifications

C. References:

1. American Society of the International Association for Testing and Materials, 2014 and all amendments thereto (ASTM Specifications).

    a. ASTM F3016/F3016M-14: Standard Test Method for Surrogate Testing of Vehicle Impact Protective Devices at Low Speeds

PART 2 PRODUCTS

2.1 MATERIALS

A. Pipe Bollard, SCH 80 Pipe

B. Neoprene Tape

C. Foundation: Concrete, Pea Gravel, SCH 40 PVC Sleeve, CE CRD-C621 Non-shrink Grout

D. Bollard cover shall be Ideal Shield Bollard Cover by Ideal Shield or approved equal.

E. Sealant shall be Sikaflex – 1C SL Sealant by Sika Corporation or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractor shall have adequate equipment to perform the work necessary under this Contract.

B. Shop drawings shall be submitted for approval detailing the aggregate base course prior to installation.

C. Subgrade preparation shall be performed in accordance with manufacturer's recommendations.

D. All materials shall be installed in accordance with manufacturer's recommendations.

END OF SECTION

SODDING

PART 1 GENERAL

1.1 SUMMARY

A. Complete sodding as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of soddings.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Maintenance Data: Submit maintenance data, including maintenance schedule.

D. Warranty: Warrant sod for a period of one year after date of Substantial Completion, against defects including death and unsatisfactory growth and except for defects resulting from neglect by Owner, abuse by others, or natural phenomena. Replace unsatisfactory sodding material at end of warranty period at no additional expense to the Owner. One replacement is required.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. References:

1. American Standard for Nursery Stock and all amendments thereto (ANSI Z60.1).

2. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 808: Sodding

PART 2 PRODUCTS

2.1 MATERIALS

A. Sodding: Refer to Contract Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials in accordance NJDOT Specifications Section 808.

B. Provide maintenance and watering until turnover to Owners for maintenance and watering. Replace damaged materials and dead or unhealthy sod prior to turnover to Owner.

END OF SECTION

PLANTS & TREES

PART 1 GENERAL

1.1 SUMMARY

A. Complete planting as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of plants.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Maintenance Data: Submit maintenance data, including maintenance schedule.

D. Notices: Submit 48-hour written notice prior to turnover to Owner for watering and maintenance.

E. Warranty: Warrant trees and shrubs for a period of one year after date of Substantial Completion, against defects including death and unsatisfactory growth and except for defects resulting from neglect by Owner, abuse by others, or natural phenomena. Replace unsatisfactory plant material at end of warranty period at no additional expense to the Owner. One replacement is required.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Balled and Burlapped Plants and Trees: Graded to American Standard for Nursery Stock, ANSI Z60.1.

C. Testing: Laboratory testing for suitable soil amendments and fertilizer.

D. References:

1. American Standard for Nursery Stock and all amendments thereto (ANSI Z60.1).
2. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT

Specifications).

a. Section 811: Planting

PART 2 PRODUCTS

2.1 MATERIALS

A. Planting: Refer to Contract Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials in accordance with approved submittals. Install landscape work in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

B. Prepare topsoil by mixing fertilizer with loam. Apply fertilizer at a rate of 2 pounds of actual nitrogen per 1000 sq. ft. for plant beds and 2 pounds per inch of trunk for tree pits.

C. Install soil mix to a depth of 18' in plant beds.

D. For seeded lawns, apply seed at rate of 4 pounds per 1000 square feet.

E. For lawns with sod, place sod tightly, with grain in same direction.

F. Excavate as required for trees and shrubs.

G. Install plant material and backfill with soil mix. Stake and guy trees. Water thoroughly. Allow for soil settlement.

H. Provide maintenance and watering until turnover to Owners for maintenance and watering. Replace damaged materials and dead or unhealthy plants prior to turnover to Owner.

END OF SECTION

UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Site Improvements include installation of Public Utilities, including Gas, Electric and Telephone, to the Replacement Buildings. Contractor shall coordinate installation with the respective utility companies.

PART 2 - PRODUCTS – N/A

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation to be completed by the respective utility companies. Contractor to coordinate installation.

END OF SECTION

WATER UTILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Complete water utilities and provide underground, exterior water servicing piping systems as per requirements of local authority having jurisdiction and as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of water utilities.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Testing: Hydrostatic tests at minimum 2 times working pressure for 2 hours.

C. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 651: Water

2. American Water Works Association

    a. AWWA D 102-78

PART 2 PRODUCTS

2.1 MATERIALS

A. Water Service Piping Systems:

1. Manufacturers:
   Endot Industries Inc.
   James Jones Co.
   Jay R. Smith Mfg. Co.
   Kupferle Foundry Co.
   Merrill Mfg. Co.
   Or approved equal.
2. Application: Water service piping for buildings.
3. Piping: Ductile iron.
4. Piping: PVC.
5. Piping: Fiberglass.
6. Piping: Copper.
7. Piping: Polybutylene.
8. Piping: Polyethylene.
9. Valves: Suitable for service.
10. Anchorages: Suitable for service.
11. Accessories:
    a. Gray iron sleeve coupling assemblies.
    b. Reinforced concrete valve pits with ladder and cast-iron manhole frame and cover.
    c. Utility Company water meter.
    d. Backflow preventers.
    e. Vacuum breakers.
    f. Free standing fire hydrants.
    Fire hydrants shall be Mueller Supercenturion Model #250A423, Waterous Pacer Model 250, American Darling B-62-B, or approved equal.
    g. Free standing fire department connections.
    h. Metallic-lined plastic underground identification tapes.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction. Coordinate with work of other sections.

B. Water utilities shall be in accordance with NJDOT Specifications Section 651 with the following added to Section 651.03.07:

Resetting Water Valves shall be such that when reset, the vent/valve/cleanout boxes shall conform to the grade of the resurfaced or re-graded area. Care shall be exercised in resetting the vent/valve/cleanout boxes. After resetting, the vent/valve/cleanout boxes shall be protected until the final resurfacing course has been laid. Castings which are damaged because of construction operations or vehicular traffic shall be replaced in kind and in a manner satisfactory to the utility

company concerned without additional compensation.

C. Clean and disinfect system. Test for proper operation. Backfill and protect work from damage.

END OF SECTION

SANITARY SEWERAGE UTILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Complete sanitary sewerage utilities as per requirements of local authority having jurisdiction and as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of sanitary sewerage utilities.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

D. This work shall include the resetting of sanitary sewer vents and sanitary sewer cleanouts; storm sewer cleanouts; and under-drain cleanouts. The work shall also consist of relocating sewer vents as shown on the contract drawings.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 652: Sanitary Sewers

2. American Society of the International Association for Testing and Materials, 2014 and all amendments thereto (ASTM Specifications).

    a. ASTM D3034: Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

    b. ASTM C-478: Standard Specification for Circular Precast Reinforced Concrete Manhole Sections

3. American Water Works Association
   a. AWWA D 102-78

PART 2 PRODUCTS

2.1 MATERIALS

A. Sanitary Sewerage Systems:
   1. Manufacturers:
      Quikrete Companies (The)
      Tensar International Corporation
      Five Star Products, Inc.
      Or approved equal.
   2. Application: Sewerage piping and systems for building wastes.
   3. Pipe and Fittings: Hub-and-spigot cast-iron pipe.
   4. Pipe and Fittings: Hubless cast-iron pipe.
   5. Pipe and Fittings: PVC.
   6. Pipe and Fittings: Fiberglass.
   7. Pipe and Fittings: Non-reinforced concrete.
   8. Pipe and Fittings: Reinforced concrete.
   9. Sleeves, Couplings, Gaskets and Valves: Suitable for service.
   10. Manholes, Cleanouts and Catch Basins: Suitable for service.
       Manhole covers and frames shall be American made by Campbell Foundry, Pattern No. 10128 or approved equal with drop lift handles and “SEWER” cast in lid.
   11. Accessories:
       a. Outfalls.
       b. Dry wells.
       c. Trench drains.
       d. Packaged pumping stations.

PART 3 EXECUTION

3.1 INSTALLATION

A. All construction methods for sanitary sewer facilities shall conform to Section 652 of NJDOT Specifications with the exception of the following subsection additions in Section 652.03:

   Castings which are damaged because of construction operations or vehicular traffic shall be replaced in kind and in a manner satisfactory to the utility company concerned without additional compensation.

B. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction. Coordinate with work of other sections.

C. Where connections are made to existing systems, rout out old drainage lines.

D. Test for proper operation. Clean and protect work from damage.

END OF SECTION

STORM DRAINAGE UTILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Complete storm drainage utilities as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of storm drainage utilities.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 602: Drainage Structures

2. American Society of the International Association for Testing and Materials, 2014 and all amendments thereto (ASTM Specifications).

    a. ASTM C76-15a: Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

    b. ASTM C-478: Standard Specification for Circular Precast Reinforced Concrete Manhole Sections

1.4 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Engineer not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Engineer's written permission.

PART 2 PRODUCTS

2.1 MATERIALS

A. Storm Drainage Systems:

1. Manufacturers:
   Contech
   Or approved equal
2. Application: Storm drainage piping and systems for storm water runoff.
3. Pipe and Fittings: Reinforced Concrete
4. Pipe and Fittings: HERCP
5. Pipe and Fittings: HDPE
6. Pipe and Fittings: PVC
7. Sleeves, Couplings, Gaskets and Valves: Suitable for service.
8. Manholes, Cleanouts and Catch Basins: Suitable for service.
9. Accessories:
   a. Swales
   b. Basins
   c. Culverts
   b. Headwalls
   d. Flared end sections
   e. Concrete outflow structures
   f. Emergency spillways
   g. Rip-rap and scour holes

Related: 312500 – Erosion and Sedimentation Controls

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction. Coordinate with work of other sections.

B. Clean and disinfect system. Test for proper operation. Backfill and protect work from damage.

END OF SECTION

STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Complete pipe, fittings, and joints as per requirements of local authority having jurisdiction and as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of pipe.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 601: Pipe

2. ASTM F 1216

    a. AWWA D 102-78

PART 2 PRODUCTS

2.1 MATERIALS

A. Storm Utility Drainage Piping:

1. Application: Storm drainage.
2. Piping: Reinforced Concrete, Class III;
Reinforced Concrete, Class IV
PVC Pipe, SDR 26;
Storm Sewer Cleanout
Gasketed Bell Connection
Gasketed Bell Connection shall be Inserta Tee Fatboy, SDR 26, SDR 35 Gasketed Bell Gravity or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All construction methods for reinforced concrete pipe shall conform to Section 601 of NJDOT Specifications as amended by the NJDOT Special Provisions for State Aid Projects, current revision.

B. PVC pipe, SDR 26; storm water cleanout, and gasketed bell connection shall be installed in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction. Coordinate with work of other sections.

C. Clean and disinfect system. Test for proper operation. Backfill and protect work from damage.

END OF SECTION

BASINS

PART 1 GENERAL

1.1 SUMMARY

A. Complete stormwater basins as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of stormwater basins.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Stormwater basins: Refer to Contract Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractor shall have adequate equipment to perform the work necessary under this Contract.

B. Shop drawings shall be submitted for approval detailing the stormwater basins prior to installation.

C. All materials shall be installed in accordance with manufacturer’s recommendations.

END OF SECTION

STORM DRAINAGE STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. Complete structures, fittings, and joints as per requirements of local authority having jurisdiction and as detailed on the Contract Drawings and as specified herein.

B. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of drainage structures.

C. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Test Reports: Submit for approval test reports.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

    a. Section 602: Drainage Structures

PART 2 PRODUCTS

2.1 MATERIALS

A. Storm Utility Drainage Structures:

1. Application: Storm drainage.
2. Inlets: Type “A”; Type “B”; Type “Double B”; Type “E”
3. Manholes: 4’ Diameter; Jellyfish

4. Bicycle Safe Grate
5. Concrete Outflow Structure, 0’-6’ Deep
6. Concrete Headwall

PART 3 EXECUTION

3.1 INSTALLATION

A. All construction methods for storm drainage structures shall conform to Section 602 of NJDOT Specifications as amended by the NJDOT Special Provisions for State Aid Projects, current revision.

B. Clean and disinfect system. Test for proper operation. Backfill and protect work from damage.

END OF SECTION

PIPED ENERGY DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

A. Provide piped energy distribution system piping, specialties, and accessories outside the building.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1.3 QUALITY ASSURANCE

A. Comply with ANSI Z223.1 or NFPA 54 or AGA IFGC and local codes for materials, installation, testing, inspection, and purging.

B. Minimum Working-Pressure Ratings:
1. Piping and Valves: 100 psig.
2. Service Regulators: 100 psig.
3. Service Meters: 20 psig.
4. Aboveground Fuel Oil Piping: 150 psig.
5. Underground Fuel Oil Piping: 150 psig.
6. Vent, Gauge, and Fill Piping: 100 psig.
7. Fuel Oil Storage Tanks: 5 psig.
8. Fuel Oil Storage Tank, Outer Containment Shell Walls: 5 psig.
9. Containment Conduit Piping System, Carrier Pipe: 150 psig.
10. Containment Conduit Piping System, Containment Conduit: 5 psig.

PART 2 PRODUCTS

2.1 MATERIALS

A. Natural Gas Piping Systems:
1. Manufacturers:
Air Products and Chemicals, Inc.
Dura Line Corp.
Performance Pipe

2. Application: Piping systems for natural gas supply to buildings.
3. Piping Type: Steel.
4. Piping Type: Polyethylene.
5. Fittings, Valves and Boxes: Suitable for service.
6. Gas Meters: Provided by utility company.
7. Pressure Regulators: Steel-jacketed pressure regulators.
8. Valve and Meter Pits: Concrete, 3000 psi; with ladder, manhole frame and cover, drain.
9. Piping Specialties: Dielectric fittings, service line risers, flexible

connectors, and strainers.

10. Protective Coating: Factory-applied, corrosion-resistant, polyethylene coating for corrosive atmospheres.
11. Identification: Metal engraved nameplates; metallic-core plastic underground warning tapes.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with local utility company requirements, pipe manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction. Coordinate with work of other sections.

B. Test for proper operation. Clean and protect work from damage.

END OF SECTION

ELECTRICAL UTILITY POLES

PART 1 GENERAL

1.1 SUMMARY

A. This section applies to installation of street lighting as indicated on the Site Plans.

B. Complete electrical utility poles for lighting as detailed on the Contract Drawings and as specified herein. Work includes coordinating with Utility Company and installing underground conduit and wiring as necessary for a complete and operational lighting system.

C. Provide all labor, superintendence, materials, tools, transportation, equipment and all means of construction necessary and reasonably incidental to the installation of lighting poles.

D. All materials and labor obviously a part of the work, and as necessary for proper installation and/or operation of same, although not specifically indicated in the Contract Documents and/or in the specifications shall be provided by the Contractor as if called in detail without additional cost to the Owner.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Maintenance Data: Submit maintenance data, including maintenance schedule.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. References:

2. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019 and all amendments thereto (NJDOT Specifications).

a. Section 703: Highway Lighting

PART 2 PRODUCTS

2.1 MATERIALS

A. Pole Mounted Lighting: Refer to Contract Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractor shall have adequate equipment to perform the work necessary under this Contract.

B. Shop drawings shall be submitted for approval detailing the electric utility poles prior to installation.

C. All materials shall be installed in accordance with manufacturer's recommendations.

END OF SECTION

APPENDIX

A101 OWNER /CONTRACTOR AGREEMENT FORM (Draft)	7 Pages
A201 GENERAL CONDITIONS	54 Pages
STATE AND COUNTY PREVAILING WAGE RATES	1 Page
GEOTECHNICAL ENGINEERING REPORT	26 Pages
SOILS ENGINEERING REPORT	16 Pages
PROJECT LABOR AGREEMENT	43 Pages
STEELWORKERS ADDENDUM	1 Page

A101 OWNER /CONTRACTOR AGREEMENT FORM (Draft)

AIA® Document A101™ – 2007

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the _____ day of _____ in the year 2026
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

Gloucester County
254 County House Road
Clarksboro, New Jersey 08020

and the Contractor:
(Name, legal status, address and other information)

.
.
.

for the following Project:
(Name, location and detailed description)

Harrison Township EMS Building
169-171 Bridgetown Pike
Mullica Hill, New Jersey 08062

The Architect:
(Name, legal status, address and other information)

Bach Associates, PC
304 White Horse Pike
Haddon Heights, New Jersey 08035

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

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6 DISPUTE RESOLUTION

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8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

10 INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

Shop drawings, submittals, etc can be commenced after Notice to Proceed has been given by Owner or Architect.

(Paragraph deleted)

3.3 § The Contractor shall achieve Substantial Completion of the entire Work not later than Two Hundred Forty (240) days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

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Portion of Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

Liquidated damages shall be $500.00 per calendar day.

ARTICLE4CONTRACTSUM

1.4 § The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be XXXXX ($ 00.00) including the base bid, and allowances, subject to additions and deductions as provided in the Contract Documents.

2.4 § The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.3 Unit prices, if any:
(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price Per Unit ($0.00)
NA	NA	NA

§ 4.4 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price
Construction Allowance (Included in base Bid)	$15,000
Exterior Signage Allowance (Included in Base Bid)	$20,000

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

The exact schedule of Application for Payment submittals will be established at the Pre-Construction Meeting.

3.1.5 § Provided that an Application for Payment is received by the Architect not later than two weeks prior to the first Wednesday of a month, the Owner shall authorize same payment of the certified amount to the Contractor not later than the first day of the next month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than sixty (60) days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

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§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of two percent (2%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of two percent (2%);

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made as follows:

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The Contractor shall submit a separate voucher for the full amount of the retainage along with the Consent of Surety, A.I.A. Form G707A and the Contractor shall be required to furnish a Maintenance Bond for 100% of the Project Cost for a period of two (2) years from the Date of Final Acceptance.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 NON-BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of non-binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

[X] Non-binding Arbitration pursuant to Section 15.4 of AIA Document A201–2007

[ ] Litigation in a court of competent jurisdiction

[ ] Other *(Specify)*

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

No interest

§ 8.3 The Owner's representative:
(Name, address and other information)

Peter A. Scirrotto Sr. - Director Buildings and Grounds
Building and Grounds
254 County House Road
Clarksboro, New Jersey 08020

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§ 8.4 The Contractor's representative:
(Name, address and other information)

Contractor...

8.5 §Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

8.6 §Other provisions:

The Drawings, Specifications and any addendums shall be considered as part of this Contract.

DOCUMENTS CONTRACT OF 9 ENUMERATION ARTICLE

9.1 §The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

9.1.1 §The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

9.1.2 §The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

§ 9.1.4 The Specifications:

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)
See Specification Section TABLE OF CONTENTS of the Project Specifications for the Harrison Township EMS Building, dated October 26, 2026 for a complete list of specification section.

Section	Title	Date	Pages

5.1.9 §The Drawings:

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

See Specification Section 000115 - LIST OF DRAWING SHEETS of the Project Specifications for the Harrison Township EMS Building, dated October 26, 2026 for a complete list of drawings.

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

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§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

.1 The Drawings, Specifications and any addendums shall be considered as part of this Contract.

.2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

N/A

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007. The contractor shall also purchase and maintain bonds as set forth in Article 12 of AIA Document A201-2007

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007.)

Type of insurance or bond	Limit of liability or bond amount ($0.00)
Performance and Payment Maintenance Bond	100% Contract Value 100% Final Contract Value - 2 year

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR***(Signature)* .
Stephen Sweeney - Gloucester County Administrator	.
(Printed name and title)	*(Printed name and title)*

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A201 GENERAL CONDITIONS

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
Harrison Township EMS Building
169-171 Bridgetown Pike
Mullica Hill, New Jersey 08062

THE OWNER:
(Name, legal status and address)
Gloucester County
254 County House Road
Clarksboro, New Jersey 08020

THE ARCHITECT:
(Name, legal status and address)
Bach Associates, PC
304 White Horse Pike
Haddon Heights, New Jersey 08035

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

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§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION
Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION
In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE
§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM
If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

§ 1.7 EXECUTION OF CONTRACT DOCUMENTS

§ 1.7.1 The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon Request. ***The Agreement shall be signed in not less than quadruplicate by the Owner and Contractor.***

§ 1.7.2 Execution of the contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with the local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. ***Execution of the contract by the Contractor is a representation that said Contract Documents are full and complete, are sufficient to have enabled the Contractor to determine the cost of the Work therein to enter into the Contract and that the Contract Documents are sufficient to enable it to construct the Work outlined therein, and otherwise to fulfill all its obligations hereunder, including, but not limited to, Contractor's obligation to construct the Work for an amount not in excess of the Contract Sum on or before the date(s) of Substantial Completion established in the Agreement. The Contractor further acknowledges and declares that it has visited and examined the site, examined all physical, legal, and other conditions affecting the Work and is fully familiar with all of the conditions thereon and thereunder affecting the same. In connection therewith, Contractor specifically represents and warrants to Owner that it has, by careful examination, satisfied itself as to: (1) the nature, location and character of the Project and the site, including, without limitation, the surface and subsurface conditions of the site and all structures and obstructions thereon and thereunder, both natural and man-made, and all surface and subsurface water conditions of the site and the surrounding area; (2) the nature, location, and character of the general area in which the Project is located, including without limitation, its climatic conditions, available labor supply and labor costs, and available equipment supply and equipment costs; and (3) the quality and quantity of all materials, supplies, tools, equipment, labor, and professional services necessary to complete the Work in the***

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manner and within the cost and time frame required by the Contract Documents, In connection with the foregoing, and having carefully examined all Contract Documents, as aforesaid, and having visited the site, the contractor acknowledges and declares that it has no knowledge of any discrepancies, omissions, ambiguities, or conflicts in said Contract Documents and that if it becomes aware of any such discrepancies, omissions, ambiguities, or conflicts, it will promptly notify Owner and Architect of such fact.

§ 1.7.3 ***The Contract Documents include all items necessary for the proper execution and completion of the Work by the Contractor. The Work shall consist of all items specifically included in the Contract Documents as well as all additional items of work which are reasonably inferable from that which is specified in order to complete the Work in accordance with the Contract Documents, The Contract Documents are complementary, and what is required by any one Contract Document shall be as binding as if required by all. Any differences between the requirements of the Drawings and the Specifications or any differences noted within the Drawings themselves or within the Specifications themselves have been referred to the Owner and Architect by Contractor prior to the submission of bids and have been clarified by an Addendum issued to all bidders.***

If any such differences or conflicts were not called to the Owner's and Architect's attention prior to submission of bids, the Architect shall decide which of the conflicting requirements will govern based upon the most stringent of the requirements, and, subject to the approval of the Owner, the Contractor shall perform the Work at no additional cost and/or time to the Owner in accordance with the Architect's decision. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results.

§ 1.7.3.1 The term "reasonably inferable" includes work necessary to "provide" work indicated or specified, as defined in section: Definitions and Standards; that is: furnish and install, complete, in place and ready for use.

§ 1.7.3.2 Details referenced to portions of the Work shall apply to other like portions of the Work not otherwise details.

§ 1.7.3.3 The Contractor shall request the Architect/Engineer's interpretation of apparent discrepancies, conflicts, or omissions in the Specifications and Drawings. Subcontractors shall forward such requests through the Contractor. Such requests, and the Architect/Engineer's interpretation, shall be in written form; other forms of communications shall be used to expedite resolution of concerns, but will not be binding.

§ 1.7.4 Explanatory notes shall take precedence over conflicting drawn note indications. Large scale drawings shall take precedence over small scale drawings. Figured dimensions shall take precedence over scaled measurements. Should contradictions be found, the Architect shall determine which indication is correct.

§ 1.7.5 When more than one material, brand, or process is specified for a particular item of Work, the choice shall be the Contractor's. Contractor may, after notifying the Architect and Owner, select the one it considers to be the best. Approval by Architect or Owner of materials, suppliers, processes, or Subcontractors does not imply a waiver of any Contract requirements including, without limitation, Contractor's warranty.

§ 1.7.6 In all cases, the details, drawings, and specifications shall be checked with existing conditions and with work in place, and variations, if any, shall be referred by the Contractor to the Architect for adjustment, as the Contractor will be responsible for the fit or work in place.

§ 1.7.7 When a profile, section or other finished condition is shown, furring or other method of obtaining such finished conditions shall be provided. The drawings may show work fully drawn out or only a portion thereof, the remainder being in outline, the drawn out portions apply to other like or similar places.

§ 1.7.8 Where it is required in the specifications that materials, products, processes, equipment, or the like be installed or applied in accordance with manufacturer's instructions, directions, or specifications, or words to this effect, it shall be construed to mean that said application or installation shall be in strict accordance with printed material concerned for use under conditions similar to those at the job site. Three copies of such instructions shall be furnished to the Architect and his written approval thereof obtained before work is begun.

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§ 1.7.9 Any material specified by reference to the number, symbol, or title of a Commercial Standard, Federal Specification, ASTM Specification, trade association standard, or other similar standards, shall comply with the requirements in the latest revision thereof and any amendments or supplements thereto in effect one month prior to the date on which bids are opened and read except as limited to type, class, or grade, or modified in such reference. The standards referred to, except as modified in the specifications, shall have full force and effect as through printed in the specifications. The Architect will furnish upon request information as to how copies of the standards referred to may be obtained.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

(Paragraph deleted)

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.2 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

(Paragraphs deleted)

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or fails to carry out Work in accordance with the Contract Documents, *or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time or fails to remove and discharge (within ten days) any lien filed upon Owner's property by anyone claiming by, through, or under Contractor, or disregards the instructions of Architect or Owner when based on the requirements of the Contract Documents,* the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

(Paragraph deleted)

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§ 3.1.1.1 The term "Contractor" shall mean the respective Prime Contract person or entity identified as such in the Owner Contractor Agreement, for each respective Prime Construction Contract, as responsible for the supervisory control over allocation, coordination of all SubContractors or trades, performance and completion of all portions of the Work, including cooperation with those doing portions of the Work under Separate Contract with the Owner.

§ 3.1.1.2The term "Contractor" shall mean and apply with equal force to each respective Prime Contractor and all other Contractors having a direct Contract with the Owner, or with each respective Contractor or other Prime Contractor for other branches of the Work, or his authorized representative.

§ 3.1.2 The Contractor shall not be relived of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 In addition to and not in derogation of Contractor's duties under Paragraph 1.7.2 and 1.7.3, the Contractor shall carefully study and compare the Contract Documents with each other and shall at once report to the Architect errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner or Architect for damage resulting from errors, inconsistencies or omissions in the Contract Documents that could not have been discovered by a prudent and experienced contractor in advance and that are not in the nature of items described in and intended to be covered in Paragraph 1.7.2 and 1.7.3 unless the Contractor recognized or reasonably should have recognized such error, inconsistency or omission and failed to report it to the Architect. If the Contractor performs any construction activity involving an error, inconsistency or omission in the Contract Documents that the Contractor recognized or reasonably should have recognized without such notice to the Architect, the Contractor shall Assume Complete Responsibility for such performance and shall bear the full amount of the attributable costs for correction.

§ 3.2.1.1 If any errors, inconsistencies, or omissions in Contract Documents are recognized or reasonably should have been recognized by the Contractor, any member of its organization, or any of its Subcontractors, the Contractor shall be responsible for notifying the Architect in writing of such error, inconsistency, or omission before proceeding with the Work. The Architect will take such notice under advisement and within a reasonable time commensurate with job progress render a decision. If Contractor fails to give such notice and proceeds with such Work, it shall correct any such errors, inconsistencies, or omissions at no additional cost to the Owner.

§ 3.2.1.2 Deviations from the Construction documents must be noted by the Prime Contractor at the time of shop drawing submission. Failure to do so will result in the implication of Section 3.2 of the General Conditions and Paragraph 3.2.1 and 3.2.1.1 above.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor

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shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor, when requested by the Architect, shall meet with representative of the Architect at all times and furnish all information requested; he shall allow the Architect to inspect the work at all times. Neither the Owner, nor the Architect shall be liable to the Contractor for extra compensation or damages for interference or delays on account of any such meetings, information, or inspections so requested or other acts of the Architect done in good faith and within the scope of their employment by the Owner.

§ 3.3.4.1 In addition the Contractor is entrusted with the oversight, management control, and general direction of this project to insure that all contract completion dates are met. In the event that there are any delays caused to any subcontractor on this project, liability shall lie with the Contractor and not with the Owner.

§ 3.3.5 The contractor has the responsibility to ensure that all material suppliers and Subcontractors, their agents, and employees adhere to the Contract Documents, and that they order materials on time, taking into account the current market and delivery conditions and that they provide materials on time. The Contractor shall coordinate its Work with that of all others on the Project including deliveries, storage, installations, and construction utilities. The contractor shall be responsible for the space requirements, locations, and routing of its equipment. In areas and locations where the proper and most effective space requirements, locations and routing cannot be made ad indicated, the Contractor shall meet with all others involved, before installation, to plan the most effective and efficient method of overall installation.

§ 3.3.6 The Contractor shall establish and maintain bench marks and all other grades, lines and levels necessary for the Work, report errors or inconsistencies to the Architect before commencing Work, and review the placement of the building(s) and permanent facilities on the site with the Owner and Architect after all lines are staked out and

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before foundation Work is started. Contractor shall provide access to the Work for the Owner, the Architect, other persons designated by Owner, and governmental inspectors. Any encroachments made by contractor or its Subcontractor (of any tier) on adjacent properties due to construction as revealed by an improvement survey, except for encroachments arising from errors or omissions not reasonably discoverable by Contractor in the Contract Documents, shall be the sole responsibility of the Contractor, and Contractor shall correct such encroachments within thirty (30) days of the improvement survey (or as soon thereafter as reasonably possible), at contractor's sole cost and expense, either by the removal of the encroachment (and subsequent reconstruction on the Project site) or agreement with the adjacent property owner(s) (in form and substance satisfactory to Owner in its sole discretion) allowing the encroachments to remain.

§ 3.3.7 **Coordination:**

§ 3.3.7.1 In the case of a single prime Contract, the General Contractor becomes the sole responsible party for the coordination of the entire project, and all other prime contractors shall mean subcontractors; In the case of a multiple Prime Contract, the General Contractor shall also be responsible to coordinate the relationships among the Prime Contractors.

§ 3.3.7.2 The General Contractor shall be responsible to coordinate and expedite the total construction process and all of its parts. The Owner relies upon the organization, management, skill, cooperation and efficiency of the General Contractor to supervise, direct, control and manage the work and to coordinate and expedite the efforts of the other prime contractors and subcontractors so as to deliver the work conforming to the contract within the schedules time. The General Contractor is responsible for Proper sequence and coordination. It shall determine the location of work and resolve conflicts amongst Contractors.

§ 3.3.7.3 The General Contractor and all other prime contractors shall provide a qualified full-time staff member or members (i.e.: project managers, superintendent, or foreman) to oversee their own work and the work of their sub-contractors. Should the Prime contractor be responsible for multiple projects at different sites, then such prime contractor shall provide a separate qualified superintendent for each of the projects. In addition, the General Contractor shall provide a qualified full-time superintendent or members to provide mechanical and electrical coordination and perform coordination with all their subcontractors.

§ 3.3.7.4 The Contractor's superintendent and/or foreman will at all times be subject to the approval of the Architect and Construction manager. The Architect and Construction Manager reserves the right to require the contractor to replace the superintendent and/or foreman if, in the opinion of the Architect and Construction Manager, the superintendent and/or foreman is not performing satisfactorily.

§ 3.3.7.5 Each prime contractor shall coordinate his activities with the activities of other contractors.

§ 3.3.7.6 All questions pertaining to the work are to be made to the Architect/Engineer sufficiently in (via an RFI Form) advance of construction to permit comparisons, investigations, or references to drawings and shop drawings as necessary.

§ 3.3.7.7 The General Contractor is required to submit a site logistics plan coordinating all Owner functions with the access and safety of the job site.

§ 3.3.7.8 The Contractor is required to coordinate all the inspection and material testing to meet the contract document specifications.

§ 3.3.7.9 The Contractor has full and sole responsibility for construction methods and implementation of a "quality control system" to insure coordination.

§ 3.3.7.10 The Contractor is responsible for field verification of all dimensions/measurements for the coordination of materials and trades. Check field dimensions, clearances, relationships to available space, and anchors.

§ 3.3.7.11 The Contractor shall make all necessary arrangements to conduct work so that all parts shall be carried harmoniously and simultaneously or sequentially, so as components or increments of the same shall not interfere or retard the progress of others.

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§ 3.3.7.12 Minor changes in locations of equipment, parts, etc due to field conditions shall be made, if so directed, at no additional cost.

§ 3.3.7.13 The Contractor shall coordinate the delivery, unloading, movement, relocation, storage and protection of all materials.

§ 3.3.7.14 The Contractor shall examine the drawings and dimensions and is responsible for satisfactory joining and fitting of all parts of the work.

§ 3.3.7.15 Accurate dimensions, sleeved and opening drawings are to submitted prior to placement in the field.

§ 3.3.7.16 Prepare coordination drawings for all above ceiling areas throughout the entire project. Drawings showing all piping, duct, cabletrays, electrical ductbanks, and similar items, but not electrical conduit less than 4 inches in diameter. Complete architectural, mechanical and electrical reflected ceiling layouts, (including ductwork, conduits, piping, lighting, etc,).

§ 3.3.7.17 The Contractor is responsible for any omissions of the subcontractors and is required to provide a complete operating facility.

§ 3.3.7.18 The General Contractor shall be responsible for preserving the integrity of ceiling heights and room sizes.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

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§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the

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proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified

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materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.11 Detailed requirements are specified in the Division 1 section 01300 relating to "Submittals".

§ 3.12.12 All shop drawings are to include manufacturer's data. All shop drawings and samples are to be submitted by the Contractor to the Architect for review. Each sheet of the shop drawings shall identify the project, contractor, subcontractor, and fabricator or manufacturer and the date of the drawings. All shop drawings shall be numbered in consecutive sequence and each sheet shall indicate the total number of sheets in the set.

§ 3.12.13 Substitutions: All substitutions or deviations from plans and specifications must be clearly noted as such on all shop drawings. Contractor shall identify, coordinate and pay for any additional requirements as a result of substitutions, deviations, etc. including necessary change orders. In addition, substitution submittals shall be made no later than 30 days after Notice to Proceed in order to provide time for comparison review.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

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§ 3.13.1 Location and weights of all equipment and materials that the Contractor intends to place on the slab shall be submitted to the Architect for review.

§ 3.13.2 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.

§ 3.13.3 The contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner.

§ 3.13.4 Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any provision of the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work or (2) the Building in the event of partial occupancy, as more specifically described in Paragraph 9.9.

§ 3.13.5 Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including without limitation, lavatories, toilets, entrances and parking areas other than those designated by the Owner. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Building, as amended from time to time.

§ 3.13.6 The Contractor shall immediately notify the Owner in writing if during the performance of the Work, the Contractor finds compliance with any portion of such rules and regulations to be impracticable, setting forth the problems of such and suggest alternatives through which the same results can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements and collective bargaining agreements applicable to use and occupancy of the Project site and the Building

§ 3.13.7 The General Contractor shall provide a temporary construction fence whether shown on the Contract Documents or not as required to separate the area or areas under construction from the Owners area or areas used by the public. The temporary fencing shall be approved by the Owner prior to installation.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

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§ 3.15.3 Each Prime Contractor shall perform all daily clean up and removal of debris from the site including that of his subcontractors. Each Prime Contractor shall maintain an adequate supply of laborers to accomplish daily clean up and removal of debris from the site and work areas. No debris will be allowed to accumulate in or around the building including masonry debris. This building site must be maintained free of all litter and debris on a daily basis. No accumulation of flammable material is permitted. Prior to installation of finishes the floors will be swept and kept free of dust and dirt until turned over to the owner.

§ 3.15.4 Cleaning and debris removal may be considered a safety concern by judgment of the Owner or his agents and as such the work may be stopped to provide time and labor for immediate clean up.

§ 3.15.5 Final Clean-Up: The General Construction Contractor has the responsibility for the final clean-up and policing of the entire site after other contractors have removed their own waste materials, rubbish, equipment, tools and plant. In addition thereto, the General Construction Contractor shall have a professional cleaning company perform the following immediately prior to the Architect's inspection for Substantial Completion:

§ 3.15.5.1 Removal of all manufacturer's temporary labels from materials, equipment and fixtures.

§ 3.15..5.2 Removal of all stains from glass and mirrors; wash, polish, inside and outside.

§ 3.15.5.3 Removal of marks, stains, finger prints, other soil, dust, dirt, from painted, decorated, or stained woodwork, plaster or plasterboard, metal, acoustic tile, and equipment surfaces.

§ 3.15.5.4 Remove spots, paint, soil, from resilient flooring.

§ 3.15.5.5 Remove temporary floor protections; clean, strip and provide three (3) coats of wax on new VCT floors or otherwise treat as directed by the material manufacturer's recommendation, all finished floors. Final vacuum all carpet.

§ 3.15.5.6Clean all interior finished surfaces, including doors and window frames, and hardware required to have a polished finish, of oil, stains, dust, dirt, paint, and the like; leave without finger prints, blemishes.

§ 3.15.5.7 Final site clean-up shall extend beyond the Contract Limit Lines as reasonably required to insure the complete removal of all construction debris from the entire site, including staging areas.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.16.1 The Contractor shall promptly notify the Architect/Engineer and Owner of the presence of hazardous conditions at the site, including the start of hazardous operations or the discovery or exposure of hazardous substances.

§ 3.16.2 Contractor shall be responsible for snow plowing and snow removal as required to maintain access/egress to construction area.

§ 3.16.3 Contractor shall keep only necessary equipment on site and shall cooperate with the Owner regarding location of stored material.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

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§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.1.1 Contractor for itself, its successors and assigns, agrees to indemnify and save Owner, its successors, assigns, employees, agents, architects and engineers, harmless from, and against any and all claims, demands, damages, actions or causes of action, together with any and all losses, costs or expenses in connection therewith or related thereto, including but not limited to attorney fees for costs of suit, for bodily injuries, death or property damage arising in or in any manner growing out of the work performed, or to be performed under this Contract whether or not caused by fault or negligence of Owner. Contractor, for itself, its successors and assigns, hereby expressly agrees to waive any provision of the applicable State's Workers' Compensation Act, including Section 303(b), whereby the contractor could preclude its joinder as an additional defendant or avoid liability for damages, Contribution or Indemnity in any action at law, or otherwise where Contractor's employee or employees, heirs, assigns or anyone otherwise entitled to receive damages by reason of injury or death brings an action at law against the Owner, its successors, assigns employees, agents, engineers or architects, Contractor, of itself, its successors and assign, agrees to indemnify the Owner, its successors, assigns, employees, agents, architects, Construction Manager and engineers against all fines, penalties or losses incurred for, including but not limited to attorney fees and costs of suit, or by reason of the violation by Contractor in the performance of this Contract, of any ordinance, regulation, rule of law of any political subdivision or duly constituted public authority. Without limiting the foregoing, the Contractor, at the request of Owner, its successors, assigns, employees, agents, architect, Construction Manager or engineers, agrees to defend at the Contractor's expense any suit or proceeding brought against Owner, its successors, assigns, employees, agents, architect, Construction Manager or engineers, due to, or arising out of the work performed by the Contractor.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment.

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The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION
Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

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§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

(Paragraph deleted)

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by

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terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

(Paragraphs deleted)
§ 5.3.1 The Contractor shall obligate each subcontractor specifically to comply with the New Jersey Plan of Affirmative Action to avoid discriminatory practice in employment.

§ 5.3.2 The Contractor shall obligate each subcontractor to comply with the applicable prevailing wage schedule of the Department of Labor of the State of New Jersey.

§ 5.3.3 The Contractor shall obligate each Subcontractor to comply with the Public Works Contractor Registration Act of the State of New Jersey.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ALL WORK. All trades have a mutual obligation to coordinate their work with the other trades and cooperate as necessary with the Contractor, Construction Manager if applicable, and the Construction schedule – to complete the work as required by the Owner. The Construction Manager if applicable will provide assistance to the Contractor for coordination between their work and the Owner. The Contractor is required to have their superintendent or foreman on site at all times when their work or that of their subcontractors is in progress.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

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§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, *should the Contractor be damaged by any other separate Contractor on the work by reason of such other Contractor's failure to perform properly his Contract with the Owner, no action will lie against the Owner and the Owner shall have no liability therefore, but the Contractor may assert his claim for damage against such separate Contractor as a third party beneficiary under the Contract between such other Contractor and the Owner.*

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5, *should the Contractor be damaged by any other separate Contractor on the work by reason of such other Contractor's failure to perform properly his Contract with the Owner, no action will lie against the Owner and the Owner shall have no liability therefore, but the Contractor may assert his claim for damage against such separate Contractor as a third party beneficiary under the Contract between such other Contractor and the Owner..*

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible as the Owner determines to be just, based on the recommendation of the Architect.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.1.1 A field directive or field order shall not be recognized as having any impact upon the Contract Sum or the Contract Time and the Contractor shall have no claim therefor unless it shall, prior to complying with same and in no event no later than 10 working days from the date such direction or order was given, submit to the Owner for the Owner's approval its change proposal.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone in accordance with Section 7.4.1.

§ 7.1.2.1 **"Neither this Contract nor the Work to be performed hereunder can be changed by oral agreement. No course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work and no claims that the Owner has been unjustly enriched by any alteration or addition to the Work, whether there is, in fact, any unjust enrichment to the Work, shall be the basis for any alleged implied agreement by the Owner to the change, any alleged waiver of the Owner's rights under this Contract**

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or any increase in any amounts due under the Contract or any or a change in any time period provided for in the Contract Documents."

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.1.4 A directive or order from the Owner or the Architect, other than a Change Order, a Construction Change Directive or any Order for a minor change pursuant to this Article 7, shall not be recognized as having any impact on the Contract Sum or the Contract Time and the Contractor shall have no claim therefore. If the Contractor believes that a directive or order would require it to perform work not required by the Contract Documents, the Contractor shall so inform the Owner and Architect in writing prior to complying with the same and in no event any later than five (5) working days from the day such direction or order was given, and shall submit to the Owner and Architect for the Owner's and Architect's approval its change proposal.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 Any change in work authorized in writing by the Owner and Architect that will require a change in the cost of the work, whether an additive or deductive change in cost, shall show a complete cost breakdown of labor, material, equipment and insurance, and appropriate overhead and profit in accordance with 7.3.6 and 7.3.6.1.

§ 7.2.3 When a Change Order involves both additions and deletions in material, the net quantity is to be determined and the overhead and profit is to be applied to the net quantity in accordance with 7.3.6 and 7.3.6.1.

§ 7.2.4 When a Change Order involves deletions in materials and labor, the amount of the credit will be equal to the line item on the Schedule of Values or a unit of the value if only a portion of the value is being deleted.

§ 7.2.5 When any change in the Work, regardless of the reason therefore, requires or is alleged to require an adjustment in Contract Time, such request for time adjustment shall be submitted by the Contractor as part of the change proposal. Any Change Order approved by the Owner and for which payment is accepted by the Contractor, in which no adjustment in Contract Time is stipulated, shall be understood to mean that no such adjustment is required by reason of the change, and any and all rights of the Contractor or any subsequent request of adjustment of Contract Time by reason of the change is waived.

§ 7.2.6 Request by the Contractor for adjustment of the Contract Amount regardless of the reason therefore, shall be submitted to the Architect and the Owner with itemized labor and material quantities and unit prices to permit proper evaluation of the request. A submission by the Contractor containing unsubstantiated lump sum requests for adjustment of the Contract Amount will not be considered by the Owner and Architect. The Owner and Architect will not be liable for any delay incurred by reason of the Contractor's failure to submit satisfactory justification and back-up with any request for adjustment to the Contract Amount.

§ 7.2.7 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the initial Work which is the subject of the Change Order, including, but not limited to, all direct or indirect costs associated with such change and any and all adjustment to the Contract Sum and the Construction Schedule. The contractor will not be entitled to any compensation for additional work or delays in the Construction Schedule not included in the Change Order

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes

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in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation as prepared by the Architect;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an allowance for overhead in accordance with the schedule set forth in Subparagraph 7.3.7.1 below, or if no such amount is set forth , a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
.2 Costs of materials, supplies and equipment, whether incorporated or consumed;
.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

§ 7.3.7.1 In Subparagraph 7.3.7 the allowance for overhead and profit combined, included in the total cost to the Owner, shall be based upon the following schedule and may only include a Contractor, his Subcontractor and his sub-subcontractor:

7.3.7.1.1 For the Contractor, for any work performed by the Contractor's own forces, 15% of the cost.

7.3.7.1.2 For the Contractor, for any work performed by his Subcontractor, 5% of the amount due the Subcontractor.

7.3.7.1.3 For each Subcontractor or Sub-subcontractor involved, for any Work performed by that contractor's own forces, 10% of the cost.

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7.3.7.1.4 For each Subcontractor, for any Work performed by his Sub-subcontractor 10% of the amount due the Subcontractor.

7.3.7.1.5 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.7.

7.3.7.1.6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs, including labor, materials and subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are subcontractors, they shall be itemized also. In no case will a change involving over $200.00 be approved without such itemization.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

(Paragraph deleted)

§ 8.1.2.1 The work to be performed under this Contract shall commence after the required insurance has been obtained and approved and within three days after issuance of the Notice to Proceed by the Owner. The Contract Time shall commence as of the date of the Notice to Proceed unless otherwise specified in the agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.2.4 Owner, or his representative, in coordination with the Contractor, shall set work hours. Contractor may be required to work nights, weekends or holidays as necessary to complete the work in accordance with the Schedule or in coordination with the Owner's activities. Under no circumstances shall the Contractor begin or continue with work that is adversely impacting activities or operations. All utility shutdowns, interruptions, work in or adjacent to existing buildings will be coordinated through the Owner. Or his representative, and may have to be performed during hours when the Owner's activities are not in operation. All cutting, hammering or other activity that is noisy, produces smoke or fumes or is otherwise disruptive to the Owner's operations may have to be done during hours when the Owner's activities are not in operation. Work required to be performed during non-operating hours, as determined by the Owner or his representative, will be performed at no additional cost to the Owner.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by occurrences beyond the control and without the fault or negligence of the Contractor and which by the exercise of reasonable diligence the Contractor is unable to prevent or provide against, including labor disputes (other than disputes limited to the work force of, or provided by, the Contractor or its Subcontractors), fire, unusual delay in deliveries not reasonably anticipatable, unavoidable casualties, or by other occurrences which the Architect, subject to the Owner's approval, determines may justify delay, then, provided that the Contractor is in compliance with Subparagraph 4.3.3 hereof, the Contract Time shall be extended by Change Order or Construction Change Directive for the length of time actually and directly caused by such occurrence as determined by the Architect and approved by the Contractor and Owner (such approval not to be unreasonably withheld, delayed or conditioned); provided, however, that such extension of Contract Time shall be net of any delays caused by or due to the fault o negligence of the Contractor or which are otherwise the responsibility of the Contractor and shall also be net of any contingency or "float" time allowance included in the Contractor's construction Schedule. The Contractor shall, in the event of any occurrence likely to cause a delay, cooperate in good faith with the Architect and Owner to minimize and mitigate the impact or any such occurrence and do all things reasonable under the circumstances to achieve this goal.

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(Paragraph deleted)

§ 8.3.2.1 Any claim for extension of time should be made in writing to the Architect not more than five (5) days after the commencement of the delay, otherwise, it should be waived. The Contractor shall provide an estimate of the possible effect of such delay on the progress of the work. No claim made beyond the five (5) days shall be valid.

§ 8.3.2.2 The Contractor agrees that if any delay in the Contractor's works unnecessarily delays the work of any other Contractor of Contractors, the Contractor shall in that case pay all costs and expenses incurred by such parties due to such delays and hereby authorizes the Owner to deduct the amount of such costs and expenses from any moneys due or to become due the Contractor under this Contract. The Architect shall be responsible for ascertaining whether the Contractor is responsible for delaying any of the work of any other Contractor. His decision shall be final.

§ 8.3.2.3 Notwithstanding anything to the contrary in the Contract Documents, any extension of the Contract Time, to the extent permitted under Paragraph 8.3.1, shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution or completion of the Work, (2) hindrance or obstruction in the performance of the Work, (3) loss of productivity or (4) other similar claims (collectively referred to in this Paragraph 8.3.2.3 as "delays"), whether or not such delays are foreseeable, unless a delay is caused by acts of the Owner constituting active interference with the Contractor's performance of the Work and only to the extent such acts continue after the Contractor furnishes the Owner with written notice of such interference. In no event shall the Contractor be entitled to any compensation or recovery of any damages in connection with any delay including without limitation consequential damages, lost opportunity cost, impact damages or other similar remuneration. The Owner's exercise of any of its rights or remedies under the Contract Documents (including without limitation ordering changes in the Work or directing suspension, rescheduling or correction of the Work) regardless of the extent or frequency of the

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Owner's exercise of such rights or remedies shall not be construed as an act interference with the Contractor's performance of the Work.

§ 8.3.2.4 The Contractor agrees that the Owner can deduct from the Contract Sum, any wages paid by the Owner to any Inspector or Architect or other professional necessarily employed by the Owner for any number of days in excess of the number of days allowed in the specifications for completion of work.

§ 8.3.2.5 Where the cause of delay is due to weather conditions, extension of time shall be granted only for unusually severe weather, as determined by reference to historical data. The term "historical data" as used in the previous sentence shall be construed according to this formula: Average rainfall (or snow or low temperature) for the past five years.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.1 Payment Procedures shall be as follows:

9.1.1.1 Contractor shall submit Schedule of Values to Construction Manager and Architect for review
9.1.1.2 Prior to end of each pay period, Contractor shall submit a rough draft ("pencil copy ") for their payment application for review and approval by the Architect and the Construction Manager.
9.1.1.3 Upon approval of pencil copy, Contractor shall submit at least five copies of their payment application to the Architect for approval along with their certified payrolls and monthly manning reports.
9.1.1.4 Architect and Construction Manager will approve payments and forward to the Owner.

§ 9.2 SCHEDULE OF VALUES

§ 9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to various portions of the Work, which in the aggregate equals that total Contract Sum, divided so as to facilitate payments to Subcontractors, supported by such evidence of correctness as the Architect may direct or as required by the Owner. These schedules, when approved by the Architect, Construction Manager (if applicable) and Owner, shall be used to monitor the progress of the Work and as a basis for Certificates for Payment. All items with entered values will be transferred by the Contractor to the "Applications and Certificate for Payment", and shall include the latest approved Change Orders and Construction Change Directives. Change Order values and Construction Change Directive values shall be broken down to show the various subcontracts. The Application for Payment shall be on AIA Document G702 and G703 and the approved Voucher obtainable from the Owner. Each Item shall show its total scheduled value, value of previous applications, value of the application, percentage completed, value completed and value yet to be completed. All blanks and columns must be filled in, including every percentage complete figure.

§ 9.3 APPLICATIONS FOR PAYMENT

The Contractor shall submit to the Architect an itemized Application for Payment for their Contract on AIA Document G702 and G703 and the approved Voucher obtainable from the Owner. Payroll Certification for all employees of all of the workers on the project shall be submitted as well as other such data for the purposes of summarizing the work and tracking the project. The architect and Construction Manager (if applicable) will process the application and forward it with his recommendations to the Owner.

(Paragraphs deleted)

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

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§ 9.3.1.3 Until substantial completion, the Owner will pay 98% of the amount due the Contractor on account of progress payments. The retainage will be held until final acceptance of the project by the Architect and the Owner. The Contractor shall submit a separate voucher for the full amount of the retainage along with the Consent of Surety, AIA Form G707A and the Contractor shall be required to furnish a Maintenance Bond for 100% of the Project Cost for a period of two (2) years from the Date of Final Acceptance.

§ 9.3.1.4 Upon acceptance of the Work performed pursuant to this Contract for which the Contractor has agreed to the withholding of payments pursuant to Article 9 of this Contract, all amounts being withheld by the Owner shall be paid in accordance with Paragraph 9.3.1.3 without further withholding of any amounts for any purposes whatsoever, provided that the Contract has been satisfactorily completed.

§ 9.3.1.5 Each application for payment shall be accompanied by the following, all in form and substance satisfactory to the Owner and Architect:

> § 9.3.1.5.1 A current contractor's lien waiver and duly executed and acknowledged sworn statement by an officer of the Contractor showing all subcontractors and materialmen with whom the Contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for any subcontractor and materialmen in the requested progress payment and the amount to be paid to the Contractor from such progress payment together with similar sworn statements from all such subcontractors and materialmen
>
> § 9.3.1.5.2 Duly executed waivers of mechanic's and materialmen's liens from all subcontractors and when appropriate, from materialmen and lower tier subcontractors establishing payment or satisfaction of payment of all amounts requested by the Contractor on behalf of such entities or persons in any previous application for payment; and
>
> § 9.3.1.5.3 All information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner or the Architect.

§ 9.3.2 At the Owner's option, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with paragraphs 9.3.2.1, 9.3.2.2, 9.3.2.3, and 9.3.2.4 satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.2.1 With each Application for Payment the Contractor shall submit to the Architect and Owner a written list identifying each location where materials are stored off the Project site and the value of materials at each location. The Contractor shall procure insurance satisfactory to the Owner for materials stored off the Project site in an amount not less than the total value thereof.

§ 9.3.2.2 The consent of any surety shall be obtained to the extent required prior to the payment for any materials stored off the Project site.

§ 9.3.2.3 Representatives of the Owner shall have the right to make inspections of the off site storage areas at any time.

§ 9.3.2.4 Materials stored off site shall be protected from diversion, destruction, theft and damage to the satisfaction of the Owner, shall specifically be marked for use on the Project and shall be segregated from other materials at the storage facility.

§ 9.3.3 The Contractor warrants and agrees that title to all Work will pass to the Owner either by incorporation in the construction or upon receipt of payment therefor by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests, or encumbrances whatsoever, that the vesting of such title shall not impose any obligation on Owner or relieve Contractor of any of its obligations under the Contract, that the Contractor shall remain responsible for damages to or loss of the Work, whether completed or under construction, until responsibility for the Work has been accepted by Owner in the manner set forth in the Contract Documents, and that no Work

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covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.1.1 The Owner will issue payment to the Contractor pursuant to the Owner's administrative policy at the time that a duly approved Payment Certificate is presented.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

§ 9.5.1.1 defective Work not remedied;

§ 9.5.1.2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;

§ 9.5.1.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

§ 9.5.1.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

§ 9.5.1.5 damage to the Owner or a separate contractor;

§ 9.5.1.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

§ 9.5.1.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.1.8 The failure of any Contractors to comply with mandatory requirements for maintaining record drawings. The Contractor shall be required to check record drawings each month. Written confirmation that the record drawings are up-to-date shall be required by the Architect before approval of the Contractors monthly payment requisition will be considered.

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§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect. Notwithstanding Certification by the Architect, the Owner may refuse to make payment based on any default by the Contractor including, but not limited to those defaults set forth in Subparagraphs 9.5.1 through 9.5.1.8. The Owner shall not be deemed in default by reason of withholding payment while any of such defaults by the Contractor remain uncured.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not for reasons other than a default of the Contract, including but not limited to those defaults set forth in Subparagraphs 9.5.1.1 through 9.5.1.8 pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by a court of law, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended

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§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof which the Owner agrees to accept separately is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The Work will not be considered substantially complete until all project systems included in the Work are operational as designed and scheduled, all designated or required inspections, certifications, permits, approvals, licenses and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial use and occupancy of the Project are received, designated instruction of Owner's personnel has been completed, and all final finishes within the Contract are in place. In general, the only remaining Work shall be minor in nature, so that the Owner can occupy the building on that date and the completion of the Work by the Contractor would not materially interfere or hamper the Owner's (or those claiming by, through or under the Owner) normal operations. Contractor recognizes that normal operation requires the use and occupancy of the Work by departmental employees without interruption and that any punchlist or corrective work shall be done at times when the Work is not to occupied. As a further condition of substantial completion acceptance, the Contractor shall certify that all remaining Work will be completed within thirty (30) consecutive calendar days or as agreed upon following the date of substantial completion.

§ 9.8.1.1 In addition to the above, the following items must be completed in order to deem the work Substantially Complete:

§ 9.8.1.1.1 All required final inspections have been completed by the authority having jurisdiction resulting in a TCO or CO.

§ 9.8.1.1.2 Air Balancing Reports: Reports can be hand written field notes but must be reviewed and approved via the shop drawing process by the Mechanical engineer. Final Air and Water Balancing Reports certified by the licensed balancer are require fro "Final Acceptance" and the start of the warranty period. (These reports must be submitted in accordance with the shop drawing process to Architect so that they can be tracked and approved and distributed to all applicable parties).

§ 9.8.1.1.3 Equipment Start Up Reports: Reports can be hand written field notes but must be reviewed and approved via the shop drawing process by the Mechanical Engineer. (These reports must be submitted in accordance with the shop drawing process to Architect so that they can be tracked and approved and distributed to all applicable parties).

§ 9.8.1.1.4 Completion of the Owner On-Site ATC Training: Refer to the ATC specifications for training requirements on-site and off-site. The Owner does not have beneficial use of the mechanical system until they can operate it following this training.

§ 9.8.1.1.5 Completion of Commissioning: Refer to the Start-up and Adjustment specifications. This process will require the Owner's Operator, Construction Manager (if applicable) and the Mechanical Engineer on site to witness a demonstration and operation of every mechanical device. The devices shall be operated fro the on-site Owner's ATC Computer and verified by the Mechanical Contractor's field personnel to confirm proper operation. In addition to this demonstration, the contractor shall demonstrate Owner required maintenance of all mechanical equipment to maintain the manufacturer's warranty. This should include but not be limited to belt tension/adjustments, filters, etc. Please schedule several days for the commissioning process.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected along with all special warranties required by the Contract Documents endorsed by the Contractor prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

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§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.4.1 The Architects Certificate of Substantial Completion shall be subject to the Owner's final approval.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage sufficient to increase the total payments to 100% of the Contract Sum, less such amounts as the Architect shall determine for all incomplete work and unsettled claims. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. All warranties and guarantees required pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Owner as part of the final application for payment. The final Certificate for Payment will not be issued by the Architect until all warranties and guarantees have been received and accepted by the Owner.

§ 9.10.1.1 The Architect's Certificate of Final Completion shall be subject to the Owner's final approval.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed

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to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, and (6) evidence of compliance with all requirements of the Contract Documents: notices, certificates, affidavits, other requirements to complete obligations under the Contract Documents: including but not limited to (a) instruction of Owner's representatives in the operation of mechanical, electrical, plumbing and other systems, (b) delivery of keys to Owner with keying schedule: master, sub-master and special keys, (c) delivery to Architect of Contractor's General Warranty (as described in Paragraph 3.5) and each written warranty and assignment thereof prepared in duplicate, certificates of inspections, and bonds for Architect's review and delivery to Owner, (d) delivery to Architect a printed or typewritten operating, servicing, maintenance and cleaning instructions for all Work; parts lists and special tools for mechanical and electrical Work, in approval form, (e) delivery to the Architect of specified Project record documents and (f) delivery to Owner of a Final Waiver of Liens (AIA Document G706 or other form satisfactory to Owner), covering all Work including that of all Subcontractors, vendors, labor, materials and services, executed by an authorized officer and duly notarized. In addition to the foregoing, all other submissions required by other articles and paragraphs of the Specifications including final construction schedule shall be submitted to the Architect before approval of final payment.. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;

.2 failure of the Work to comply with the requirements of the Contract Documents; or

.3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.11 LIQUIDATED DAMAGES

§ 9.11.1 The Contractor understands and agrees that all work must be performed in an orderly and closely coordinated sequence so that the date for substantial completion is met.

§ 9.11.2 If the Contractor fails to complete his work or fails to complete a portion of his work, he shall pay the Owner, as liquidated damages and not as a penalty, the sum as specified in the technical portion of the Contract Documents. Such amount is agreed upon as a reasonable and proper measure which the Owner will sustain each calendar day by failure of the Contractor to complete work within the stipulated time.

§ 9.11.3 Substantial Completion will be determined by the Architect and shall be deemed to be completion of the whole work for purposes of tolling the Municipal Mechanics Lien Law.

§ 9.11.4 For damage occurring at the time of delay, the Owner may retain the amount due to him under this clause from any payments due to the Contractor.

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§ 9.11.5 The Owner will suffer financial loss if the project is not substantially complete on the date set forth in the Contract Documents. The Contractor (and the Contractor's Surety) shall be liable for and pay to the Owner the sum of $500.00 stipulated and fixed, agreed as liquidated damages for each calendar day of delay until the Work is substantially complete.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

§ 10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.1.1.1 The Contractor must fully comply with the job safety requirements in addition to all Federal, State and Local safety guidelines. All cost associated with complying with all safety requirements shall be included in each contractors base bid.

§ 10.1.1.2 The General Contractor will serve as the overall Project Safety Coordinator and shall be responsible for all issues of safety and protection. The Contractor shall designate a safety person at the job site while the contractor is working on the project site. The designated safety person shall be responsible for the safety of their work and for their workers and to make continuous inspections for all safety issues relating to his work. The Construction Manager (if applicable) is not responsible for safety on this project but will endeavor to promote safety. Each Contractor must comply with job Safety Requirements in addition to OSHA and local agency requirements. Failure to comply with safety issues will be grounds for withholding of payments.

§ 10.1.1.3 Contractor will comply with all reasonable requests of the Owner and Construction Manager (if applicable) with respect to additional security and protections required for work interfacing with Facility Operations. Safety is of the utmost importance on this project and all issues relative to safety and protection of the Facility, Staff and Occupants will be treated as emergency needs and will not be subject to the 7 day notice requirements of Article 14.

§ 10.1.1.3.1 General Contractor to provide, maintain, relocate and remove in coordination with Construction Manager if applicable, a 6 foot high, perimeter security fence. Fence will surround the building and proposed parking areas and will have signage attached at 100' intervals advising "Construction Area – Please Keep Out". General Contractor to be responsible for opening and securing site each day.

§ 10.1.1.3.2 Orange safety fencing will be installed around the entire area of any and all earthwork, excavations, etc. and will be maintained until the work is complete.

§ 10.1.1.3.3 This is a hard hat job. Identifying hard hats shall be worn at all times.

§ 10.1.1.3.4 Hot work permits will be issued by foreman for all activities involving open flames, Construction Manager (if applicable) will provide copy of Hot Work Permit Forms.

§ 10.1.1.4 The proper execution of the required safety provisions is directly related to the general condition safety line item on the schedule of values.

§ 10.1.1.5 The Contractor shall be responsible for the immediate investigation and resolution of all safety and environmental complaints / issues generated by contractor employees, owners, owner's representatives or members of the public.

§ 10.1.1.6 Contractor shall be maintain all egress routes throughout building. Contractor shall post exit signs as coordinated with Construction Manager (if applicable). Contractor shall provide wall hung fire extinguishers throughout building as deemed necessary by Construction Manager (if applicable) and fire officials.

§ 10.1.1.7 Contractor's safety representative shall perform a daily safety inspection walk through to ensure that all requirements of the OSHA Standards, Fire Protection Standards and Safe Work Practices are being complied with

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and/or corrected. The responsibility of the Contractor is to provide a safe and healthy work environment for construction personnel. Owner's personnel and representative, and the public.

§ 10.1.1.8 Upon written receipt of safety concerns and/or issues, the Contractor shall respond in writing addressing how the safety concerns or issues were resolved. The Construction Manager (if applicable) shall be copied on all safety related correspondence.

§ 10.1.1.9 Prime Contractor's response and compliance with Construction manager's Project Manager (if applicable) and correction of deficiencies noted in Construction Manager's Safety Report is mandatory. Failure to comply will be grounds for withholding of progress payments until the conditions are acceptable to Construction Manager and OSHA.

§ 10.1.1.10 The Contractor shall submit to Construction Manager (if applicable) a copy of all licenses (welding, power nailer, asbestos, etc,) as required by applicable agencies.

§ 10.1.1.11 Contractor shall have all required personal protective equipment and materials available for and used by each employee as required by Federal, State and Local guidelines.

§ 10.1.1.12 Contractor shall supply proper equipment and crew sizes as necessary to safely complete the work.

§ 10.1.1.13 Contractor shall provide documented safety training for each of their employees and subcontractor's employees no later than the first day they arrive on site. The training shall be documented and signed by the trainer and employee. A copy of all safety-training documents is to be provided to Construction Manager (if applicable) and updated as manpower loading increases.

§ 10.1.1.14 The Contractor shall supply two (2) OSHA approved means of access / egress to each floor and roof for the course of the entire project for use by all applicable parties. The Contractor shall erect and maintain OSHA approved pedestrian walking bridges, for emergency access / egress and as necessary to protect personnel from overhead work. The number of protected entrances will be as determined by Construction Manager (if applicable).

§ 10.1.1.15 The Contractor shall be responsible for providing and maintaining all temporary emergency egress routes. The Contractor shall obtain the approval of the Building and Fire Departments for all temporary emergency egress routes. General Contractor to provide for fire separation walls between occupied areas as required by local officials.

§ 10.1.1.16 Contractor shall provide OSHA approved pedestrian walking bridges as necessary (determined by Construction Manager – if applicable) to protect against overhead hazards.

§ 10.1.1.17 Contractor shall provide, relocate and / or maintain barricades, signage, provide flagmen etc. as necessary to ensure public safety and safe egress. Contractor to provide, maintain, relocate and remove in coordination with Construction Manager, if applicable to protect against overhead hazards.

§ 10.1.1.18 Notify Construction Manager (if applicable) immediately upon arrival of OSHA to the site.

§ 10.1.1.19 Contractor shall submit to Construction Manager (if applicable), all MSDS sheets and shall cooperate in the posting of all required notifications relative to the use of hazardous substances on the property. Contractor to comply with NJ Law regarding the use or storage of hazardous substances in Buildings. MSDS sheets shall be posted prior to product being delivered to site.

§ 10.1.1.10 Contractor, subcontractor, vendor, etc should enforce a full time no smoking or alcohol use policy for all employees during the entire course of the project. Any worker found violating these reflections, or being belligerent, will be subject to removal from the site at the sole discretion of Construction Manger, if applicable.

§ 10.1.1.11 Contractor shall be responsible to secure the site at the end of each workday by an effective means and maintain until all parties determine no longer required.

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§ 10.1.1.12 For the safety of occupants, staff, and the public, the steel erection must be scheduled and coordinated with the Owner and Construction Manager (if applicable). Swinging of steel and crane boom over occupied space will not be allowed. Steel contractor shall provide additional barricades and fencing around his crane and steel at all times.

§ 10.1.1.13 Contractor must submit an acceptable OSHA compliant site specific written safety plan to Construction Manger (if applicable) for review within fourteen (14) days from the notice to proceed or prior to mobilizing on site, which ever comes first. The written safety plan shall include (as applicable to their work) but is not limited to the following:

-Full time no smoking policy or alcohol use is allowed on the project. Any worker. Any worker found violating these restrictions, or being belligerent, will be subject to removal from the site. (Contractors shall post required signs).
-Full time hard hat policy (identifying hard hats shall be worn at all times).
-Site specific emergency action plan with contractor phone numbers, active 24 hours a day, 7 days a week.
-Competent on site safety representative, named and active (Provide alternate)
-Scaffold erection plan, including a log of daily inspections.
-Full time fall protection plan and exposures over 6'-0"
-Job site signage plan (perimeter fence warning signs posted 50'-0" o.c.
-First aid and CPR provisions
-OSHA 200 log and Job Safety and Health Protection Poster
-Daily clean up.
-Hazard Communication Program with MSDS logged and maintained.
-Hazard Communication program.
-Daily diary of work, issues, and incident, etc.
-Sheeting, shoring and excavations protection line.
-GFI safety program
-Hazardous Energy Control Lock out tag out program
-Required safety clothes; Eye and ear protection, respirators, boots, belts, gloves etc. as appropriate to their work requirement.
-Fire Extinguishers.
-Removal guard rail and protection at material loading areas, 200lb force minimum requirement.
-All stairs and platforms must have railings, 200lb force minimum requirement. Stair pans and landings must be filled prior to their use.
-Daily inspection of tools and equipment; verify safety devises are operational.
-Ladder usage plan
-Weekly tool box meetings, documented and signed by each employee.
-Temporary heat procedures.

§ 10.1.1.14 Contractor shall maintain and submit a complete copy of the written safety plan, logs, diaries, plans and programs on site for the Construction Manager (if applicable).

§ 10.1.1.15 The speed limit within the project property is 5MPH. Contractor employees operating vehicles in excess of the speed limit or in any otherwise unsafe manner will be directed to leave the site and not permitted to return.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction as well as any other real or personal property of the Owner.

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§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.2.1 Contractor shall comply with all regulations required by the Federal Occupational Safety and Health Act (OSHA).

§ 10.2.2.2 The Contractor shall conform to all applicable New Jersey Department of Environmental Protection regulations.

§ 10.2.2.3 Contractors must comply with Construction and Environmental Standards contained in Federal and State Regulations and other applicable laws.

§ 10.2.2.4 It is the Contractor's responsibility to determine the existence of potentially hazardous materials, including lead, and to protect his workmen and the work area.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.9 The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment, and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief for fire marshal. The area within the site limits under the Contractor's control shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site. Contractor will comply with all reasonable requests of the Owner and Construction Manager with respect to additional security and protections required for work interfacing with Owner's Operations. Safety is of the utmost importance on this project and all issues relative to safety and protection of the staff and public will be treated as emergency needs and will not be subject to the 7-day notice requirements of Article 14.

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§ 10.2.10 The Contractor shall remove snow or ice which may accumulate on the site within areas under his control which might result in damage or delay.

§ 10.2.11 The Contractor shall take all precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of the Owner and Contractor, whether or not forming part of the Work, located within those areas of the Project to which the Contractor ha access. Whenever unattended, including nights and weekends, mobile equipment and operable machinery shall be kept locked and made inoperable and immovable.

§ 10.2.12 Neither the Owner nor the Architect shall be responsible for providing a safe working place for the Contractor, the Subcontractors or their employees, or any individual responsible to them for the work.

§ 10.2.13 The Contractor shall conform to requirements of OSHA, the Construction Safety Code of the State Department of Labor and those of the AGC Manual. The requirements of the New Jersey and Local Building Construction Codes shall apply where there are equal to or more restrictive than the requirements of the Federal Act.

§ 10.2.14 When all or a portion of the Work is suspended for any reason, the Contractor shall securely fasten down all coverings and protect the Work as necessary from injury or any cause.

§ 10.2.15 The Contractor shall promptly report in writing to the Owner and Architect all accidents arising out of or in connection with the Work which caused death, personal injury or property damage giving full details and statements of any witnesses. In addition, if death, serious personal injury or serious property damage is caused, the accident shall be reported immediately by telephone or messenger to the Owner and Architect.

§ 10.2.16 Contractor is required to follow and enforce the work rules set forth below. Failure to comply with or enforce any of these rules will be grounds for suspension and/or termination of this contract:

§ 10.2.16.1 No use of alcoholic beverages prior to or during working hours.

§ 10.2.16.2 No use of illegal drugs or prescription medications which could induce drowsiness or otherwise impair perception or performance. Use of illegal drugs may result in prosecution to the fullest extent of the law. Any warning associated with use of prescription drugs must be complied with, particularly warning against operation of machinery and equipment.

§ 10.2.16.3 No horseplay or rough-housing will be allowed.

§ 10.2.16.4 No sexual, racial, or ethnic harassment, or similar conduct will be tolerated.

§ 10.2.16.5 All employees shall use proper sanitation habits including use of toilet facilities and garbage cans.

§ 10.2.16.6 All employees shall dress in clothing appropriate for the work they are to perform. All personnel are to wear hardhats, safety shoes, glasses, gloves, masks or respirators, noise protection devices, and other protective clothing and equipment as required by OSHA standards.

§ 10.2.16.7 All equipment is to be properly stored and/or secured at the end of the work day or if it is to remain idle for greater than one hour.

§ 10.2.16.8 All personnel are to be made aware of the availability of Material Safety Data Sheets for materials used at the Project site. This information is available from the Contractor using the product. The Contractor shall maintain a copy of all MSDS forms at the construction site office for all personnel to review.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death

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to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1

(Paragraphs deleted)

Contractor shall without in any way altering Contractor's liability under the Contract or applicable law, obtain, pay for and maintain insurance for the coverages and amounts of coverage not less than those set forth below in the Instructions to Bidders and shall provide to Owner certificates issued by insurance companies satisfactory to Owner to evidence such coverage no later than 7 days from the date of the execution of this Contract and prior to any personnel or equipment being brought onto and/or before any work commences at the job site. The coverage afforded under any insurance obtained pursuant to this paragraph shall be primary to any valid and collectible insurance carried separately by any of the indemnities. Such certificates shall provide that there shall be no

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termination, nonrenewal, modification, or expiration of such coverage without thirty (30) days prior written notice to Owner. In the even of any failure by Contractor to comply with the provisions of this Paragraph 11.1, Owner may, at its option, on notice to Contractor, suspend the Contract for cause until there is full compliance with this Paragraph 11.1 and/or terminate the Contract for cause. Alternatively, Owner may purchase such insurance at Contractor's expense, provided that Owner shall have no obligation to do so, and if Owner shall do so, Contractor shall not be relieved of or excused from the obligation to obtain and maintain such insurance amounts and overages. Contractor shall provide to Owner a coy of any and all applicable insurance policies. Architect and the State of New Jersey shall be named as an additional insured on all Insurance Policies to the provided by the Contractor. The Owner shall be named as an additional primary insured on all Insurance Policies to be provided by the Contractor..

§ 11.1.2 Contractor shall require all Subcontractors to carry similar insurance coverages and limits of liability as required under this Article 11, adjusted to the nature of Subcontractors' operations and submit same to Owner for approval before any personnel or equipment is brought onto the site and/or before any work commences.

§ 11.1.3 In the event Contractor fails to obtain the required certificates of insurance from the Subcontractor and a claim is made or suffered, the Contractor shall indemnify, defend and hold harmless the Owner, Architect, and the Sate of New Jersey from any and all claims for which the required insurance would have provide coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

(Paragraphs deleted)

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§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 Contractor shall furnish a performance bond and labor and material payment bond meeting all statutory requirements of the State of New Jersey in form and substance satisfactory to the Owner and without limitation complying with requirements set forth in the Instructions to Bidders.

§ 11.4.2 If any of the foregoing insurance coverages are required to remain in force after final payment, including, but not limited to coverage for completed operations, an additional certificate evidencing continuation of such coverage shall be submitted with the Final Application for Payment.

§ 11.4.3 In no event shall any failure of the Owner to receive certified copies or certificates of policies required under Paragraph 11.1 or to demand receipt of suck certified copies or certificates prior to the Contractor commencing Work be construed as a waiver of the Owner or the Architect of the Contractor's obligations to obtain insurance pursuant to this Article 11. The obligation to procure and maintain any insurance required by this Article 11 is a separate responsibility of the Contractor and independent of the duty to furnish a certified copy or certificate of such insurance policies.

§ 11.4.4 If the Contractor fails to purchase and maintain or require to be purchased and maintained any insurance required under this Paragraph 11.1, the Owner may, but shall not be obligated to, upon 5 days written notice to the Contractor, purchase such insurance on behalf of the Contractor and shall be entitled to deduct said cost from the Contractor's Contract Sum.

§ 11.4.5 When any required insurance due to the attainment of a normal expiration date or renewal date shall expire the Contractor shall supply the Owner with certificates of insurance and amendatory riders or endorsements that clearly evidence the continuation of all coverage in the same manner, limits of protection and scope as was provided by the previous policy. In the event any renewal or replacement policy for whatever reason obtained or required is written by a carrier other than that with whom the coverage was previously placed or the subsequent policy differs in any way from the previous policy, the Contractor shall also furnish replacement policy unless the Owner provided the Contractor with prior written consent to submit only a certificate of insurance for any such policy. All renewal and or replacement policies shall be in form and substance satisfactory to the Owner and written by carriers acceptable to the Owner.

§ 11.4.6 The Contractor shall cause each subcontractor to (1) procure insurance in the amounts set forth in Paragraph 11.2 and (2) name the indemnities under Paragraph 3.18 as additional insures under the subcontractor's comprehensive general liability policy. The additional insured endorsements included on the subcontractor's comprehensive general liability policy shall state that coverage is afforded the additional insureds with respect to claims arising out of operations performed by or on behalf of the Contractor. If the additional insureds have other insurance which is applicable to the claims, such other insurance shall be on an excess or contingent basis. The amount of the insurance liability under this insurance policy shall not be reduced by the existence of such other insurance.

§ 11.4.7 Property insurance provided by the Owner shall not cover any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring, or other similar items commonly referred to as construction equipment which may be on the site and the capital value of which is not included in the work. The Contractor shall make its own arrangements for any insurance it might require on such construction requirement. Any such policy obtained by the Contractor under this Paragraph 11.4.7 shall include a waiver of subrogation.

§ 11.4.8 The Contractor may carry whatever additional insurance he deems necessary to protect himself against hazards not covered for theft, collapse, water damage, materials and equipment stored on the site, and for materials and equipment stored off site, and against loss of owned or rented capital equipment and tools owned by mechanics or any tools, equipment, scaffolding, stagings, towers and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the Work.

§ 11.4.9 All insurance coverage procured by the Contractor shall be provided by insurance companies having policy holder ratings no lower than "A" and financial rating no lower than "X" in the Best's Insurance guide, latest edition in effect as of the date of the Contract and subsequently in effect at the time of the renewal of the policies required by the Contract Documents.

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§ 11.4.10 If the Owner or the Contractor is damaged by the failure of the other party to purchase or maintain insurance required under Article 11, then the party who failed to purchase or maintain the insurance shall bear all reasonable costs (including attorneys fees and court and settlement costs) properly attributable thereto.

§ 11.4.11 The Contractors must remove all "X, C & U" exclusions from their policies.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time or Contract Sum.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense. If prior to the date of Substantial Completion the Contractor, a subcontractor or anyone for whom either is responsible, uses or damages any portion of the Work, including without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor shall cause each such item to be restored to "like new conditions" at no expense to the Owner.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Final Acceptance of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.1.1 The obligations under Paragraph 12.2 shall cover any repairs and replacement to any part of the Work or other property caused by the defective Work.

§ 12.2.2.1.2 Upon completion of any work under or pursuant to this Paragraph 12.2, the two year correction period in connection with the work requiring correction shall be renewed and recommenced.

§ 12.2.2.2 The two -year period for correction of Work shall be extended with respect to portions of Work first performed after Final Acceptance by the period of time between Final Acceptance and the actual completion of that portion of the Work.

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§ 12.2.2.3 The two -year period for correction of Work shall be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

§ 12.3.1 This Subparagraph relates exclusively to the knowing acceptance of nonconforming work by the Owner. T has no applicability to work accepted by the Owner or Architect without the knowledge that such work fails to conform to the requirements of the Contract Documents.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

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§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense. The Contractor also agrees that the cost of testing services required for the convenience of the Contractor in his scheduling and performance of the Work and the cost of testing services related to remedial operations performed to correct deficiencies in the Work shall be borne by the Contractor.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

§ 13.6.1 The Contractor shall not be entitled to any payment of interest for any reason, action or inaction by the Architect or the Owner.

§ 13.6.2 Any payments withheld for time delays, faulty materials, or workmanship, shall not bear interest for period of delay or non-acceptance.

§ 13.7 TIME LIMITS ON CLAIMS

Owner and Contractor issues including the applicable statute of limitations shall be as governed by New Jersey Law.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract in the manner provided in Subparagraph 14.1.2 if repeated suspensions, delays or interruptions by the Owner as described in Paragraph 14.3 constitute in the aggregate more than 100% of the total number of days scheduled for completion or 120 days in any 365 day period, whichever is less, or if all the Work is entirely stopped for a continuous period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities

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performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

.3 because the Architect has not issued certificate for payment and has not notified the Contractor of the reason for withdrawing certification as provided in Subparagraph 9.4.1, or because the Owner has not made payment on a certificate for payment (without cause) within the time stated in the Contract Documents.

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§ 14.1.2 If one of the above reasons exist, the Contractor may upon fourteen (14) days written notice to the Owner and Architect, terminate the Contract unless this reason is cured prior to the expiration of the notice, and recover from the Owner payment of Work properly executed in accordance with the Contract Documents (the basis for such payment shall be as provided in the Contract) and for payment for cost directly related to work thereafter performed by Contractor in terminating such work including reasonable demobilization and cancellation charges provided said Work is authorized in advance by Architect and Owner.

§ 14.1.3 The Owner shall not be responsible for damages for loss of anticipated profits on work not performed on account of any termination described in Subparagraph 14.1.1 and 14.1.2.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 refuses or fails to supply enough properly skilled workers or proper materials and/or equipment;

.2 fails to make proper payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 Disregards the instructions of Architect or Owner (when such instructions are based on the requirements of the Contract Documents;

.5 Is adjudged bankrupt or insolvent, or makes a general assignment for the benefit of Contractor's creditors, or a trustee or a receiver is appointed for Contractor or for any of its property, or files a petition to take advantage of any debtor's act, or to recognize under bankruptcy or similar laws; or

.6 Breaches any warranty made by the Contractor under or pursuant to the Contract Documents.

.7 Fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with the requirements of the Contract Documents.

.8 Fails after the commencement of the Work to proceed continuously with the construction and completion of the work for more than 10 days except as permitted under the Contract Documents.

.9 Otherwise does not fully comply with the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and

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after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

§ 14.4.4 If Owner terminates the Contract for cause pursuant to Paragraph 14.2 and it is subsequently determined that the Owner was not authorized to terminate the Contract as provided in Paragraph 14.2, the Owner's termination shall be treated as a termination for convenience under this Paragraph 14.4 and the rights and obligations of the parties shall be the same as if the Owner has issued a notice of termination to the Contractor as provided in this Paragraph 14.4.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in

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question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS
Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 5 days after occurrence of the event giving rise to such Claim or within 5 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE
Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST
If the Contractor wishes to make Claim for an increase in the Contract Sum written notice as provided herein shall be given to the Owner, Architect and Construction Manager (if applicable) before proceeding to execute the Work and within five (5) days after the occurrence of the event giving rise to such Claim for increase in the Contract Sum. The foregoing written notice shall contain a written statement from the Contractor setting forth in detail the nature and cause of the Claim and an itemized statement of the increase requested. No such written notice shall form the basis of an increase to the Contract Sum unless and until such increase has been authorized by a written Change Order executed and issued according to the terms and conditions set forth herein. The Contractor hereby acknowledges that the Contractor shall not have any right to and the Owner will not consider any requests for an increase in the Contract Sum that is not submitted in compliance with the foregoing requirements. Prior notice is required for Claims relating to an emergency endangering life or property arising under Section 10.6.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME
§ 15.1.5.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. Said notice shall itemize all claims and shall contain sufficient detail and substantiating data to permit evaluation of same by Owner and Architect. No such claim shall be valid unless so made. The Contractor's Claim shall include an estimate of cost and probably effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary. Any change in the Contract Sum resulting from such Claim shall be authorized only by Change Order or Construction Change Directive, as the case may be. All required notices for additional costs shall be made by Certified Mail.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES
The Owner may claim consequential damages arising out of or relating to this Contract. This includes
.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons;

§ 15.2 INITIAL DECISION
§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through litigation mediation, to binding dispute resolution.

§ 15.2.5.1 Any dispute arising under the Contract shall be resolved in accordance with and subject to the limitations contained in N.J.S.A. 40A:11-41.1 as follows:

§ 15.2.5.1.1 All remedies provided elsewhere in the Contract Documents to resolve disputes, claims and protests shall be exhausted. Where the Engineer or Architect is required to issue a decision, such decision shall be a conditions precedent to proceeding to resolve the dispute in accordance with Paragraph 2.

§ 15.2.5.1.2 Prior to litigation, the Owner and Contractor shall endeavor to settle disputes by mediation in accordance with the current Construction Industry Mediation Rules of the American Arbitration Association. Demand for mediation shall be filed in writing by the party requesting mediation with the other party to this Agreement and with the American Arbitration Association. The Engineer or Architect shall be provided with an information copy of the demand unless the Engineer or Architect is joined. In no event shall such demand be made more than 30 days after completion, acceptance and final payment nor after the date when institution of legal or equitable proceeding regarding the matter in dispute would be barred as a matter of law.

§ 15.2.5.1.3 Nothing herein shall be constructed to prevent the Owner and Contractor from agreeing to utilize any other alternative dispute resolution procedure in lieu of or in addition to mediation.

§ 15.2.5.1.4 Nothing herein shall be construed to prevent the Owner from notifying any performance guarantor (Surety) of, and requesting the Surety's assistance in resolving any disputes which involve the Contractor's performance.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the

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demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to non-binding dispute resolution.

§ 15.3.2 The mediation shall be pursuant to industry standards prior to being submitted to a court for adjudication.

(Paragraph deleted)

§ 15.4 NON-BINDING ARBITRATION

§ 15.4.1 If agreed to by Owner, non-binding arbitration shall be pursuant to industry standards prior to being submitted to a court for adjudication.

(Paragraphs deleted)

DRAFT

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STATE AND COUNTY PREVAILING WAGE RATES

PREVAILING WAGE RATES

1. To obtain current prevailing State and County wage rates, visit the following website: http://lwd.dol.state.nj.us/labor/wagehour/wagerate/prevailing_wage_determinations.html

END OF SECTION

GEOTECHNICAL ENGINEERING REPORT

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Geotechnical Engineering Report
Proposed Gloucester County EMS Building

Prepared For:
Mr. Adam Weschler
Bach Associates, PC
304 White Horse Pike
Haddon Heights, New Jersey 08035

Location:
Block 57, Lot 18
169-171 Bridgeton Pike
Township of Mullica Hill, Gloucester County, New Jersey

Prepared By:
Digneo Engineering LLC
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DE Job Number: 54-106
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A KEY MAP PLAN
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D LABORATORY TEST RESULTS

1. INTRODUCTION

This report was prepared by Digneo Engineering LLC (DE), on behalf of Bach Associates, PC, and contains the results of a subsurface geotechnical investigation conducted at the location of a proposed EMS Building in the Township of Mullica Hill, Gloucester County, New Jersey. The purpose of this investigation was to assess the suitability of the existing subsurface soil conditions to support the proposed building. Our scope of work included a subsurface exploration, laboratory testing program, and geotechnical engineering analyses. This report summarizes the work completed and provides foundation and general site improvement recommendations.

2. SITE & PROJECT DESCRIPTION

2.1 EXISTING CONDITIONS

The project is located at Block 57 and Lot 18, locally known as 169-171 Bridgeton Pike, in the Township of Mullica Hill, Gloucester County, New Jersey (see Attachment A – *Key Map Plan*). The western half of the property consisted of an open grass area that appears to have been recently cleared of trees, and the eastern half of the property consisted of a densely wooded area. The project site is bordered to the west by Bridgeton Pile, to the north and south by commercial properties, and to the east by wooded and agricultural land.

Based on the *Topographic Survey Plan* dated July 12, 2024 and prepared by Bach Associates, PC, the Design Engineer for the project, topography across the lot slopes upward from west to east from approximately Elevation (EL) 106 feet to EL 141 feet. All vertical elevations are referenced to the North American Vertical Datum of 1988 (NAVD88).

2.2 PROJECT DESCRIPTION

DE understands the proposed development scheme will entail the construction of a one-story EMS Building encompassing approximately 4,100 square feet (SF) in plan area. Additional site improvements include paved drive aisles and parking stalls as well as a bio-retention basin.

The proposed facility is expected to be of conventional masonry and steel frame construction and contain a concrete slab-on-grade. At the time of this report, column and wall loads were not available. However, maximum column and wall loads of approximately 50 kips and 4 kips per lineal foot (klf) were assumed for the purposes of our analyses.

No information regarding finished grades were available at the time of this report. However, it is anticipated that minimal cuts and fills on the order of approximately 1 foot to 2 feet will be required to reach the proposed finished floor elevation.

Should cuts and/or fills or structural loading be different from the design assumptions, DE should be notified so that our final recommendations can be reviewed and revised if necessary.

3. GEOLOGY

Based on the Surficial Geologic Map of New Jersey, the site is underlain by the soils of the Weathered Coastal Plain Formations, (Geologic Symbol: Qwcp). According to the description provided by the United States Geologic Survey (USGS), the soils of the Weathered Coastal Plain Formations are typically comprised of exposed sand and clay of coastal plain bedrock. It includes thin, patchy alluvium and colluvium and pebbles left from erosion of surficial deposits.

The soils encountered during this investigation are considered representative of this formation.

4. LABORATORY TESTING

Soil samples obtained were reviewed and visually classified. To further define the physical characteristics of the encountered soils, one representative soil sample was subjected to laboratory analysis. The analyses conducted on these samples consisted of the following:

- Natural Moisture Content Testing (ASTM D2216)
- Sieve Analysis (ASTM D6913)

The results of this testing are presented in the following table and the Lab Testing Report is enclosed as Attachment D.

Laboratory Test Results

Location	Depth (ft)	Layer ID	% Gravel	% Sand	% Fines	LL	PL	PI	% Natural Moisture Content	USCS Group Symbol	ASTM Group Name
B – 1	2 to 4	Stratum I	0.9	75.9	23.2	NP	NP	NP	12.8	SM	Silty SAND

LL = Liquid Limit, PL = Plastic Limit, PI = Plasticity Index, NP = Non-Plastic

5. SUBSURFACE INVESTIGATION

A subsurface geotechnical investigation was performed on July 6, 2024 to evaluate the subsurface conditions at the project site. Two test borings, referenced as B-1 and B-2, were performed within the proposed footprint of the building. Test boring B-1 was advanced to a depth of approximately 32 feet below existing ground surface. Test boring B-2 was advanced to a depth of approximately 37 feet below existing ground surface. The locations of the test borings are shown on the *Test Boring Location Plan* presented in Attachment B. The test borings were located in the field based on information provided by Bach Associates.

The borings were conducted utilizing a truck mounted drill rig equipped with hollow stem augers and split spoon samplers. The split spoon samples were conducted in accordance with ASTM D1586, were recovered at appropriate intervals throughout the test borings, and Standard Penetration Test (SPT) values were recorded for each soil sample. SPT values are the number of blows required to drive a 2-inch outer-diameter split barrel sampler 24 inches using a 140-pound weight dropped 30 inches. The number of blows required to advance the sampler over the 12-inch interval from 6 inches to 18 inches is considered the "N" value.

Descriptions of the encountered subsurface conditions are provided in the following sections of this report. Additional details regarding the encountered soils, obtained soil samples, and other subsurface information obtained can be found within the *Test Boring Logs*, presented as Attachment C.

Oversight of the test boring operation was performed by a representative of DE.

5.1 TOPSOIL

Topsoil was encountered at the ground surface at both test boring locations and was measured to be approximately 2 inches to 6 inches in thickness. It should be expected that topsoil thicknesses may differ within the unexplored portions of the site.

5.2 STRATUM I

Stratum I was encountered below the surficial Topsoil layer in both test borings and extended to at least the termination depths of approximately 32 feet to 37 feet below existing ground surface. Stratum I consisted primarily of a varicolored fine to medium Sand with varying amounts of Silt. Trace amounts of gravel were encountered within the near-surface overburden. The documented “N” values indicated this layer was in a very loose to loose state of relative density near the ground surface and then improving to medium dense at an approximate depth of 30 feet below existing ground surface. Please refer to the Test Boring Logs for additional information.

Laboratory testing conducted on a representative sample of Stratum I indicated this soil was poorly graded and non-plastic, with a natural moisture content of 12.8 percent. This soil was classified using the Unified Soil Classification System (USCS) as a Silty SAND (SM).

5.3 GROUNDWATER

Groundwater was encountered during our investigation at both boring locations at approximately 11.5 feet to 12 feet below existing ground surface. These depths corresponded to groundwater elevations ranging from approximately EL 97 feet to EL 97.5 feet. These observations were made at the time of the test boring operation; groundwater table elevations should be expected to vary with daily, seasonal, and climatological conditions.

6. GEOTECHNICAL CONCLUSIONS & RECOMMENDATIONS

The geotechnical investigation has revealed the general subsurface profile underlying the proposed building footprint is comprised of the naturally occurring soils of Stratum I. Provided the recommendations detailed in this report are followed, the firm and stable naturally occurring soils, or structural fill placed as described in this report, are suitable for support of the proposed structure.

Details regarding our geotechnical conclusions and recommendations are provided in the following sections.

6.1 FOUNDATIONS

Foundation recommendations for this project are provided below.

- Shallow strip and/or spread foundations are suitable for support of the proposed structure, provided the recommendation below is followed.
    - As previously referenced, portions of the near-surface soils of Stratum I are very loose to loose. Any weak and yielding foundation subgrade soils encountered that cannot be improved in-place shall be over-excavated from within the foundation subgrade areas a minimum 12 inches . The resulting over-excavation shall be backfilled back to the planned foundation subgrade elevation with clean ¾ inch stone and compacted with a trench roller.
- The foundations shall be supported on the firm and stable soils of Stratum I or structural fill placed in accordance with the recommendations in this report.
- The foundations for the proposed building shall be designed for a **maximum allowable bearing pressure of 2,000 pounds per square foot (psf)**, based on column and wall foundations being a minimum of 3 feet and 2 feet in width, respectively.
- Exterior foundations shall rest on soils no less than 3 feet below final exterior grade to protect against frost heave. Interior foundations located in permanently heated portions of the structure may be established at conventional depths below the floor slab, provided that they are established within the intended bearing stratum.
- Please note that “stay forms” or similar techniques may be required to maintain vertical excavations within the loose and moist granular soils.
- Foundation subgrades shall be promptly cleared of loose material or debris prior to the placement of concrete.
- We recommend that all footings be poured as promptly as possible to reduce the likelihood of excavation subgrade or sidewall degradation.

The foundation subgrades shall be reviewed by a Geotechnical Engineer licensed in the State of New Jersey during construction to confirm the suitability of the subgrade soils.

6.2 SETTLEMENT

For the purposes of our settlement analyses, maximum column loads of 50 kips and wall loads of 4 klf were considered. Based on these loads, recommended bearing pressures, and our geotechnical analyses, maximum post-construction settlement is expected to be less than 1 inch with differential settlements less than approximately 1/2 inches.

Should the foundation loads exceed those described above, DE shall be contacted so we may review our analyses and revise our conclusions, if required.

6.3 FLOOR SLAB

The floor slab for the proposed building may be constructed as a conventional slab on ground, supported on the firm and stable soils of Stratum I or Structural Fill placed in accordance with the recommendations set forth in this report. Provided the soils supporting the slab are compacted to at least 95 percent of their maximum dry density and within ±2 percent of the optimum moisture content, both as determined by ASTM D1557, the soils are expected to exhibit a modulus of subgrade reaction of approximately 100 pounds per cubic inch (pci).

Any localized areas which contain weak and yielding Stratum I soils that cannot be improved in place shall be removed a minimum of 12 inches. The resulting over-excavations shall be proofrolled and backfilled as detailed later in this report. The Geotechnical Engineer of Record shall be present to review the slab subgrade area during its preparation and prior to slab subgrade placement.

The concrete slab on ground shall be supported on a minimum of 4 inches of free-draining clean and washed crushed stone or gravel subbase and compacted to non-movement prior to placement of the slab concrete.

6.4 SEISMIC SITE CLASSIFICATION

Based on the subsurface conditions encountered during our investigation at the site, and the guidance provided by "The 2021 International Building Code, New Jersey Edition", the subsurface soils can be classified as Seismic Site Class E.

7. CONSTRUCTION PHASE RECOMMENDATIONS

Based on our geotechnical engineering analyses for this project and our experience with similar projects, the following construction phase recommendations are provided in the following sections.

7.1 SITE PREPARATION

All surficial topsoil, or other surficial materials present, shall be removed from all structural areas at the beginning of the project. Structural areas are defined as areas covered by the proposed structure or any asphalt or concrete paved areas, extending a minimum of 5 feet beyond the proposed structure or pavement lines. Unstable or deleterious materials shall be removed from within these areas as detailed in this report.

7.2 COMPACTION AND PROOFROLLING

Structural areas shall be compacted using a steel-drum vibratory roller having a minimum static weight of **at least 10 tons**. This shall be done following the removal of surficial materials, following any excavation needed to reach proposed subgrade elevations, and prior to the placement of any structural fill. A minimum of 5 overlapping passes, in directions perpendicular to each other, of the compaction equipment shall be completed across all structural areas. Compaction of the virgin subgrade soils and proofrolling should be completed under the observation of the Geotechnical Engineer of Record and is considered a critical part of site development.

Following the compaction procedures described above, proofrolling of the structural areas shall be performed using a fully loaded tri-axle dump truck. Weak or yielding areas discovered by visual observations during the compaction and proofrolling procedures described above shall be compacted in-place to non-movement or removed to firm and stable subbase soils and replaced with structural fill placed in accordance with this report.

The compaction and proofrolling procedures described above are necessary to verify the stability of the upper zones of the structural areas and for uniform distribution of loads. In areas where removal of soils (cut) is required, proofrolling can be postponed until after the proposed subgrade elevation is achieved.

As previously referenced, portions of the near-surface soils of Stratum I were very loose to loose. As such, the compaction and proofrolling procedures detailed above are vitally important to the performance of this project. In addition, due to these very loose soils, some localized areas of weak and yielding subgrade soils, requiring remediation, should be expected.

7.3 EXCAVATION CONSIDERATIONS

Construction excavations for this project are expected to take place within the soils of Stratum I or newly placed and compacted Structural Fill. Based on our investigation, it is anticipated that the Stratum I soils can be removed using conventional excavation equipment and techniques.

All excavations shall be adequately sloped, benched or otherwise supported to minimize collapse and protect personnel. Additionally, all excavations shall be completed in accordance with all pertinent Occupational Safety and Health Administration (OSHA) guidelines and requirements.

7.4 STRUCTURAL FILL

Recommendations regarding imported Structural Fill and the use of on-site soils as structural fill are provided in the following section.

Imported Fill

Any imported Structural Fill needed to raise site grades or replace weak and yielding soils shall be free of ash, trash, cinders, organic matter, or any other deleterious materials. This Fill shall have a Plasticity Index (PI) less than 10; Liquid Limit (LL) less than 30; and less than 15 percent by weight rock fragments larger than 2 inches with no particle size exceeding 4 inches. Further, the Fill shall be well-graded with less than 15 percent by weight larger than the ¾ inches and less than 15 percent smaller than the No. 200 sieve.

The Geotechnical Engineer of Record shall evaluate any proposed imported soils that differ from above prior to their placement as Structural Fill.

On-Site Soils Reuse

Comments regarding the suitability of the on-site soils for reuse as structural fill are provided in the following sections.

Stratum I – These soils consisted primarily varicolored fine to medium Sand with varying amounts of Gravel and Silt. This soil is considered generally suitable for use as structural fill at this site, provided it is placed in accordance with the recommendations set forth in this report.

Our analysis of the suitability of the on-site soil for use as Structural Fill was based on data collected from the test boring locations. Soil suitability shall be confirmed in the field by a qualified Geotechnical Engineer during construction.

7.5 BACKFILLING REQUIREMENTS

The following structural fill lift thicknesses can be used with the following compaction equipment:

- Loose lifts not exceeding 10 inches: Where Heavy Compaction Equipment can be utilized.
- Loose lifts not exceeding 6 inches: Where only hand operated tampers or walk-behind roller can be utilized.

Within structural areas, all structural fill shall be compacted to at least 95 percent of the maximum dry density and within ±2 percent of the optimum moisture content, both as determined by ASTM D1557.

Within non-structural areas, structural fill shall be compacted to at least 90 percent of the maximum dry density and within ±2 percent of the optimum moisture content, both as determined by ASTM D1557.

The lift thicknesses, number of passes, and the types of compaction equipment needed to achieve the compaction percentages noted above can be adjusted in the field during backfilling and compaction procedures.

7.6 FOUNDATION CONSTRUCTION

The following shall be adhered to during foundation construction:

- Foundation subgrades shall be compacted using a trench roller to provide a firm and stable subbase within the foundation excavation suitable for proper support of the proposed foundations.
    - **As previously referenced, portions of the near-surface soils of Stratum I were very loose to loose and some localized areas of weak and yielding subgrade soils should be expected. As such, the compaction procedures detailed above are vitally important to the performance of this project.**
- Should the foundation subgrade soils be disturbed and cannot be improved in-place, they shall be removed to firm and stable subbase soils. The resulting over-excavation can be backfilled with concrete, cementitious flowable fill or structural fill placed in accordance with this report.
- Water shall be prevented from entering the foundation excavations. Any water that does enter the foundation excavation shall be removed within 24 hours and the subgrade soils re-evaluated for stability.
- It is strongly recommended concrete placement take place promptly to reduce degradation of foundation subgrade and excavation sidewalls.
- **Attention is directed to Section 6.1 of this report. All items therein shall be strictly adhered to.**

The foundation subgrades shall be reviewed by a Geotechnical Engineer licensed in the State of New Jersey during construction to confirm the suitability of the subgrade soils.

7.7 SLAB CONSTRUCTION

Prior to the placement of any granular subbase, and prior to the placement of the concrete slab on ground, proofrolling and compaction of the proposed concrete slab area shall be carried out in accordance with this report.

Dependent upon the weather conditions and construction schedules, the slab subgrade may contain weak, yielding and/or overly saturated soil immediately prior to slab placement. These soils shall be removed and replaced in accordance with this report, or alternate methods, such as aerating and re-compacting shall be utilized to stabilize the slab subgrade. The most appropriate method used for stabilization of the slab subgrade shall be determined in the field based on site-specific field and soil conditions, along with the availability and cost effectiveness of various methods. The Geotechnical Engineer shall be consulted should these needs arise.

Any localized areas which contain weak and yielding Stratum I soils shall be removed in their entirety to firm and stable Stratum I soils. The resulting over-excavations shall be proofrolled and backfilled as detailed in this report. The Geotechnical Engineer of Record shall be present to review the slab subgrade area during its preparation and prior to slab subgrade placement.

Based on the results of our investigation, some localized areas of weak and/or yielding slab subgrades, requiring excavation and replacement, should be expected. Any excavation and replacement of weak and/or yielding slab subgrade soils should be carried out as detailed previously in this report. The Geotechnical Engineer of Record shall be present to review the slab subgrade area during its preparation and prior to slab subgrade placement.

7.8 DEWATERING

Groundwater was encountered during our investigation at both boring locations from approximately 11.5 feet to 12 feet below existing ground surface. These depths corresponded to groundwater elevations ranging from approximately EL 97 feet to EL 97.5 feet. As such, groundwater is not expected to be encountered within foundation or utility excavations. It is anticipated any encountered perched water will be able to be controlled using localized drainage ditches and submersible pumps.

These observations were made at the time of the exploration. Groundwater table elevations should be expected to vary with daily, seasonal, and climatological conditions.

7.9 PAVEMENT CONSTRUCTION

Prior to any newly placed bituminous pavement, proposed pavement areas shall be thoroughly compacted and proof-rolled in accordance with this report. These areas shall be compacted to a minimum 95 percent of the maximum dry density and within ±2 percent of the optimum moisture content, both as determined by ASTM D1557. This process, and the removal and replacement of any weak and yielding areas of the pavement subgrade, shall be reviewed by the Geotechnical Engineer during construction.

The granular subbase portion of the proposed paving section shall be placed as soon as possible after the subgrade has been reviewed and approved by the Geotechnical Engineer. Exposure to construction traffic prior to paving will likely result in degradation of the subbase materials and instability of the subgrade soils.

The proofrolling and compaction procedures detailed in this report are considered vitally important to the performance of the paving at this project. Any areas of weak and yielding paving subgrade soils encountered within the paved areas shall be removed in their entirety to firm and stable Stratum I soils. The resulting over-excavations shall be proofrolled and backfilled as detailed in this report. The Geotechnical Engineer of Record shall be present to review the paving subgrade areas during their preparation.

Proper drainage is required for the successful performance of any pavement. It is assumed the pavement will be designed for proper grading to provide proper runoff.

Review of all pavement construction activities, including review of the gravel subbase layer and the pavement subgrades, shall be reviewed by a Geotechnical Engineer to ensure adherence to project plans, specifications and recommendation contained in this report.

Based on the results of our investigation, some localized areas of weak and/or yielding pavement subgrades, requiring excavation and replacement, should be expected. Any excavation and replacement of weak and/or yielding pavement subgrade soils should be carried out as detailed previously in this report.

8. CONSTRUCTION PHASE OBSERVATION & TESTING

As Geotechnical Engineer of Record for this project, DE recommends we be retained to provide construction phase observations and materials testing during construction. This shall be done to verify that the geotechnical recommendations detailed in this report are adhered to during construction.

If an outside firm is retained to provide these services, DE recommends this firm prepare a letter stating they will assume the responsibilities of Geotechnical Engineer of Record for the project. Further, we also recommend this firm provide a letter stating their receipt of this report and acknowledgement of the recommendations provided therein, or detailing revisions to the recommendations within our report.

9. LIMITATIONS

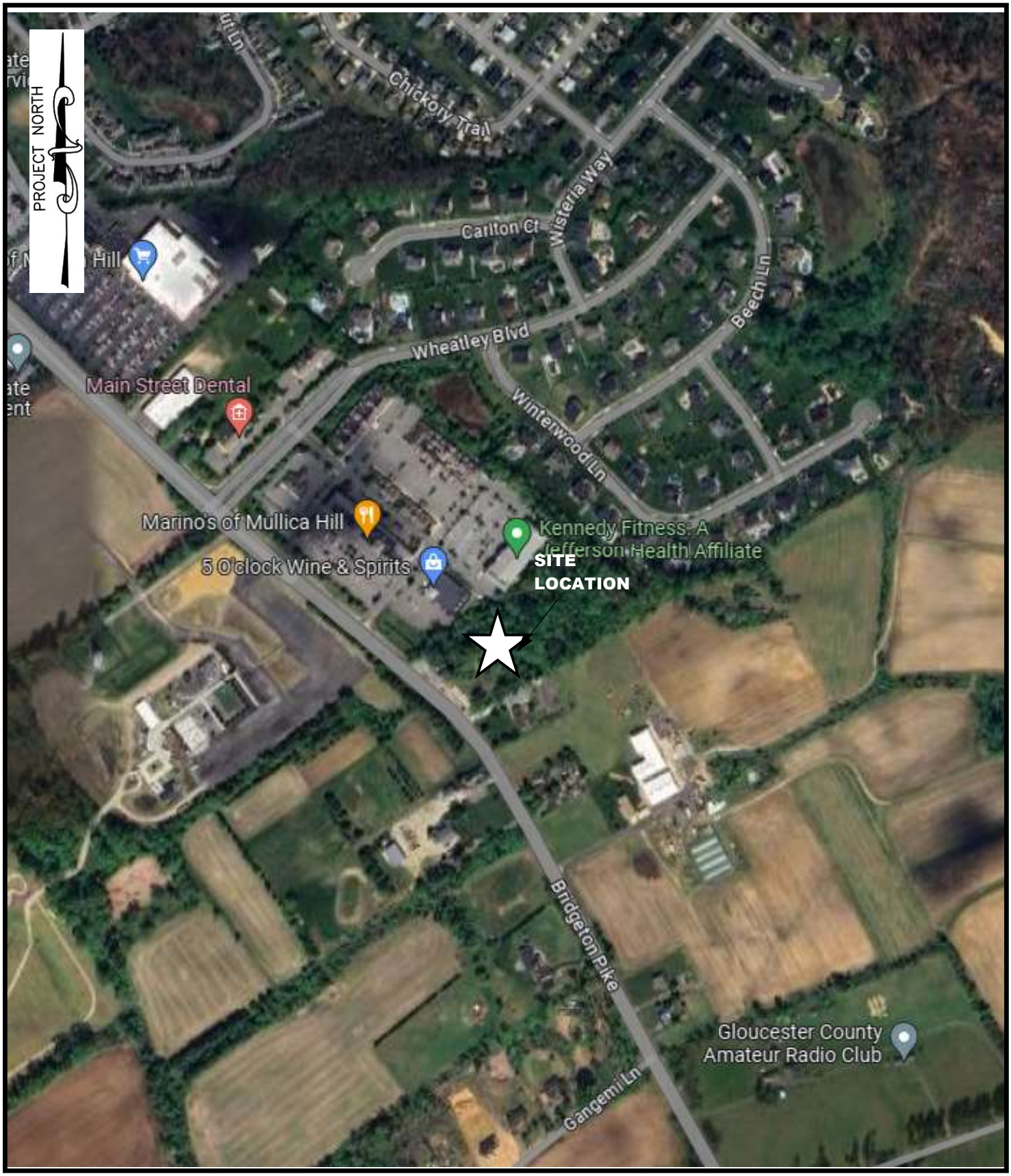
This report was prepared in accordance with generally accepted geotechnical practices for projects such as this one.

The conclusions and recommendations contained in this report were based upon the subsurface data obtained at the site. Soil conditions may vary from location to location and from point to point across the project site. The validity of the conclusions and recommendations contained in this report were limited by the scope of the field investigation and by the number of test borings completed. It is understood the number of test locations were consistent with good engineering practice; however, given the nature of subsurface conditions, there was a possibility actual encountered conditions may differ significantly from those described in this report.

Should encountered conditions differ from those described in this report, DE shall be notified immediately so our conclusions and recommendations can be reviewed and revised, if required. The scope of this investigation was limited to the geotechnical analysis of the load-carrying capabilities and stability of the soils underlying the project area.

Oil, hazardous waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this study. Their presence and/or absence are not implied, inferred or suggested by this report or results of this study.

Attachment A
Key Map Plan



PROJECT:

GEOTECHNICAL ENGINEERING INVESTIGATION
GLOUCESTER COUNTY EMS BUILDING GEOTECH
BLOCK 57 / LOT 18
169-171 BRIDGETON PIKE
MULLICA HILL, GLOUCESTER COUNTY, NJ 08062
DE PROJECT NO. 54-106

DRAWING TITLE:

KEY MAP PLAN

DRAWING SHEET:

ATTACHMENT 'A'

DIGNEO ENGINEERING

Attachment B
Test Boring Location Plan



PROJECT:

GEOTECHNICAL ENGINEERING INVESTIGATION
GLOUCESTER COUNTY EMS BUILDING GEOTECH
BLOCK 57 / LOT 18
169-171 BRIDGETON PIKE
MULLICA HILL, GLOUCESTER COUNTY, NJ 08062
DE PROJECT NO. 54-106

DRAWING TITLE:

TEST BORING LOCATION PLAN

DRAWING SHEET:

ATTACHMENT 'B'

APPROXIMATE TEST BORING LOCATION

DIGNEO ENGINEERING

Attachment C
Test Boring Logs

DIGNEO ENGINEERING

TEST BORING LOG

Project:	Gloucester County EMS Building Geotech Investigation	**Boring Number:**	B-1
Date Drilled:	7/8/24	**GS Elevation (ft):**	109.5
Driller / DE Rep:	SBI / Frank D.	**GW Elevation (ft):**	97.5
Rig Type:	Mobile B-29 Truck	**Drilling Method:**	3.25" ID HSA
Project Number:	54-106	**Topo Est:** __x__	**Field Survey** _____

Depth (ft)	Sample #	Sample Depth	Blows/6"				N	Soil Description	Remarks
1	S-1	0' - 2'	3	3	3	2	**6**	**Topsoil 6"**	
2								Loose brown fine to medium SAND, trace fine Gravel, trace Silt, moist	
3	S-2	2' - 4'	2	1	1	1	**2**	Very loose light brown fine to medium SAND, some Silt, moist	
4									
5	S-3	4' - 6'	1	2	2	3	**4**	Very loose yellowish brown fine SAND, little Clayey Silt, moist	
6									
7	S-4	6' - 8'	3	2	4	4	**6**	Loose yellowish brown fine SAND, some Silt, moist	**Stratum I**
8									
9	S-5	8' - 10'	5	5	5	4	**10**	Loose orange brown to gray fine SAND and SILT, moist	
10									
11									
12									H_2O Depth : 12'
13									
14	S-6	13' - 15'	2	2	2	3	**4**	Very loose orange brown fine SAND and SILT, wet	
15									
16	S-7	15' - 17'	3	3	2	2	**5**	Loose orange brown fine SAND and SILT, wet	
17									
18									
19	S-8	18' - 20'	1	1	2	2	**3**	Very loose orange brown to gray fine SAND and SILT, wet	
20									
21	S-9	20' - 22'	2	3	3	5	**6**	Loose orange brown fine SAND and micaceous SILT, wet	
22									
23									
24	S-10	23' - 25'	1	2	2	4	**4**	Very loose orange brown fine SAND and micaceous SILT, wet	
25									

DIGNEO ENGINEERING

TEST BORING LOG

Project:	Gloucester County EMS Building Geotech Investigation	**Boring Number:**	B-1
Date Drilled:	7/8/24	**GS Elevation (ft):**	109.5
Driller / DE Rep:	SBI / Frank D.	**GW Elevation (ft):**	97.5
Rig Type:	Mobile B-29 Truck	**Drilling Method:**	3.25" ID HSA
Project Number:	54-106	**Topo Est:__x__**	**Field Survey _____**

Depth (ft)	Sample #	Sample Depth	Blows/6"				N	Soil Description	Remarks
26									
27									
28									
29	S-11	28' - 30'	1	3	4	8	**7**	Loose orange brown fine SAND and SILT, wet	**Stratum I**
30									
31	S-12	30' - 32'	10	11	12	12	**23**	Medium dense orange brown fine SAND, some Silt, wet	
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
	END OF BORING AT 32 FEET								

DIGNEO ENGINEERING

TEST BORING LOG

Project:	Gloucester County EMS Building Geotech Investigation	**Boring Number:**	B-2
Date Drilled:	7/8/24	**GS Elevation (ft):**	108.5
Driller / DE Rep:	SBI / Frank D.	**GW Elevation (ft):**	97
Rig Type:	Mobile B-29 Truck	**Drilling Method:**	3.25" ID HSA
Project Number:	54-106	**Topo Est:** __x__	**Field Survey** _____

Depth (ft)	Sample #	Sample Depth	Blows/6"				N	Soil Description	Remarks
1	S-1	0' - 2'	3	3	3	3	**6**	**Topsoil 2"**	
2								Loose brown fine to medium SAND, little Silt, trace fine Gravel, moist	
3	S-2	2' - 4'	4	2	3	3	**5**	Loose light brown fine to medium SAND, some Silt, moist	
4									
5	S-3	4' - 6'	2	3	5	5	**8**	Loose yellowish brown fine SAND, some Clayey Silt, moist	
6									
7	S-4	6' - 8'	5	4	5	5	**9**	Loose yellowish brown fine SAND, some Silt, moist	**Stratum I**
8									
9	S-5	8' - 10'	3	5	4	4	**9**	Loose orange brown to gray fine SAND and SILT, moist	
10									
11									
12									H_2O Depth : 11.5'
13									
14	S-6	13' - 15'	2	3	1	2	**4**	Very loose orange brown fine SAND and SILT, wet	
15									
16									
17									
18									
19	S-7	18' - 20'	2	2	1	2	**3**	Very loose orange brown fine SAND and micaceous SILT, wet	
20									
21									
22									
23									
24	S-8	23' - 25'	1	2	2	3	**4**	Very loose orange brown fine SAND and micaceous SILT, wet	
25									

DIGNEO ENGINEERING

TEST BORING LOG

Project:	Gloucester County EMS Building Geotech Investigation	**Boring Number:**	B-2
Date Drilled:	7/8/24	**GS Elevation (ft):**	108.5
Driller / DE Rep:	SBI / Frank D.	**GW Elevation (ft):**	97
Rig Type:	Mobile B-29 Truck	**Drilling Method:**	3.25" ID HSA
Project Number:	54-106	**Topo Est:__x__**	**Field Survey _____**

Depth (ft)	Sample #	Sample Depth	Blows/6"				N	Soil Description	Remarks
26									
27									
28									
29	S-9	28' - 30'	3	5	6	7	**11**	Medium dense light brown fine SAND, some Silt, wet	
30									
31									
32									**Stratum I**
33									
34	S-10	33' - 35'	4	8	9	9	**17**	Medium dense light brown fine SAND, some Silt, wet	
35									
36	S-11	35' - 37'	6	9	11	12	**20**	Medium dense light brown fine SAND, some Silt, wet	
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
	END OF BORING AT 37 FEET								

Attachment D
Laboratory Test Results

SUMMARY OF LABORATORY TEST DATA

Project Name: Gloucester County EMS (DE #54-106))
Client Name: Digneo Engineering
TRC Project #: 617654.0004

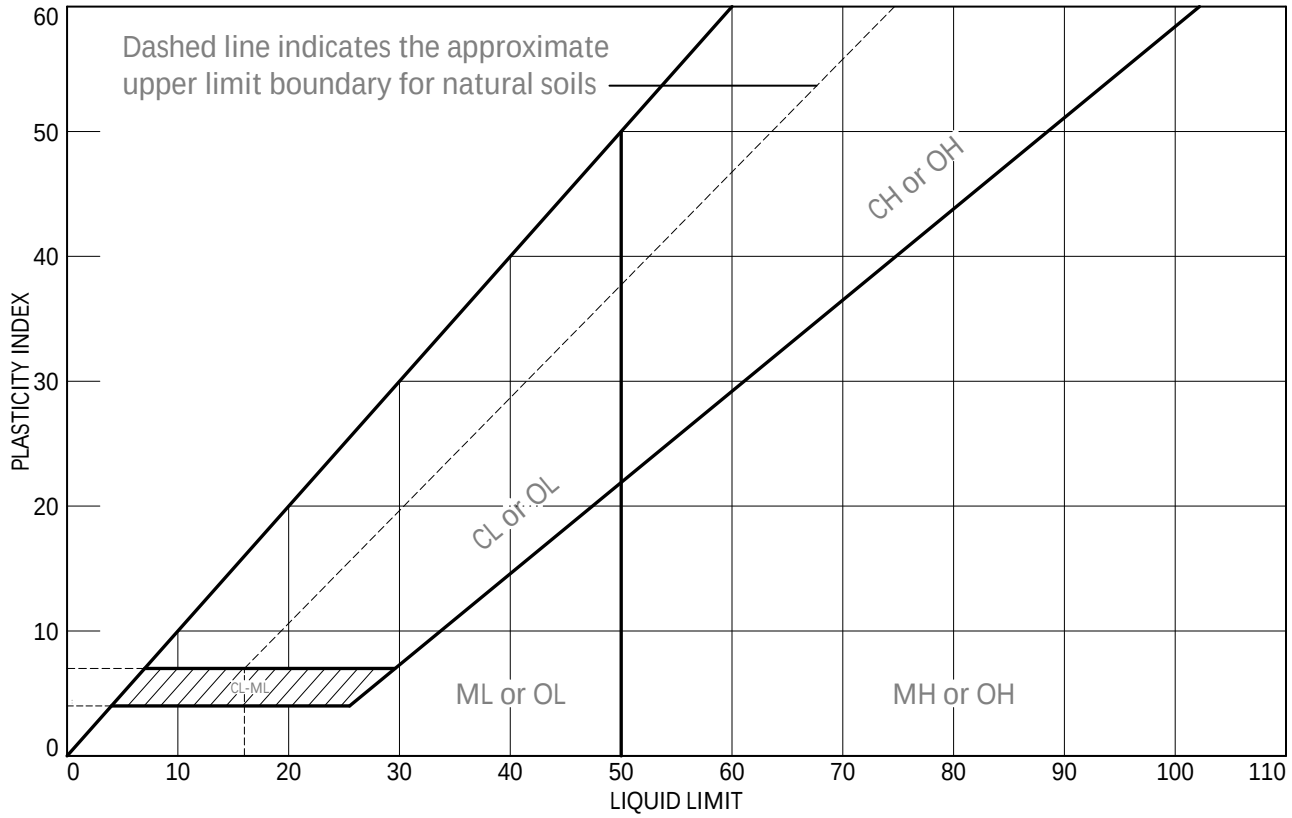
SAMPLE IDENTIFICATION			Soil Group (USCS System)	Moisture Content (%)	GRAIN SIZE DISTRIBUTION USCS GRADATION				PLASTICITY			
Source #	Sample #	Depth (ft)			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index (%)
B-1	S-2	2.0-4.0	SM	12.8	0.9	75.9	23.2		NP	NP	NP	-

NP= NON-PLASTIC

DRAWN BY: TBT 07/19/24

CHECKED BY: JPB 07/19/24

Atterberg Limits and Moisture Content Report



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-1	S-2	2.0-4.0 FT	12.8	NP	NP	NP		SM

TRC
Engineers, Inc.
Mt. Laurel, NJ

Client: DIGNEO ENGINEERING
Project: GLOUCESTER COUNTY EMS
DE #54-106
Project No.: 617654.0004 Figure 1

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.9	0.6	7.0	68.3	23.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	0.3143	0.1674	0.1357	0.0883				

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ BROWN SILTY SAND	07/12/24	SM	12.8

Project No. 617654.0004 Client: DIGNEO ENGINEERING
Project: GLOUCESTER COUNTY EMS
DE #54-106
○ Source of Sample: B-1 Depth: 2.0-4.0 FT Sample Number: S-2

TRC Engineers, Inc.

Mt. Laurel, NJ

Remarks:
○SAMPLE DESCRIPTION
BASED ON USCS

Figure 2

Tested By: JC 07/12/24 Checked By: JPB 07/19/24

SOILS ENGINEERING REPORT

UNDERWOOD ENGINEERING COMPANY
1 KEYSTONE AVE. SUITE 300
CHERRY HILL, NJ 08003

Patrick M Underwood, President 856-933-1818

CLIENT:	BACH ASSOCIATES, PC 304 White Horse Pike Haddon Heights, NJ 08035
PROJECT:	EMS Mullica Hill 169-171 Bridgeton Pike Mullica Hill, NJ
REQUIREMENT:	Professional Engineering Services
LOCATION:	Locations Surveyed and Staked by Client
DATE:	3/16/2025
UE REF. NO.:	5372-10643-1, WO#25-1031
ATTENTION:	Steven M. Bach, email: sbach@bachdesigngroup.com, Karen Weiss kweiss@bachdesigngroup.com

PURPOSE

The purpose of this report is to present the findings of the geotechnical test pits explored at the EMS Mullica Hill site, located at 169-171 Bridgeton Pike, in the Township of Harrison, Gloucester County, New Jersey. All supplemental test locations were shown on the conceptual plan.

INVESTIGATION

The geotechnical investigation was requested by Bach Associates, P.C. to ascertain groundwater and subsurface soil data. Representatives of Underwood Engineering, Inc. were present on Wednesday, March 5th, 2025 to observe and log the test pits at the previously surveyed and staked locations on site. The site consisted of an open field with low vegetation cover and grass, bounded by tree lines along the property limits and by Bridgeton Pike. The investigation consisted of 4 soil profile test pits and 4 double-ring infiltration tests conducted at the locations and depths indicated below. The test pits were located within two areas of proposed stormwater basins. A Hitachi ZAxis 245 US LC rubber wheeled backhoe was used in the subsurface investigation. Double-ring infiltration testing was completed utilizing a modified version of ASTM D-3385. Soil samples were collected for laboratory processing to determine permeability class rating and textural analysis per ASTM D-6913 and ASTM D-7928. Field work was completed in accordance with NJ Stormwater Best Management Practices Manual, Chapter 12. Areas disturbed during excavation and infiltration testing operations were restored upon completion. All investigative methods and summaries of results are provided in the following paragraphs. Test date: 3/5/2025.

FINDINGS

The soil was consistent with coastal plain geology and the Kirkwood Formation. The uppermost soil stratum consisted of fill. Fill depths varied throughout the excavation areas from approximately 3 feet to 6 feet below ground surface (BGS). An intact footing and CMU block wall was excavated in TP-4. Adjacent to TP-1, a pit of burned wood was excavated to

approximately 6 feet BGS. Underlying the fill soils were sands with little, ranging to a majority, of fine content (loamy sands, sandy loams, clay loams, loams) which extended to the depths explored. Fine content refers to the amount of silt and clay present in the soil. The test pits were terminated at depths ranging from approximately 14.5 feet to 18 feet BGS.

Seasonal high water indicators, such as redoximorphic features or moisture, were observed in the test pits at depths ranging from 6.25 feet to 8.75 feet BGS. Saturated soils were encountered in the test pits at the time of excavation and test pits were left open during the site work and groundwater was observed. Depths to groundwater ranged from 11.6 feet to 13.6 feet BGS. It should be noted that groundwater data presented on the individual test boring logs may not be representative of daily or seasonal variations in the ground water level. The seasonal high water table as indicated by mottling and other soil characteristics is only an average based on long-term fluctuations in groundwater. Actual groundwater tables may vary from average annual seasonal highs, based on precipitation frequencies and other factors.

Four double-ring infiltration tests were performed on site. The in-situ testing performed on the soil yielded stabilized infiltration rates ranging from 0.0 inches per hour to 1.5 inches per hour. The in-situ testing findings are detailed further in Appendix C, the Infiltration Log Soil Analysis.

The soil samples collected for laboratory analysis to determine textural analysis and permeability class rating per ASTM D-6913 and ASTM D-7928 yielded class ratings ranging from K0, or less than 0.2 inches per hour, to K2, or 0.6 to 2 inches per hour.

The laboratory testing yielded consistent infiltration rates with the in-situ infiltration rates. The table included below details the stabilized infiltration testing results with the textural analysis and permeability class rating results. The laboratory findings and locations are shown in Appendices A and B to include the Test Pit Layout Plan and Laboratory Soils Analysis.

Soils encountered in the test pit are as follows:

Test Pit # 1/DRI-1 (Elev. +/- 107.10)

Depth (in.)	**Classification**
0 - 11	FILL; Dark Brown fine to coarse Topsoil Loamy Sand, little to some fine to medium Gravel
11 – 16	FILL; Reddish Brown fine to coarse Loamy Sand, little fine Gravel
16 – 21	FILL; Dark Brown fine to coarse Sandy Loam, trace fine Gravel
21 – 54	FILL; 10YR 5/8 Yellowish Brown fine to coarse Loam, little fine Gravel, Wood, Bricks, Asphalt
54 – 73	10YR 7/1 Light Gray fine to coarse CLAY LOAM, trace fine Gravel
73 – 88	10YR 4/6 Light Yellowish Brown/Gray fine to coarse LOAM, trace fine Gravel, faint Yellow mottling
88 – 116	10YR 6/1 Gray & 10YR 4/6 Light Yellowish Brown fine to medium SANDY LOAM, trace fine Gravel, Distinct Light Yellow/Gray mottles 90”
116 – 216	10YR 6/6 Brownish Yellow fine to coarse SANDY LOAM, distinct Gray mottles

Groundwater Encountered at 164”
ESHWT Observed at 90”
DRI Depth at 54” Rate – 0.0 in./hr.

TP-1A/DRI Attempt Pit-1A (Elev. +/- 107.10)

Depth (in.)	**Classification**
0 – 72	FILL; Black burnt wood, little sand

Test Pit-2/DRI-2 (Elev. +/- 106.34)

Depth (in.)	**Classification**
0 - 50	FILL; Moist, Reddish Brown fine to coarse Topsoil Loamy Sand to Sandy Loam, little fine Gravel, Wood, Asphalt fragments, terracotta pipe, CMU block
50 – 75	2.5Y 6/3 Light Yellowish Brown medium to coarse LOAM, some fine Gravel
75 – 88	10YR 6/1 Gray & 10YR 5/8 Yellowish Brown mottled fine to medium SANDY CLAY LOAM, little fine Gravel
88 – 142	10YR 6/6 Brownish Yellow & 10YR 6/1 Gray mottled fine to coarse SANDY CLAY LOAM
142 – 175	Wet, 10YR 6/6 Brownish Yellow & 10YR 6/1 Gray fine, many, distinct, mottled fine to coarse LOAMY SAND
175 – 180	10YR 6/6 Brownish Yellow & 10YR 6/1 Gray fine, many, distinct, mottled fine to coarse LOAM

Groundwater Encountered 144”
ESHWT Observed at 75”
DRI Depth at 50” Rate – 1.4 in./hr.

Test Pit-3/DRI-3 (Elev. +/- 106.10)

Depth (in.)	**Classification**
0 - 39	FILL; Moist, fine to coarse Topsoil, Sandy Loam, Brick fragments
39 – 105	10YR 5/4 Yellowish Brown to 2.5Y 6/4 Light Yellowish Brown fine to coarse LOAM, little fine to coarse Gravel
105 – 140	Moist, 10YR 7/1 Light Gray & 10YR 6/6 Brownish Yellow fine to medium SANDY LOAM, many, faint, fine, mottles
140 – 148	Wet, 10YR 6/6 Brownish Yellow & 10YR 6/1 Gray many, fine, distinct, mottles fine to medium SANDY LOAM
148 – 174	Wet, 10YR 6/6 Brownish Yellow & 10YR 6/1 Gray fine, many, distinct, mottled fine to coarse LOAMY SAND

Groundwater Encountered 140”
ESHWT Observed at 105”
DRI Depth at 57” Rate – 1.5 in./hr.

Test Pit-4 (Elev. +/- 105.50)

Depth (in.)	Classification
0 - 58	FILL; Moist, Reddish Yellow/Brown fine to coarse Topsoil, Loamy Sand, Asphalt fragments, Intact foundation CMU wall and footing 0-48"
58 – 94	Moist, 2.5Y 6/4 Light Yellowish Brown to 10YR 6/1 Gray fine to medium CLAY LOAM, little fine to coarse Gravel, Hydrocarbon Odor
94 – 142	Moist, 10YR 6/1 Gray & 10YR 5/8 Yellowish Brown fine to medium SANDY LOAM, many, faint, fine, 10YR 4/6 Light Yellowish Brown mottles, Hydrocarbon Odor
142 – 180	Wet, 10YR 4/6 Light Yellowish Brown & 10YR 6/1 Gray many, fine, distinct, mottles fine to medium LOAMY SAND

Groundwater Encountered 142"
ESHWT Observed at 94"
DRI Depth at 44" Rate – 0.02 in./hr.

TP-4A/DRI Pit-4A (Elev. +/- 105.50)

Depth (in.)	Classification
0-40	FILL; Moist, Reddish Yellow/Brown fine to coarse Topsoil, Loamy Sand, Asphalt fragments
40 – 44	2.5Y 6/4 Light Yellowish Brown to 10YR 6/1 Gray fine to medium CLAY LOAM

Results of infiltration testing is contained in the table below:

Location	Depth (in.)*	Soil Classification	Stabilized Infiltration Rate (in./hr.) (field test)	Permeability Class Rating (lab tests)
T.P.-1	54	CLAY LOAM	0.0	K0 (<0.2 in./hr.)
T.P.-2	50	LOAM	1.4	K2 (0.6-2.0 in./hr.)
T.P.-3	57	LOAM	1.5	K2 (0.6-2.0 in./hr.)
T.P.-4	44	CLAY LOAM	0.02	K0 (<0.2 in./hr.)

*Depths taken below existing ground surface elevations at test pit location.

QUALIFICATIONS

The findings presented in this report are based solely on the above investigation. No conclusions are to be drawn other than those specifically stated herein. This report does not reflect any variations, which may be encountered during construction. Underwood Engineering Company will not be responsible for variations in subsurface soils encountered in other areas other than those tested.

Respectfully submitted,
UNDERWOOD ENGINEERING COMPANY

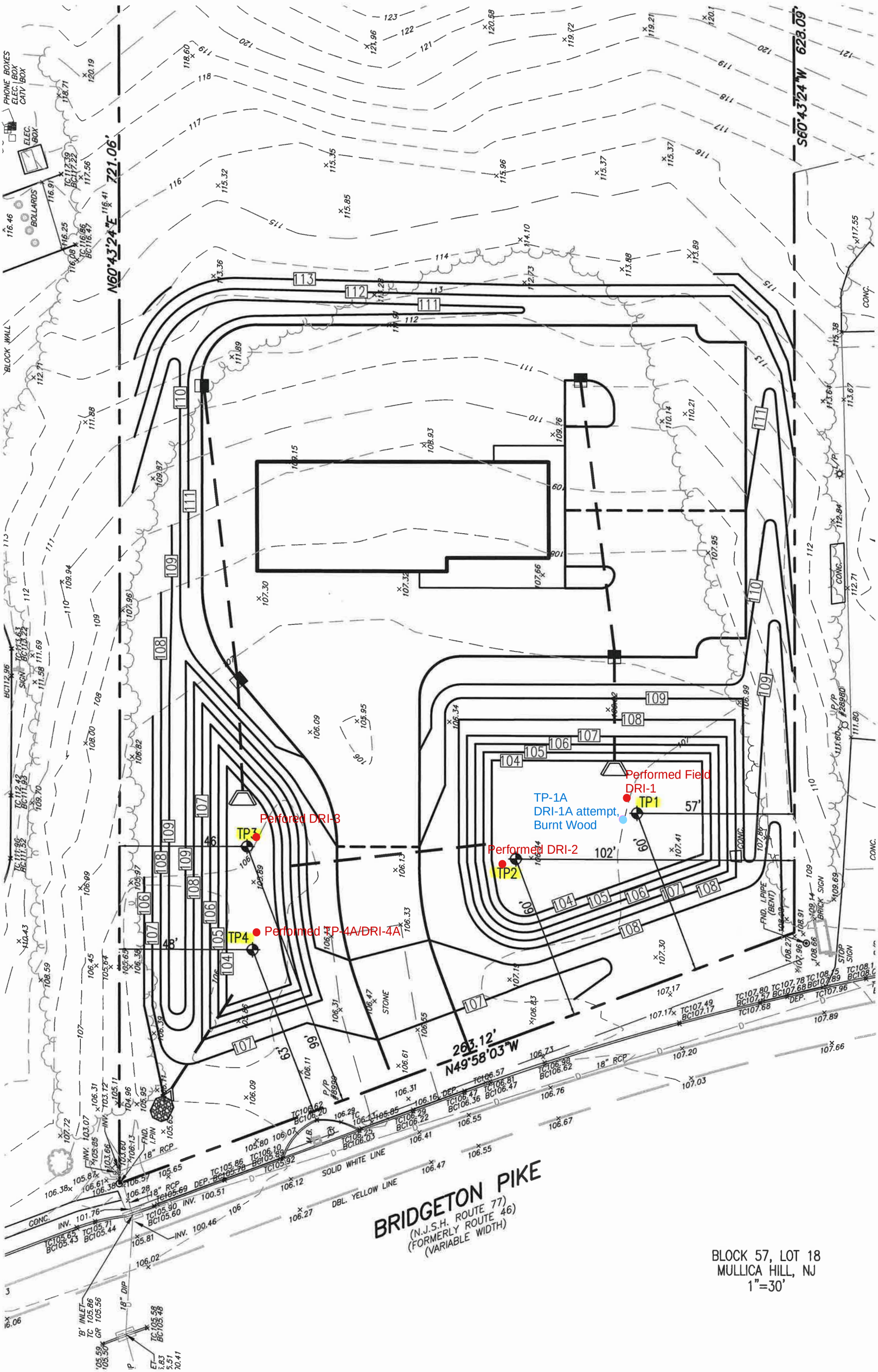
Christopher T. Koss, P.E.

Christopher T. Koss

UNDERWOOD ENGINEERING COMPANY



APPENDIX A
Test Pit Layout Plan


Performed Field DRI-1
TP-1A
DRI-1A attempt, Burnt Wood
TP1
Performed DRI-2
TP2
Perfored DRI-3
TP3
Performed TP-4A/DRI-4A
TP4
N60°43'24"E 721.06'
S60°43'24"W 628.09'
N49°58'03"W 263.12'
BRIDGETON PIKE
(N.J.S.H. ROUTE 77)
(FORMERLY ROUTE 46)
(VARIABLE WIDTH)
SOLID WHITE LINE
DBL. YELLOW LINE
BLOCK 57, LOT 18
MULLICA HILL, NJ
1"=30'

APPENDIX B
Laboratory Soil Analysis
(Permeability Class Rating & Textural Analysis)

Underwood Engineering Company

1 Keystone Avenue, Cherry Hill, NJ 08003

Patrick M. Underwood, President (856) 933-1818

Client: Bach Associates, P.C.
Project: EMS Mullica Hill
Requirement: Hydrometer & Sieve Analysis
Date Performed: 3/11/2025
Location: TP-1 Depth 54"
Test Number: 1
Project No:5372-10643-1

ASTM D-422 HYDROMETER AND SIEVE ANALYSIS

A. COARSE FRAGMENT CONTENT

Total dry sample wt. = 250.0 Wt. retained #10 sieve (2mm) = 8.8 % Coarse framents = 3.5

B. HYDROMETER ANALYSIS

Weight used for hydrometer analysis = 100.0g
Percent Passing #10 sieve = 96.5
Temperature = 24 °C
a = 1.0 based on specific gravity of soil particles = 2.65 from Table 1 of ASTM D-422
w, weight used for hydrometer analysis/percent passing #10 x 100 = 103.6
L, value of effective depth, Table 2 of ASTM D-422 = see table below
k, based on specific gravity of soil particle and temperature = 0.01301

Time, t (minutes)	Hydrometer reading, r	Percent in suspension, P=100ra/w	L (cm)	Soil particle diam.(mm), D = k sqrt(L/t)
2	54	52.1	11.4	0.03106
5	50	48.3	11.4	0.01964
15	47	45.4	11.4	0.01134
30	44	42.5	11.4	0.00802
60	35	33.8	11.4	0.00567
250	30	29.0	11.4	0.00278
1440	27	26.1	11.9	0.00118

C. SIEVE ANALYSIS (of hydrometer sample)

Wt. passing #60 sieve (0.25mm) = 7.8 Wt retained #300 sieve (0.045mm) = 23.4
% Fine plus very fine sand = 33.3

D. SOIL MORPHOLOGY

Structure : Massive Consistence : Firm

E. Soil Permeability CLASS RATING and TEXTURAL ANALYSIS

%Sand = 23.4 %Silt = 38.3 %Clay = 38.3

Soil Texture: CLAY LOAM
Soil Permeability Class Rating: K0

Underwood Engineering Company

1 Keystone Avenue, Cherry Hill, NJ 08003

Patrick M. Underwood, President (856) 933-1818

Client: Bach Associates, P.C.
Project: EMS Mullica Hill
Requirement: Hydrometer & Sieve Analysis
Date Performed: 3/11/2025
Location: TP-2 Depth 50"
Test Number: 2
Project No:5372-10643-1

ASTM D-422 HYDROMETER AND SIEVE ANALYSIS

A. COARSE FRAGMENT CONTENT

Total dry sample wt. = 250.0 Wt. retained #10 sieve (2mm) = 9.3 % Coarse framents = 3.7

B. HYDROMETER ANALYSIS

Weight used for hydrometer analysis = 100.0g
Percent Passing #10 sieve = 96.3
Temperature = 24 °C
a = 1.0 based on specific gravity of soil particles = 2.65 from Table 1 of ASTM D-422
w, weight used for hydrometer analysis/percent passing #10 x 100 = 103.9
L, value of effective depth, Table 2 of ASTM D-422 = see table below
k, based on specific gravity of soil particle and temperature = 0.01301

Time, t (minutes)	Hydrometer reading, r	Percent in suspension, P=100ra/w	L (cm)	Soil particle diam.(mm), D = k sqrt(L/t)
2	41	39.5	11.4	0.03106
5	38	36.6	11.4	0.01964
15	35	33.7	11.4	0.01134
30	32	30.8	11.4	0.00802
60	29	27.9	11.5	0.00570
250	24	23.1	12.4	0.00290
1440	19	18.3	13.2	0.00125

C. SIEVE ANALYSIS (of hydrometer sample)

Wt. passing #60 sieve (0.25mm) = 25.7 Wt retained #300 sieve (0.045mm) = 45.9
% Fine plus very fine sand = 56

D. SOIL MORPHOLOGY

Structure : Subangular Blocky Consistence : Friable

E. Soil Permeability CLASS RATING and TEXTURAL ANALYSIS

%Sand = 45.9 %Silt = 29 %Clay = 25.1

Soil Texture: LOAM
Soil Permeability Class Rating: K2

Underwood Engineering Company

1 Keystone Avenue, Cherry Hill, NJ 08003

Patrick M. Underwood, President (856) 933-1818

Client: Bach Associates, P.C.
Project: EMS Mullica Hill
Requirement: Hydrometer & Sieve Analysis
Date Performed: 3/11/2025
Location: TP-3 Depth 57"
Test Number: 3
Project No:5372-10643-1

ASTM D-422 HYDROMETER AND SIEVE ANALYSIS

A. COARSE FRAGMENT CONTENT

Total dry sample wt. = 250.0 Wt. retained #10 sieve (2mm) = 26.2 % Coarse framents = 10.5

B. HYDROMETER ANALYSIS

Weight used for hydrometer analysis = 100.0g
Percent Passing #10 sieve = 89.5
Temperature = 24 °C
a = 1.0 based on specific gravity of soil particles = 2.65 from Table 1 of ASTM D-422
w, weight used for hydrometer analysis/percent passing #10 x 100 = 111.7
L, value of effective depth, Table 2 of ASTM D-422 = see table below
k, based on specific gravity of soil particle and temperature = 0.01301

Time, t (minutes)	Hydrometer reading, r	Percent in suspension, P=100ra/w	L (cm)	Soil particle diam.(mm), D = k sqrt(L/t)
2	39	34.9	11.4	0.03106
5	37	33.1	11.4	0.01964
15	34	30.4	11.4	0.01134
30	29	26.0	11.5	0.00806
60	28	25.1	11.7	0.00575
250	25	22.4	12.2	0.00287
1440	18	16.1	13.3	0.00125

C. SIEVE ANALYSIS (of hydrometer sample)

Wt. passing #60 sieve (0.25mm) = 18 Wt retained #300 sieve (0.045mm) = 46.5
% Fine plus very fine sand = 38.7

D. SOIL MORPHOLOGY

Structure : Subangular Blocky Consistence : Friable

E. Soil Permeability CLASS RATING and TEXTURAL ANALYSIS

%Sand = 46.5 %Silt = 28.8 %Clay = 24.7

Soil Texture: LOAM
Soil Permeability Class Rating: K2

Underwood Engineering Company

1 Keystone Avenue, Cherry Hill, NJ 08003

Patrick M. Underwood, President (856) 933-1818

Client: Bach Associates, P.C.
Project: EMS Mullica Hill
Requirement: Hydrometer & Sieve Analysis
Date Performed: 3/11/2025
Location: TP-4 Depth 44"
Test Number: 4
Project No:5372-10643-1

ASTM D-422 HYDROMETER AND SIEVE ANALYSIS

A. COARSE FRAGMENT CONTENT

Total dry sample wt. = 250.0 Wt. retained #10 sieve (2mm) = 21.4 % Coarse framents = 8.6

B. HYDROMETER ANALYSIS

Weight used for hydrometer analysis = 100.0g
Percent Passing #10 sieve = 91.4
Temperature = 24 °C
a = 1.0 based on specific gravity of soil particles = 2.65 from Table 1 of ASTM D-422
w, weight used for hydrometer analysis/percent passing #10 x 100 = 109.4
L, value of effective depth, Table 2 of ASTM D-422 = see table below
k, based on specific gravity of soil particle and temperature = 0.01301

Time, t (minutes)	Hydrometer reading, r	Percent in suspension, P=100ra/w	L (cm)	Soil particle diam.(mm), D = k sqrt(L/t)
2	48	43.9	11.4	0.03106
5	46	42.0	11.4	0.01964
15	44	40.2	11.4	0.01134
30	38	34.7	11.4	0.00802
60	34	31.1	11.4	0.00567
250	28	25.6	11.7	0.00281
1440	26	23.8	12.0	0.00119

C. SIEVE ANALYSIS (of hydrometer sample)

Wt. passing #60 sieve (0.25mm) = 18.2 Wt retained #300 sieve (0.045mm) = 28.4
% Fine plus very fine sand = 64.1

D. SOIL MORPHOLOGY

Structure : Massive Consistence : Firm

E. Soil Permeability CLASS RATING and TEXTURAL ANALYSIS

%Sand = 28.4 %Silt = 32.8 %Clay = 38.8

Soil Texture: CLAY LOAM
Soil Permeability Class Rating: K0

APPENDIX C
Infiltration Log Soil Analysis

Stormwater Infiltration Testing Log

Report No.:	1
Issue No.:	1

Client: Bach Associates **cc:**

Project: EMS Mullica Hill

Work Date: 3/5/2025

Submitted By: M. Wanberg

Date of Issue: 3/5/2025

Project Name: EMS Mullica Hill

Project Address: 169-171 Bridgeton Pike, Mullica Hill, NJ

Date: 3/5/2025 **Email Address:** mwanberg@underwood-engineering.com

Weather: Overcast, High 50's **Tester's Name:** K. Tran, M. Wanberg

Testing Company: Underwood Engineering Inc. **Instrument Diameter (inches):** 6"

Phone Number: 856-933-1818 **Test Method:** Double-Ring Infiltrometer

Test Number: DRI-1 **Test Pit/Boring Hole Number:** TP-1 **Test Depth (inches):** 54

Surface Elevation (feet): 107

Soil Characterization

Depth (Inches):	Soil Texture:	Limiting Layers Type and Depth (Inches):
54	CLAY LOAM	Very Fine Sands and Fines

Presoak

Time:	Time Interval:	Measurement (Inches):	Drop in Water Level (Inches):
10:52	0	0	0
11:32	30	5.75	0.25
12:02	30	6	0

Infiltration Testing

Time:	Time Interval (10 or 30 mintues):	Measurement (Inches):	Drop in Water Level (Inches):	Infiltration Rate (inches per hour):	Remarks:
12:02	0	6	0	0	
12:32	30	6	0	0	
1:02	30	5.98	0.02	0.04	
1:32	30	6	0	0	
2:02	30	6	0	0	

Stabilized Infiltration Testing Rate (inches per hour): 0

Stormwater Infiltration Testing Log

Report No.:	1
Issue No.:	1

Client: Bach Associates **cc:**

Project: EMS Mullica Hill

Work Date: 3/5/2025

Submitted By: M. Wanberg

Date of Issue: 3/5/2025

Project Name: EMS Mullica Hill

Project Address: 169-171 Bridgeton Pike, Mullica Hill, NJ

Date: 3/5/2025 **Email Address:** mwanberg@underwood-engineering.com

Weather: Overcast, High 50's **Tester's Name:** K. Tran, M. Wanberg

Testing Company: Underwood Engineering Inc. **Instrument Diameter (inches):** 6"

Phone Number: 856-933-1818 **Test Method:** Double-Ring Infiltrometer

Test Number: DRI-2 **Test Pit/Boring Hole Number:** TP-2 **Test Depth (inches):** 50

Surface Elevation (feet): 106.35

Soil Characterization

Depth (Inches):	Soil Texture:	Limiting Layers Type and Depth (Inches):
50	LOAM	

Presoak

Time:	Time Interval:	Measurement (Inches):	Drop in Water Level (Inches):
11:02	0	0	0
11:32	30	5.25	0.75
12:02	30	5.25	0.75

Infiltration Testing

Time:	Time Interval (10 or 30 mintues):	Measurement (Inches):	Drop in Water Level (Inches):	Infiltration Rate (inches per hour):	Remarks:
12:02	0	0	0	1.5	
12:32	30	5.3	0.7	1.4	
1:02	30	5.3	0.7	1.4	
1:32	30	5.3	0.7	1.4	
2:02	30	5.3	0.7	1.4	

Stabilized Infiltration Testing Rate (inches per hour): 1.4

Stormwater Infiltration Testing Log

Report No.:	1
Issue No.:	1

Client: Bach Associates **cc:**

Project: EMS Mullica Hill

Work Date: 3/5/2025

Submitted By: M. Wanberg

Date of Issue: 3/5/2025

Project Name: EMS Mullica Hill

Project Address: 169-171 Bridgeton Pike, Mullica Hill, NJ

Date: 3/5/2025 **Email Address:** mwanberg@underwood-engineering.com

Weather: Overcast, High 50's **Tester's Name:** K. Tran, M. Wanberg

Testing Company: Underwood Engineering Inc. **Instrument Diameter (inches):** 6"

Phone Number: 856-933-1818 **Test Method:** Double-Ring Infiltrometer

Test Number: DRI-3 **Test Pit/Boring Hole Number:** TP-3 **Test Depth (inches):** 57

Surface Elevation (feet): 106.35

Soil Characterization

Depth (Inches):	Soil Texture:	Limiting Layers Type and Depth (Inches):
57	LOAM	

Presoak

Time:	Time Interval:	Measurement (Inches):	Drop in Water Level (Inches):
12:09	0	0	0
12:40	30	4.9	1.1
1:10	30	5.25	0.75

Infiltration Testing

Time:	Time Interval (10 or 30 mintues):	Measurement (Inches):	Drop in Water Level (Inches):	Infiltration Rate (inches per hour):	Remarks:
1:10	0	0	0	1.5	
1:42	30	5.25	0.75	1.5	
2:12	30	5.25	0.75	1.5	
2:42	30	5.25	0.75	1.5	
3:12	30	5.25	0.75	1.5	

Stabilized Infiltration Testing Rate (inches per hour): 1.5

Stormwater Infiltration Testing Log

Report No.:	1
Issue No.:	1

Client: Bach Associates **cc:**

Project: EMS Mullica Hill

Work Date: 3/5/2025

Submitted By: M. Wanberg

Date of Issue: 3/5/2025

Project Name: EMS Mullica Hill

Project Address: 169-171 Bridgeton Pike, Mullica Hill, NJ

Date: 3/5/2025 **Email Address:** mwanberg@underwood-engineering.com

Weather: Overcast, High 50's **Tester's Name:** K. Tran, M. Wanberg

Testing Company: Underwood Engineering Inc. **Instrument Diameter (inches):** 6"

Phone Number: 856-933-1818 **Test Method:** Double-Ring Infiltrometer

Test Number: DRI-4 **Test Pit/Boring Hole Number:** TP-4 **Test Depth (inches):** 44

Surface Elevation (feet): 106.35

Soil Characterization

Depth (Inches):	Soil Texture:	Limiting Layers Type and Depth (Inches):
44	CLAY LOAM	Very Fine Sands and Fines

Presoak

Time:	Time Interval:	Measurement (Inches):	Drop in Water Level (Inches):
11:51	0	0	0
12:21	30	6	0
12:51	30	5.97	0.03

Infiltration Testing

Time:	Time Interval (10 or 30 mintues):	Measurement (Inches):	Drop in Water Level (Inches):	Infiltration Rate (inches per hour):	Remarks:
12:51	0	0	0	0.06	
1:21	30	5.99	0.01	0.02	
1:51	30	5.99	0.01	0.02	
2:21	30	5.99	0.01	0.02	
2:51	30	5.99	0.01	0.02	

Stabilized Infiltration Testing Rate (inches per hour): 0.02

PROJECT LABOR AGREEMENT

PROJECT LABOR AGREEMENT

COVERING

_____ [project title]

ARTICLE 1 - PREAMBLE

WHEREAS, _____, on behalf of itself as Owner, and _____, the General Contractor, desire to provide for the efficient, safe, quality, and timely completion of _____ project, in a manner designed to afford lower reasonable costs, and the advancement of public policy objectives; and

WHEREAS, this Project Labor Agreement will foster the achievement of these goals, inter alia by:

(1) ensuring a reliable source of skilled and experienced labor;

(2) standardizing the terms and conditions governing the employment of labor on the Project;

(3) permitting wide flexibility in work scheduling and shift hours and times; from those which otherwise might obtain;

(4) receiving negotiated adjustments as to work rules and staffing requirements from those which otherwise might obtain;

(5) providing comprehensive and standardized mechanisms for the settlement of work disputes, including those relating to jurisdiction;

(6) avoiding the costly delays of potential strikes, slowdowns, walkouts, picketing and other disruptions arising from work disputes, and promote labor harmony and peace for the duration of the Project.

(7) furthering public policy objectives as to improved employment opportunities for minorities, women and the economically disadvantaged in the construction industry;

(8) expediting the construction process; and

WHEREAS, the signatory Unions desire the stability, security and work opportunities afforded by a Project Labor Agreement; and

WHEREAS, the Parties desire to maximize Project safety conditions for both workers and the public.

NOW, THEREFORE, the Parties enter into this Agreement:

SECTION 1. PARTIES TO THE AGREEMENT

This is a Project Labor Agreement ("Agreement") entered into by and between the General Contractor, and their successors and assigns, for the _____ _____ Project to be performed on the property of the _____ _____, Gloucester County, in the State of New Jersey and by the United Building Trades Council of Southern New Jersey, on behalf of itself and its affiliates and members and the signatory Local Unions, listed in Schedule A, on behalf of themselves and their members.

This Agreement shall also bind each Contractor engaged for the Project and any subcontractors, each of whom shall confirm their assent to the Agreement's terms through the execution of a Letter of Assent, the form of which is annexed to this Agreement as Schedule C.

ARTICLE 2 - GENERAL CONDITIONS

SECTION 1. DEFINITIONS

Throughout this Agreement, the Union party and the Building Trades Council are referred to singularly and collectively as "the Union(s)" where specific reference is made to "Local Unions" that phrase is sometimes used; "Local Unions" or "Local Union" means one or more of the unions signatory to this Agreement; the term "Contractor(s)" shall include (except as the

context of this Agreement requires otherwise) the General Contractor (GC), and all signatory contractors, and their subcontractors of whatever tier, engaged in on-site Project construction work within the scope of this Agreement as defined in Article III; the Gloucester County Utilities Authority is referenced as (Owner); the United Building Trades Council of Southern New Jersey (AFL-CIO) is referenced as the BTC, and the work covered by this Agreement (as defined in Article III) is referred to as the "Project".

SECTION 2. CONDITIONS FOR AGREEMENT TO BECOME EFFECTIVE

The Agreement shall not become effective unless executed by the BTC and the GC and will remain in effect until the completion of the Project.

SECTION 3. ENTITIES BOUND & ADMINISTRATION OF AGREEMENT

This Agreement shall be binding on all signatory Unions and the General Contractor and all signatory Contractors performing on-site Project work, including site preparation and staging areas, as defined in Article 3. The Contractors shall include in any subcontract that they let, for performance during the term of this Agreement, a requirement that their subcontractors, of whatever tier, become signatory and bound by this Agreement with respect to subcontracted work performed within the scope of Article 3 and execute the Letter of Assent attached as Schedule C. This Agreement shall be administered by the GC on behalf of all Contractors. The BTC warrants that it is authorized to execute this Agreement on behalf of all the Unions noted in Schedule A.

SECTION 4. SUPREMACY CLAUSE

This Agreement, together with the local Collective Bargaining Agreements appended hereto as Schedule A represents the complete understanding of all signatories and supersedes any national agreement, local agreement or other collective bargaining agreement of any type which would otherwise apply to this Project, in whole or in part, except for all work performed under the NTD Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, all instrument calibration work and loop checking shall be

performed under the terms of the UA/IBEW Joint National Agreement for Instrument an Control Systems Technicians, and the National Agreement of the International Union of Elevator Constructors, with the exception of Article VII, IX and X of this Project Agreement, shall apply to such work. Where a subject covered by the provisions, explicit or implicit, of this Agreement is also covered by a Schedule A; the provisions of this Agreement shall prevail. It is further understood that neither the GC nor any Contractor shall be required to sign any other agreement as a condition of performing work on this Project. No practice, understanding or agreement between a Contractor and Local Union, which is not explicitly set forth in this Agreement shall be binding on this Project unless endorsed in writing by the GC.

SECTION 5. LIABILITY

The liability of any Contractor and the liability of any Union under this Agreement shall be several and not joint. The GC and any Contractor shall not be liable for any violations of this Agreement by any other Contractor and the BTC and Local Unions shall not be liable for any violations of this Agreement by any other Union.

SECTION 6. THE GENERAL CONTRACTOR

The Owner and the GC shall require in its bid specifications for all work within the scope of Article 3 that all successful bidders, and their subcontractors of whatever tier, become bound by, and signatory to, this Agreement. The Owner shall not be liable in any manner under this Agreement. It is understood that nothing in this Agreement shall be construed as limiting the sole discretion of Owner in determining which Contractors shall be awarded contracts for Project work. It is further understood that Owner or a designated Owner Representative has sole discretion at any time to terminate, delay or suspend the work, in whole or part, on this Project.

SECTION 7. AVAILABILITY AND APPLICABILITY TO ALL SUCCESSFUL BIDDERS

The Unions agree that this Agreement will be made available to, and will fully apply to any successful bidder for Project work who becomes signatory thereto, without regard

to whether that successful bidder performs work at other sites on either a union or non-union basis and without regard to whether employees of such successful bidder are, or are not, members of any unions. This Agreement shall not apply to the work of any Contractor or GC , which is performed at any location other than a Project site, as defined in Article 3, Section 1.

SECTION 8. SECURITY MONITORING

The parties agree that all communication by the parties with any media sources regarding the Project must be done only by the Owner.

The parties agree and consent to the Contractors' implementation and use of a security badging system.

Finally, the parties agree and consent to the Contractors' implementation of Security checkpoints at the entrances to and exits from the Project Site, at which Project Security personnel will randomly inspect the containers, apparel, vehicles and other personal belongings of employees who enter and exit the Project Site to deter theft. Employees who refuse to submit to an inspection of their containers, apparel, vehicles and other personal belongings will be prohibited from re-entering the Project Site. The parties agree and consent to implement and cooperate with any other Project Site security requirements imposed by the Owner, which shall be disclosed to the County Council in advance of the pre-job meeting.

ARTICLE 3 - SCOPE OF THE AGREEMENT

The Project work covered by this Agreement shall be as defined and limited by the following sections of this Article.

SECTION 1: THE WORK

This Agreement shall apply to all on-site public construction work, including site preparation, demolition and hazardous waste remediation, performed on the construction and renovation of the _____ Project in _____, New Jersey in the County of Gloucester , as is further delineated in Schedule "B".

The scope of work is confined to the on-site Project work contained in the scope of the final construction contract of the General Contractor. The scope of Project work may be amended from time to time by the Owner's Representative to include work not performed under the above description.

The parties hereby agree that all Tele-data work and associated electrical work performed on any of the sites during construction shall be done by employees represented by the signatory unions. For the purpose of this Agreement, Tele-data work shall include, but not limited to, the following: All receiving, placement, installation, operation, testing, inspection, maintenance, repair and service of radio, television, video, data, voice, sound, emergency call, microwave and visual production and reproduction apparatus, equipment and appliances used for domestic, commercial, education and entertainment purposes; all installation and erection of equipment, apparatus or appliance, cables and/or wire, emergency power (batteries) and all directly related work which becomes an integral part of the telecommunication and/or telecommunications related systems repair and service maintenance work of telecommunications systems and devices including, but not limited to, Private Branch Exchanges (PBX-PABX), Key equipment-owned, CCTV, CATV, card access, Systems RS 232 ethernet and/or any local area network system associated with computer installation.

SECTION 2. EXCLUDED EMPLOYEES

The following persons are not subject to the provisions of this Agreement, even though performing work on the Project:

a. Superintendents, supervisors (excluding superintendents and general supervisors and forepersons specifically covered by a craft's Schedule A), engineers, inspectors and testers (excluding divers specifically covered by a craft's Schedule A), quality control/assurance personnel, timekeepers, mail carriers, clerks, office workers, messengers, guards, non-manual employees, and all professional, engineering, administrative and management persons;

b. Employees of Owner or any State agency, authority or entity or employees of any municipality or other public employer;

c. Employees and entities engaged in off-site manufacture, modifications, repair, maintenance, assembly, painting, handling or fabrication of project components, materials, equipment or machinery, unless such offsite

operations are covered by the New Jersey Prevailing Wage Act (for example, by being dedicated exclusively to the performance of the public works contract or building project and are adjacent to the site of work), or involved in deliveries to and from the Project site, excepting local deliveries of all major construction materials including fill, ready mix, concrete and cement, asphalt and other items which are covered by this Agreement. Provided, however, local deliveries of ready mix, concrete, cement and asphalt shall not be contracted except to a subcontractor who pays wages and benefits not less than the economic equivalent of the wages and benefits set forth in Schedule A.

d. Employees of the GC, excepting those performing manual, on-site construction labor who will be covered by this Agreement;

e. Employees or representatives of the off-site manufacturers, assemblers, or fabricators of components, materials, equipment or machinery to be installed as part of the Project while supervising in any way in the installation any of the foregoing;

f. It is recognized that specialized or unusual equipment may be installed on the Project and in such cases, the Union recognizes the right of the Contractor and the Owner to involve the equipment supplier or vendor's personnel in supervising the setting of the equipment, making modifications and final alignment which may be necessary prior to and during the start-up process, in order to protect factory warranties;

g. Employees engaged in on-site equipment warranty repair, replacement or modification of previously installed equipment.

h. Employees engaged in geophysical testing (whether land or water) other than boring for core samples;

i. Employees engaged in laboratory or specialty testing or inspections;

j. Employees engaged in ancillary Project work performed by third parties such as electric utilities, gas utilities, telephone utility companies, and railroads.

k. Employees of any Construction Manager or Consultant engaged by Owner, except those who are performing manual, on-site construction labor;

l. Laboratory or specialty testing or inspections not ordinarily done by the crafts.

SECTION 3. NON-APPLICATION TO CERTAIN ENTITIES

This Agreement shall not apply to the parents, affiliates, subsidiaries, or other joint or sole ventures of any Contractor or of GC, which do not perform work at this Project. It is agreed, for the purposes of this Agreement only, that this Agreement does not have the effect of creating any joint employment, single employer or alter ego status among the Owner, the GC and/or any Contractor. The Agreement shall further not apply to the Owner or any other state or county agency, authority, or other municipal or public entity and nothing contained herein shall be construed to prohibit or restrict the Owner or its employees of any other state authority, agency or entity and its employees from performing on or off-site work related to the Project. As the contracts which comprise the Project work are completed and accepted, the Agreement shall not have further force or effect on such items or areas except where inspections, additions, repairs, modifications, check-out and/or warranty work are assigned in writing (copy to Local Union involved) by the General Contractor for performance under the terms of this Agreement.

SECTION 4. LETTER OF ASSENT

It is agreed that the General Contractor shall require all Contractors of whatever tier, who have been awarded contracts for work covered by this Agreement to accept and be bound by the terms and conditions of this Agreement by executing the Letter of Assent (Schedule C) prior to commencing work. Owner shall not be liable for any violation by any Contractor unless the Owner directly caused and is solely responsible for such violation.

ARTICLE 4 - UNION RECOGNITION AND EMPLOYMENT

SECTION 1. PRE-HIRE RECOGNITION

The Contractors recognize the signatory Unions as the sole and exclusive bargaining representatives of all craft employees who are performing on-site Project work within the scope of this Agreement as defined in Article 3.

SECTION 2. UNION REFERRAL

A. The Contractors agree to hire Project, craft employees covered by this Agreement through the job referral systems and hiring halls (where the referrals meet the qualifications set forth in items 1, 2, and 4 subparagraph B) established in the Local Unions' area collective bargaining agreements (attached as Schedule A to this Agreement), subject to the goals of any applicable local ordinances or agreements pertaining to hiring and apprenticeship goals for minorities, women, residents of disadvantaged communities, and local residents... Notwithstanding this, the Contractors shall have sole rights to determine the competency of all referrals; the number of employees required (except with regard to piledriving and cranes); the selection of employees to be laid-off (subject to the applicable procedures in Schedule A for permanent and/or temporary layoffs and except as provided in Article 5, Section 3); and the sole right to reject any applicant referred by a Local Union, subject to the show-up payments required in the applicable Schedule A. In the event that a Local Union is unable to fill any request for qualified employees within a 48-hour period after such requisition is made by the Contractor (Saturdays, Sundays, and holidays excepted), the Contractor may employ qualified applicants from another competent source. In the event that the Local Union does not have a job referral system, the Contractor shall give the Local Union first preference to refer applicants, subject to the other provisions of this Article. The Contractor shall notify the Local Union of the
Project, craft employees hired within its jurisdiction from any source other than referral by the Union.

B. A Contractor may request by name, and the Local will honor, referral of persons who have applied to the Local for Project work and who meet the following qualifications as determined by a committee of 3 designated, respectively, by the applicable Local Union, the GC and a mutually selected third party or, in the absence of agreement, the permanent arbitrator (or designee) designated in Article 7:

(1) possess any license required by NJ law for the Project work to be performed;

(2) have worked a total of at least 1000 hours in the Construction craft during the prior 3 years;

(3) were on the Contractor's active payroll for at least 60 out of the 180 calendar days prior to the contract award;

(4) have demonstrated ability to safely perform the basic function of the applicable trade.

Following the employment of the first employee in each craft under Schedule A or the procedure set forth above in paragraph A, no more than 12 per centum of the employees covered by this Agreement, per Contractor by craft, shall be hired through the special provisions above (any fraction shall be rounded to the next highest whole number).

C. A certified MBE/WBE contractor may request from the Workforce Coordinator, through the GC, an exception to, and waiver of, the above per centum limitation upon the number of its employees to be hired through the special provision of Section 2.B above. This exception is based upon hardship and demonstration by the contractor that the Project work would be the contractor's only job and that it would be obliged to lay off qualified minority and female employees in its current workforce moving from the last job. The exception and waiver are also conditioned upon the employees meeting the qualifications as set forth in Section 2.B above.

SECTION 3. NON-DISCRIMINATION IN REFERRALS

The Unions represent that their hiring halls and referral systems will be operated in a non-discriminatory manner and in full compliance with all applicable federal, state and local laws and regulations, which require equal employment opportunities. Referrals shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements and shall be subject to such other conditions as are established in this Article. No employment applicant shall be discriminated against by any referral system or hiring hall because of the applicant's union membership, or lack thereof.

SECTION 4. <u>WORKFORCE DIVERSITY</u>

To the extent applicable, the parties hereby agree that each will implement and abide by the requirements of the Developer with regard to workforce diversity. Furthermore, General Contractor, Contractors and the Unions will comply with such affirmative action plan, including

but not limited to: (1) the parties will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, sex or any other protected category used by government regulation; (2) the parties will endeavor to include in any solicitations or advertisements for employees or subcontractors, a notice that all qualified applicants will receive consideration for employment, and contractors and subcontractors for work, without regard to age, race, creed, color, national origin, ancestry, marital status, sex or any other protected category used by government regulation; and (3) the parties agree to utilize the best efforts to ensure that minority business enterprises and women-owned business enterprises shall have the maximum practicable opportunity to provide Construction Work under this Agreement.

The Local Unions agree and support the importance the Owner places on having and maintaining a diverse workforce. The Unions agree to refer any and all Gloucester County resident journeymen and apprentices who are registered on the Out-of-Work list of the local union referral systems at the time of a contractor's request. The Local Unions will cooperate with Contractor requests for Gloucester County residents, residents of disadvantaged communities, minority, or women referrals to meet the requirements of the Owner.

SECTION 5. MINORITY AND FEMALE REFERRALS

In the event a Union either fails, or is unable, to refer qualified minority or female applicants in percentages equaling Project affirmative action goals as set forth in the Owners bid specifications, the Contractor may employ qualified minority or female applicants from any other available source as Apprentice Equivalents. Apprentice Equivalents will have completed a DOL approved training program, applied to take a construction Apprenticeship test, and will be paid at not less than the applicable equivalent Apprentice rate. With the approval of the Local Administrative Committee (LAC), experience in construction related areas may be accepted as meeting the above requirements.

SECTION 6. CROSS AND QUALIFIED REFERRALS

The Unions shall not knowingly refer to a Contractor an employee then employed by another Contractor working under this Agreement. The Local Unions will exert their utmost

efforts to recruit sufficient numbers of skilled and qualified craft employees to fulfill the requirements of the Contractor.

SECTION 7. UNION DUES / WORKING ASSESMENTS

The union security provisions contained in the applicable Schedule A local agreements, shall not apply to the employees covered by this Agreement as for the period of time during which they are performing on-site Project work. No employee shall be discriminated against at the Project site because of the employee's union membership or lack thereof. In the case of unaffiliated employees who have voluntarily executed dues checkoff authorization cards provided in a Schedule A local agreement, the dues payment can be received by the Unions as a working assessment fee.

SECTION 8. CRAFT FOREPERSONS AND GENERAL FOREPERSONS

The selection of craft forepersons and/or general forepersons and the number of forepersons required shall be solely the responsibility of the Contractor except where otherwise provided by specific provisions of an applicable Schedule A. All forepersons shall take orders exclusively from the designated Contractor representatives. Craft foreperson shall be designated as working forepersons at the request of the Contractor, except when an existing local Collective Bargaining Agreement prohibits a foreperson from working when the craftsperson they are is leading exceeds a specified number.

ARTICLE 5 - UNION REPRESENTATION

SECTION 1. LOCAL UNION REPRESENTATIVE

Each Local Union representing on-site Project employees shall be entitled to designate in writing (copy to General Contractor involved) representatives, including the Business Manager, who shall be afforded access to the Project.

SECTION 2. STEWARDS

(a) Each Local Union shall have the right to designate a working journey person as a Steward and an alternate and shall notify the Contractor and GC of the identity of the designated Steward (and alternate) prior to the assumption of such duties. Stewards shall not exercise supervisory functions and will receive the regular rate of pay for their craft classifications. There will be no non-working Stewards on the Project.

(b) In addition to their work as an employee, the Steward shall have the right to receive complaints or grievances and to discuss and assist in their adjustment with the Contractor's appropriate supervisor. Each Steward shall be concerned with the employees of the Steward's Contractor and, if applicable, subcontractors of that Contractor, but not with the employees of any other Contractor. The Contractor will not discriminate against the Steward in the proper performance of Union duties.

(c) The Stewards shall not have the right to determine when overtime shall be worked, or who shall work overtime, except pursuant to a Schedule A provision providing procedures for the equitable distribution of overtime.

SECTION 3. LAYOFF OF A STEWARD

Contractors agree to notify the appropriate Union 24 hours prior to the layoff of a Steward, except in cases of discipline or discharge for just cause. If a Steward is protected against layoffs by a Schedule A, such provisions shall be recognized to the extent the Steward possesses the necessary qualifications to perform the work required. In any case in which a Steward is discharged or disciplined for just cause, the Local Union involved shall be notified immediately by the Contractor.

ARTICLE 6 - MANAGEMENT'S RIGHTS

SECTION 1. RESERVATION OF RIGHTS

Except as expressly limited by a specific provision of this Agreement, Contractors retain full and exclusive authority for the management of their Project operations including, but not limited to the right to direct the work force, including determination as to the number to be hired and the qualifications therefore; the promotion, transfer, layoff of its employees; or the discipline or discharge for just cause of its employees; the assignment and schedule of work; the promulgation of reasonable Project work rules; and the requirement, timing and number of employees to be utilized for overtime work. No rules, customs, or practices, which limit or restrict productivity or efficiency of the individual, as determined by the Contractor, GC, and/or joint working efforts with other employees shall be permitted or observed.

SECTION 2. MATERIALS, METHODS & EQUIPMENT

There shall be no limitations or restrictions upon the contractors' choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials, tool, or other labor-saving devices. Contractors may, without restriction, install or use materials, supplies or equipment regardless of their source. The on-site installation or application of such items shall be performed by the craft having jurisdiction over such work; provided, however, it is recognized that other personnel having special qualifications may participate, in a supervisory capacity, in the installation, check-out or testing of specialized or unusual equipment or facilities as designated by the Contractor. Notwithstanding the foregoing statement of contractor rights, prefabrication issues relating to work traditionally performed at the job site shall be governed pursuant to the terms of the applicable Schedule A. There shall be no restrictions as to work, which is performed off-site for the Project, except for 1) offsite operations work covered under the New Jersey Prevailing Wage
Act or 2) done in a fabrication center, tool yard, or batch plant dedicated exclusively to the performance of work on the Project and located adjacent to the “site of work”. Where available

locally offsite operations work covered under the New Jersey Prevailing Wage Act shall be performed within the territorial jurisdiction of the local unions signatory to this Agreement.

General Contractor agrees that when subcontracting for prefabrication of H.V.A.C. duct and other related sheet metal, such prefabrication shall be subcontracted to fabricators who pay their employees engaged in such fabrication not less than the prevailing wage for comparable sheet metal fabrication as established under agreements between local affiliates of Sheet Metal Workers' International Association and local sheet metal fabricators.

ARTICLE 7 - WORK STOPPAGES AND LOCKOUTS

SECTION 1. NO STRIKES-NO LOCKOUT

There shall not be strikes, sympathy strikes, picketing, work stoppages, slowdowns, hand billing, demonstrations or other disruptive activity at the Project for any reason by any Union or employee against any Contractor or employer while performing work at the Project. There shall be no other Union, or concerted or employee activity which disrupts or interferes with the operation of the existing free flow of traffic in the project area. Failure of any Union or employee to cross any picket line established by any union, signatory or non-signatory to this Agreement, or the picket or demonstration line of any other organization, at or in proximity to the Project site is a violation of this Article. There shall be no lockout at the Project by any signatory Contractor. Contractors and Unions shall take all steps necessary to ensure compliance with this Section 1 and to ensure uninterrupted construction and the free flow of traffic in the project area for the duration of this Agreement.

SECTION 2. DISCHARGE FOR VIOLATION

A Contractor may discharge any employee violating Section 1, above, and any such employee will not be eligible thereafter for referral under this Agreement for a period of 100 days.

SECTION 3. NOTIFICATION

If a Contractor contends that any Union has violated this Article, it will notify the appropriate district or area council of the Local Union involved advising of such fact, with copies of the notification to the Local Union and the BTC. The district or area council, and the BTC shall each instruct, order and otherwise use their best efforts to cause the employees, and/or the Local Unions to immediately cease and desist from any violation of this Article. A district or area council, or the BTC complying with these obligations shall not be liable for the unauthorized acts of a Local Union or its members.

SECTION 4. EXPEDITED ARBITRATION

Any Contractor or Union alleging a violation of Section 1 of this Article may utilize the expedited procedure set forth below (in lieu of, or in addition to, any actions at law or equity) that may be brought.

a. A party invoking this procedure shall notify J.J. Pierson Jr, Esq., at 51 JFK Parkway, First Floor West, Short Hills, New Jersey 07078, telephone number (973) 359-8100, fax number (973) 359-8161**,** who shall serve as Arbitrator under this expedited arbitration procedure. In the event that J.J. Pierson is unable to serve, a party invoking this procedure shall notify Louis Verrone, who shall serve as arbitrator under this expedited procedure. Copies of such notification will be simultaneously sent to the alleged violator and, if a Local Union is alleged to be in violation, it's International, the Owner, the GC, and the BTC.

b. The Arbitrator shall thereupon, after notice as to time and place to the Contractor, the GC, the Local Union involved, and the BTC, hold a hearing within 48 hours of receipt of the notice invoking the procedure it is contended that the violation still exists. The hearing will not, however, be scheduled for less than 24 hours after the notice to the district or area council required by Section 3 above. Hearings shall be held at the jobsite

or at the office of the New Jersey State Board of Mediation, or as directed by the Arbitrator.

c. All notices pursuant to this Article may be by telephone, telegraph, hand delivery, or fax, confirmed by overnight delivery, to the arbitrator, Contractor or Union involved. The hearing may be held on any day including Saturdays or Sundays. The hearing shall be completed in one session, which shall not exceed 8 hours duration (no more than 4 hours being allowed to either side to present their case, and conduct their cross examination) unless otherwise agreed. A failure of any Union or Contractor to attend the hearing shall not delay the hearing of evidence by those present or the issuance of an award by the Arbitrator.

d. The sole issue at the hearing shall be whether a violation of Section 1, above, occurred. If a violation is found to have occurred, the Arbitrator shall issue a Cease-and-Desist Award restraining such violation and serve copies on the Contractor and Union involved. The Arbitrator shall have no authority to consider any matter in justification, explanation or mitigation of such violation or to award damages, which issue is reserved solely for court proceedings, if any. The Award shall be issued in writing within 3 hours after the close of the hearing and may be issued without an Opinion. If any involved party desires an Opinion, one shall be issued within 15 calendar days, but its issuance shall not delay compliance with, or enforcement of, the Award.

e. An Award issued under this procedure may be enforced by any court of competent jurisdiction upon the filing of the Agreement together with the Award. Notice of the filing of such enforcement proceedings shall be given to the Union or Contractor involved. In any court proceeding to obtain a temporary or preliminary order enforcing the arbitrator's Award

as issued under this expedited procedure, the involved Union and Contractor waive their right to a hearing and agree that such proceedings may be ex parte, provided notice is given to opposing counsel. Such agreement does not waive any party's right to participate in a hearing for a final court order of enforcement or in any contempt proceeding.

f. Any rights created by statue or law governing arbitration proceedings which are inconsistent with the procedure set forth in this Article, or which interfere with compliance thereto, are hereby waived by the Contractors and Unions to whom they accrue.

g. The fees and expenses of the Arbitrator shall be equally divided between the involved Contractor and Union.

SECTION 5. ARBITRATION OF DISCHARGES FOR VIOLATION

Procedures contained in Article 9 shall not be applicable to any alleged violation of this Article, with the single exception that an employee discharged for violation of Section 1, above, may have recourse to the procedures of Article 9 to determine only if the employee did, in fact, violate the provisions of Section 1 of this Article; but not for the purpose of modifying the discipline imposed where a violation is found to have occurred.

ARTICLE 8. - LOCAL ADMINISTRATIVE COMMITTEE (LAC)

SECTION 1. MEETINGS

The Local Administrative Committee (LAC) will meet on a regular basis to 1) Implement and oversee the Agreement procedures and initiatives; 2) monitor the effectiveness of the Agreement; and 3) identify opportunities to improve efficiency and work execution.

Each Contractor, upon Award of a Contract by the Owner to perform work at the Project and prior to commencing work, shall:

A. Notify the BTC at (609) 704-8351 of the Contract Award.

B. Through the BTC, coordinate a pre-job conference meeting with the signatory Unions and the Owner's Representative. The purpose of the meeting will be to discuss in detail the scope of the work to be performed and conduct a jurisdictional "mark-up" meeting.

Labor/Management meetings among the Owner's Representative, the appropriate Contractors and sub-Contractors, the BTC, and signatory Unions will be held on a quarterly basis, or more or less frequently upon the agreement of the parties. All appropriate Contractors, sub-Contractors, and Unions will be expected to be in attendance. The purpose of the meetings shall be to keep all parties fully apprised of the Project's progress, schedule, manpower requirements, safety and labor relations issues, and to generally promote labor-management harmony and cooperation.

SECTION 2. COMPOSITION

The LAC will be co-chaired by the President of the United Building and Construction Trades Council of Southern Jersey or his designee, and designated official of the GC. It will be comprised of representatives of the local unions signatory to the project labor agreement (PLA) and representatives of the GC and other contractors on the project.

ARTICLE 9 - GRIEVANCE & ARBITRATION PROCEDURE

SECTION 1. PROCEDURE FOR RESOLUTION OF GRIEVANCES

Any question, dispute or claim arising out of, or involving the interpretation or application of this Agreement (other than jurisdictional disputes or alleged violations of Article 7, Section 1) shall be considered a grievance and shall be resolved pursuant to the exclusive procedure of the steps described below; provided, in all cases, that the question, dispute or claim arose during the term of this Agreement.

Step 1:

(a) When any employee covered by this Agreement feels aggrieved by a claimed violation of this Agreement, the employee shall, through the Local Union business

representative or job steward give notice of the claimed violation to the work site representative of the involved Contractor. To be timely, such notice of the grievance must be given within 7 calendar days after the act, occurrence, or event giving rise to the grievance, or after the act, occurrence or event became known or should have become known to the Union. The business representative of the Local Union or the job steward and the work site representative of the involved Contractor shall meet and endeavor to adjust the matter within 7 calendar days after timely notice has been given. If they fail to resolve the matter within the prescribed period, the grieving party, may, within 7 calendar days thereafter, pursue Step 2 of they grievance procedure by serving the involved Contractor and the General Contractor with written copies of the grievance setting forth a description of the claimed violation, the date on which the grievance occurred, the provisions of the Agreement alleged to have been violated. Grievances and disputes settled at Step 1 are non-precedential except as to the specific Local Union, employee and Contractor directly involved, unless the settlement is accepted in writing, by the General Contractor, as creating a precedent.

(b) Should any signatory to this Agreement have a dispute (excepting jurisdictional disputes or alleged violations of Article 7, Section 1) with any other signatory to this Agreement and, if after conferring, a settlement is not reached within 7 calendar days, the dispute shall be reduced to writing and proceed to Step 2 in the same manner as outlined in subparagraph (a) for the adjustment of employee grievances.

Step 2:

The Business Manager or designee of the involved Local Union, together with representatives of the BTC, the involved Contractor, and the General Contractor shall meet in Step 2 within 5 calendar days of the written grievance to arrive at a satisfactory settlement.

Step 3:

(a) If the grievance shall have been submitted but not resolved in Step 2, any of the participating Step 2 entities may, within 14 calendar days after the initial Step 2 meeting, submit the grievance in writing (copies to other participants) to the next available arbitrator of the panel of arbitrators consisting of J.J. Pierson Jr., Esq., Louis Verrone and Wellington Davis, who shall serve as arbitrator under this expedited procedure. The Labor Arbitration Rules of the American

Arbitration Association shall govern the conduct of the arbitration hearing, at which all Step 2 participants shall be parties. Hearings shall be held at the jobsite or at the Newark office of the New Jersey State Board of Mediation, as directed by the Arbitrator.

The decision of the Arbitrator shall be final and binding on the involved Contractor, Local Union and employees and the fees and expenses of such arbitration's shall be borne equally by the involved Contractor and Local Union.

(b) Failure of the grieving party to adhere to the time limits set forth in this Article shall render the grievance null and void. These time limits may be extended only by written consent of the GC, involved Contractor and involved Local Union at the particular step where the extension is agreed upon. The Arbitrator shall have authority to make decisions only on the issues presented to him and shall not have the authority to change, add to, delete or modify any provision of this Agreement.

SECTION 2. LIMITATION AS TO RETROACTIVITY

No arbitration decision or award may provide retroactivity of any kind exceeding 30 calendar days prior to the date of service of the written grievance on the construction Project Manager and the involved Contractor or Local Union.

SECTION 3. PARTICIPATION BY GENERAL CONTRACTOR

The General Contractor shall be notified by the involved Contractor of all actions at Steps 2 and 3 and, at its election, may participate in full in all proceedings at these Steps, including Step 3 arbitration.

ARTICLE 10 - JURISDICTIONAL DISPUTES

SECTION 1. NO DISRUPTIONS

There will be no strikes, sympathy strikes, work stoppages, slowdowns, picketing or other disruptive activity of any kind arising out of any jurisdictional dispute. Pending the

resolution of the dispute, the work shall continue uninterrupted and as assigned by the Contractor. No jurisdictional dispute shall excuse a violation of Article 7.

SECTION 2. ASSIGNMENT

A. There shall be a mandatory pre-job markup / assignment meeting prior to the commencement of any work. Attending such meeting shall be designated representatives of the Union signatories to this Agreement, the GC, and the involved Contractors. Best efforts will be made to schedule the pre-job meeting in a timely manner after Notice to Proceed is issued but not later then 30 days prior to the start of the Project.

B. All Project construction work assignments shall be made by the Contractor according criteria set forth in Section 3, Subsection D 1-3.

C. When a Contractor has made an assignment of work, he shall continue the assignment without alteration unless otherwise directed by an arbitrator or there is agreement between the National or International Unions involved. Claims of a change of original assignment shall be processed in accordance with Article I of the Procedural Rules of the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry ("the Plan").

D. In the event that a Union involved in the change of original assignment dispute is an affiliate of a National or International Union that is not affiliated with the Building and Construction Trades Department and does not wish to process a case through the Plan, the parties shall mutually select one of the following Arbitrators: Arbitrator J.J. Pierson, Arbitrator Paul Greenberg or Arbitrator Richard K. Hanft and submit the dispute directly to the Arbitrator. The selected Arbitrator shall determine whether the case requires a hearing or may be decided upon written submissions. In rendering his determination on whether there has been a change of original assignment, the Arbitrator shall be governed by the following:

1. The contractor who has the responsibility for the performance and installation shall make a specific assignment of the work which is included in his contract to a particular union(s). For instance, if contractor A subcontracts certain work to contractor B, then contractor

B shall have the responsibility for making the specific assignments for the work included in his contract. If contractor B, in turn, shall subcontract certain work to contractor C, then contractor C shall have the responsibility for making the specific assignment for the work included in his contract. After work has been so assigned, such assignment will be maintained even though the assigning contractor is replaced and such work is subcontracted to another contractor. It is a violation of the Agreement for the contractor to hold up disputed work or shut down a project because of a jurisdictional dispute.

2. When a contractor has made an assignment of work, he shall continue the assignment without alteration unless otherwise directed by an arbitrator or there is agreement between the National or International Unions involved.

a. Unloading and/or handling of materials to stockpile or storage by a trade for the convenience of the responsible contractor when his employees are not on the job site, or in an emergency situation, shall not be considered to be an original assignment to that trade.

b. Starting of work by a trade without a specific assignment by an authorized representative of the responsible contractor shall not be considered an original assignment to that trade, provided that the responsible contractor, or his authorized representative, promptly, and, in any event, within eight working hours following the start of work, takes positive steps to stop further unauthorized performance of the work by that trade.

SECTION 3. PROCEDURE FOR SETTLEMENT OF DISPUTES

A. Any Union having a jurisdictional dispute with respect to Project work assigned to another Union will submit through its International the dispute in writing to the Administrator of the Plan within 72 hours and send a copy of the letter to the other Union involved, the Contractor involved, the General Contractor, the BTC, and the district or area councils of the unions involved. Upon receipt of a dispute letter from any Union, the Administrator will invoke the procedures set forth in the Plan to resolve the jurisdictional dispute. The jurisdictional dispute letter shall contain the information described in Article IV of the Procedural Rules of the Plan.

B. Within 5 calendar days of receipt of the dispute letter, there shall be a meeting of the General Contractor, the Contractor involved, the Local Unions involved and designees of the

BTC and the district or area councils of the Local Unions involved for the purpose of resolving the jurisdictional dispute.

C. In order to expedite the resolution of jurisdictional disputes, the parties have agreed in advance to mutually select one of the following designated Arbitrators: Arbitrator J.J. Pierson, Arbitrator Paul Greenberg or Arbitrator Richard K. Hanft to hear all unresolved jurisdictional disputes arising under this Agreement. All other rules and procedures of the Plan shall be followed. If none of the three Arbitrators is available to hear the dispute within the time limits of the Plan, the Plan's arbitrator selection process shall be utilized to select another arbitrator.

D. In the event that a Union involved in the dispute is an affiliate of a National or International Union that is not affiliated with the Building and Construction Trades Department and does not wish to process a case through the Plan as described in paragraphs A-C above, the parties to the dispute shall mutually select one of the following Arbitrators: Arbitrator J. J. Pierson, Arbitrator Paul Greenberg or Arbitrator Richard K. Hanft to hear the dispute and shall submit the dispute directly to the selected arbitrator. The time limits for submission and processing disputes shall be the same as provided elsewhere in this Section. The selected Arbitrator shall schedule the hearing within seven business days from the date of submission. If he cannot hear the case within the required timeframe, one of the other Arbitrators will be selected to hear the case unless all parties to the dispute agree to waive the seven day time limit. In rendering his decision, the Arbitrator shall determine:

1. First whether a previous agreement of record or applicable agreement, including a disclaimer agreement, between the National and International Unions to the dispute governs;

2. Only if the Arbitrator finds that the dispute is not covered by an appropriate or applicable agreement of record or agreement between the crafts to the dispute, he shall then consider the established trade practice in the industry and prevailing practice in the locality where there is a previous decision of record governing the case, the Arbitrator shall give equal weight to such decision of record, unless the prevailing practice in the locality in the past ten years favors one craft. In that case, the Arbitrator shall base his decision on the prevailing practice in the locality. Except, if the Arbitrator finds that a craft has improperly obtained the prevailing practice in the locality through raiding, the undercutting of wages or by the use of

vertical agreements, the Arbitrator shall rely on the decision of record and established trade practice in the industry rather than the prevailing practice in the locality.

3. Only if none of the above criteria is found to exist, the Arbitrator shall then consider that because efficiency, cost or continuity and good management are essential to the well-being of the industry, the interests of the consumer or the past practices of the employer shall not be ignored.

The Arbitrator shall set forth the basis for his decision and shall explain his findings regarding the applicability of the above criteria. If lower-ranked criteria are relied upon, the Arbitrator shall explain why the higher-ranked criteria were not deemed applicable. The Arbitrator's decision shall only apply to the job in dispute.

Each party to the arbitration shall bear its own expense for the arbitration and agrees that the fees and expenses of the Arbitrator shall be borne by the losing party or parties as determined by the Arbitrator.

E. The Arbitrator shall render a short-form decision within 5 days of the hearing based upon the evidence submitted at the hearing, with a written decision to follow within 30 days of the close of hearing.

F. This Jurisdictional Dispute Resolution Procedure will only apply to work performed by Local Unions that represent workers employed on the Project.

G. Any Local Union involved in a jurisdictional dispute on this Project shall continue working in accordance with Section 2 above and without disruption of any kind.

SECTION 4. AWARD

Any award rendered pursuant to this Article, and the Plan shall be final and binding on the disputing Local Unions and the involved Contractor on this Project only and may be enforced in accordance with the provisions of Article VII of the Plan. Any award rendered pursuant to the alternate procedures of this Article shall be final and binding on the disputing Local Unions and the involved Contractor on this Project only and may be enforced in any court of competent jurisdiction. Such award or resolution shall not establish a precedent on any other construction

work not covered by this Agreement. In all disputes under this Article, the General Contractor and the involved Contractors shall be considered parties in interest.

SECTION 5. LIMITATIONS

The Arbitrator shall have no authority to assign work to a double crew, that is, to more employees than the minimum required by the Contractor to perform the work involved; nor to assign work to employees who are not qualified to perform the work involved; nor to assign work being performed by non-union employees to union employees. This does not prohibit the establishment, with the agreement of the involved Contractor, of composite crews where more than 1 employee is needed for the job. The aforesaid determinations shall decide only to whom the disputed work belongs.

SECTION 6. NO INTERFERENCE WITH WORK

A. There shall be no interference or interruption of any kind with the work of the Project while any jurisdictional dispute is being resolved. The work shall proceed as assigned by the Contractor until finally resolved under the applicable procedure of this Article. The award shall be confirmed in writing to the involved parties. There shall be no strike, work stoppage or interruption in protest of any such award. Any claims of a violation of this section shall be submitted and processed in accordance with the impediment to job progress provisions of the Plan.

B. In the event a Union alleged to have engaged in an impediment to job progress is an affiliate of a National or International Union that is not affiliated with the Building and Construction Trades Department and does not wish to have the impediment to job progress charge processed through the Plan, the parties to the dispute shall mutually select one of the three Arbitrators designated in this Article to hear the dispute. The selected Arbitrator shall schedule the hearing within two business days from the date of submission. If he cannot hear the case within the required timeframe, one of the other Arbitrators shall be selected by the parties to hear the case unless all parties to the dispute agree to waive the two day time limit. The sole issue at the hearing shall be whether or not a violation of this Section has in fact occurred, and the Arbitrator shall have no authority to consider any matter in justification, explanation or

mitigation of such violation or to award damages. The Arbitrator's decision shall be issued in writing within 3 hours after the close of the hearing and may be issued without an opinion. If any party desires an opinion, one shall be issued within 15 days, but its issuance shall not delay compliance with, or enforcement of, the decision. The Arbitrator may order cessation of the violation of this Section and other appropriate relief, and such decision shall be served on all parties by facsimile upon issuance. Each party to the arbitration shall bear its own expense for the arbitration and agrees that the fees and expenses of the Arbitrator shall be borne by the losing party or parties as determined by the Arbitrator.

ARTICLE 11 - WAGES AND BENEFITS

SECTION 1. CLASSIFICATION AND BASE HOURLY RATE

All employees covered by this Agreement shall be classified in accordance with the work performed and paid the base hourly wage rates for those classifications as specified in the attached Schedules A, as amended during this Agreement. Recognizing, however, that special conditions may exist or occur on the Project, the parties, by mutual agreement may establish rates and/or hours for one or more classifications, which may differ from Schedules A. Parties to such agreements shall be the General Contractor, the Contractor involved, the involved Local Unions and the BTC.

SECTION 2. EMPLOYEE BENEFIT FUNDS

A. The Contractors agree to pay contributions on behalf of all employees covered by this Agreement to the established employee benefit funds in the amounts designated in the appropriate Schedule A. Bona fide jointly trusted fringe benefit plans established or negotiated through collective bargaining during the life of this Agreement may be added. However, if a defined benefit pension fund covered by the terms and conditions of this Agreement has not adopted the building and construction industry exemption authorized by subsection (b) of Section 4203 of the Employee Retirement Income Security Act of 1974, the Contractor shall not be

obligated to hire employees for whom contributions are required to be made to that pension fund for this Project. For purposes of this Section 2, the terms "employee benefit funds," "fringe benefit plans" and "fringe benefit trust fund" mean only those funds and plans that are trust funds that were established under and are in compliance with the requirements of 29 U.S.C. Section 186(c)(5), (6) or (8); provided that nothing herein shall impact any separate and independent preexisting obligation unrelated to this Agreement to contribute to any other jointly trusteed funds.

B. The Contractor agrees to be bound by the written terms of the legally established Trust Agreements specifying the detailed basis on which payments are to be paid into, and benefits paid out of, such Trust Funds but only with regard to work done on this Project and only for those employees to whom this Agreement requires such benefit Payments.

C. Should any contractor or sub-contractor become delinquent in the payment of contributions to the fringe benefit funds, then the subcontractor at the next higher tier, or upon notice of the delinquency claim from the Union or the Funds, agrees to withhold from the subcontractor such disputed amount from the next advance, or installment payment for work performed and the amount claimed and owed will be paid within thirty (30) days after receipt of the notification by the General Contractor, if not paid prior to said date by the delinquent contractor/subcontractor.

ARTICLE 12 - HOURS OF WORK, PREMIUM PAYMENTS, SHIFTS AND HOLIDAYS

SECTION 1. WORK WEEK AND WORKDAY

A. The standard work week shall consist of 40 hours of work at straight time rates per one of the following schedules:

1) Five-Day Work Week: Monday-Friday, 5 days, 8 hours plus half-hour unpaid lunch period each day.

2) Four-Day Work Week: Monday-Thursday; 4 days, 10 hours plus half-hour unpaid lunch period each day.

B. The Day Shift shall commence between the hours of 6:00 a.m. and 9:00 a.m. and shall end between the hours of 2:30 p.m. and 5:30 p.m. Starting and quitting times shall occur at the employees' place of work as may be designated by the Contractor in accordance with area practice.

C. Second/Shift - The second shift (starting between 2 p.m. and 8p.m.) shall consist of 8 hours work for an equal number of hours pay at the straight time rate plus 15% in lieu of overtime and exclusive of a half-hour unpaid lunch period.

D. Scheduling - The Contractor, with the approval of the Owner or Owner's authorized Representative, shall have the option of scheduling either a five-day work week, or four-day work week, when mutually agreed upon, on a craft-by-craft basis. The Contractor, with the approval of the Owner/Owner's Representative, also has the option to set the workday hours consistent with Project requirements, the Project schedule, and minimization of interference with Owner's operations and traffic flow. When conditions beyond the control of the Contractor, as contemplated in and limited by the Owner's contract documents, occur, the Contractor may, with the approval of the Owner/Owner's Representative, and with mutual agreement of the Local Union on a craft-by-craft basis, which agreement shall not be unreasonably withheld, schedule Friday (where on Four Tens) or Saturday (where on Five Eights) during the calendar week in which a workday was lost, at straight time pay; provided the employees involved work a total of 40 hours or less during that work week, and also in accordance with each crafts' Schedule "A".

E. Notice - Contractors shall provide not less than 5 days prior notice to the Local Union involved as to the work week and work hours schedules to be worked or such lesser notice as may be mutually agreed upon.

SECTION 2. OVERTIME

Overtime pay for hours outside of the standard work week and workday, described in paragraph A above, shall be paid in accordance with the applicable Schedule A. There will be no restriction upon the Contractor's scheduling of overtime or the non-discriminatory designation of employees who shall be worked, except as noted in Article 5, Section 2. There shall be no pyramiding of overtime pay under any circumstances. The Contractor shall have the right to schedule work so as to minimize overtime.

SECTION 3. SHIFTS

A. Flexible Schedules - Scheduling of shift work shall remain flexible in order to meet Project schedules and existing Project conditions including the minimization of interference with traffic. Shifts must be worked a minimum of five consecutive workdays, must have prior approval of the Owner and GC and must be scheduled with not less than five work days notice to the Local Union.

B. Flexible Starting Times – Shift starting times will be adjusted by the Contractor as necessary to fulfill Project requirements subject to the notice requirements of Paragraph A.

C. It is agreed that when project circumstances require a deviation from the above shifts, the involved unions, contractors and the General Contractor shall adjust the starting times of the above shifts or establish shifts which meet the project requirements. It is agreed that neither party will unreasonably withhold their agreement.

SECTION 4. HOLIDAYS

A. Schedule - There shall be 8 recognized holidays on the Project:

New Years Day	Labor Day
President's Day	Veterans Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas Day

*Presidential Election Day shall be observed as a holiday in a presidential election year. Work shall be scheduled on Columbus Day and Good Friday pursuant to the craft's Schedule A. The Friday after Thanksgiving shall be observed as a holiday for the Elevator Constructors only.

All said holidays shall be observed on the dates designated by New Jersey State Law. In the absence of such designations, they shall be observed on the calendar date except those holidays which occur on Sunday shall be observed on the following Monday. Holidays falling on Saturday are to be observed on the preceding Friday. No work shall be done on Labor Day except that of an emergency nature.

B. Payment - Regular holiday pay, if any, and/or premium pay for work performed on such a recognized holiday shall be in accordance with the applicable Schedule A.

C. Exclusivity - No holidays other than those listed in Section 4-A above shall be recognized nor observed.

SECTION 5. REPORTING PAY

A. Employees who report to the work location pursuant to regular schedule and who are not provided with work or whose work is terminated early by a Contractor, for whatever reason, shall receive minimum reporting pay in accordance with the applicable Schedule A.

B. When an employee, who has completed their scheduled shift and left the Project site, is "called back" to perform special work of a casual, incidental or irregular nature, the employee shall receive pay for actual hours worked with a minimum guarantee, as may be required by the applicable Schedule A.

C. When an employee leaves the job or work location of their own volition or is discharged for cause or is not working as a result of the Contractor's invocation of Section 7 below, they shall be paid only for the actual time worked.

D. Except as specifically set forth in this Article or except where specifically provided in an applicable Schedule A, there shall be no premiums, bonuses, hazardous duty, high time or other special payments of any kind.

E. There shall be no pay for time not actually worked except as specifically set forth in this Agreement or except where specifically provided in an applicable Schedule A.

SECTION 6. PAYMENT OF WAGES

A. Payday - Payment shall be made by check, drawn on a New Jersey bank with branches located within commuting distance of the job site. Paychecks shall be issued by the Contractor at the job site by 10 a.m. on Thursdays. In the event that the following Friday is a bank holiday, pay checks shall be issued on Wednesday of that week. Not more than 3 days wages shall be held back in any pay period. Paycheck stubs shall contain the name and business address of the Contractor, together with an itemization of deductions from gross wages.

B. Termination-Employees who are laid-off or discharged for cause shall be paid in full for that which is due them at the time of termination. The Contractors shall also provide the employee with a written statement setting forth the date of lay off or discharge.

SECTION 7. EMERGENCY WORK SUSPENSION

A Contractor or GC may, if considered necessary for the protection of life and /or safety of employees or others, suspend all or a portion of Project Work. In such instances, employees will be paid for actual time worked; provided, however, that when a Contractor request that employees remain at the job site available for work, employees will be paid for "stand-by" time at their hourly rate of pay.

SECTION 8. INJURY/DISABILITY

An employee who, after commencing work, suffers a work-related injury or disability while performing work duties, shall receive no less than 8 hours wages for that day. Further, the employee shall be rehired at such time as able to return to duties provided there is still work available on the Project for which the employee is qualified and able to perform.

SECTION 9. TIME KEEPING

A Contractor may utilize brassing or other systems to check employees in and out. Each employee must check in and out. The Contractor will provide adequate facilities for checking in and out in an expeditious manner.

SECTION 10. MEAL PERIOD

A Contractor shall schedule an unpaid period of not more than a half-hour duration at the work location between the 3rd and 5th hour of the scheduled shift. A Contractor may, for efficiency of operation, establish a schedule which coordinates the meal periods of two or more crafts. If an employee is required to work through the meal period, the employee shall be compensated in a manner established in the applicable Schedule A.

SECTION 11. BREAK PERIODS

There will be no rest periods, organized coffee breaks or other non-working time established during working hours. Individual coffee containers will be permitted at the employee's work location. Local area practice will prevail for coffee breaks that are not organized.

ARTICLE 13 - APPRENTICES

SECTION 1. RATIOS

Recognizing the need to maintain continuing supportive programs designed to develop adequate numbers of competent workers in the construction industry and to provide craft entry opportunities for minorities, women and economically disadvantaged non-minority males, Contractors will employ apprentices in their respective crafts to perform such work as is within their capabilities and which is customarily performed by the craft in which they are indentured. Contractors may utilize apprentices and such other appropriate classifications as are contained in the applicable Schedule A in a ratio not to exceed the ratio provided in the applicable Schedule A providing prevailing wage and fringe benefits as defined in N.J.S.A. 34:11-56.26(9) for the classification in Gloucester County, New Jersey. Apprentices and such other classifications as are appropriate shall be employed in a manner consistent with the provisions of the appropriate collective bargaining agreement listed in Schedule A.

SECTION 2. DEPARTMENT OF LABOR

To assist the Contractors in attaining a maximum effort on this Project, the Unions agree to work in close cooperation with, and accept monitoring by, the New Jersey State and Federal Departments of Labor to ensure that minorities, women, or economically disadvantaged are afforded opportunities to participate in apprenticeship programs which result in the placement of apprentices on this Project. To further ensure that this Contractor effort is attained, up to 50% of the apprentices placed on this Project should be first year, minority, women or economically disadvantaged apprentices. The Local Unions will cooperate with Contractor request for minority, women or economically disadvantaged referrals to meet this Contractor effort.

SECTION 3. HELMETS TO HARDHATS

The Employers and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Employers and Unions agree to utilize the services of the Center for Military recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

The Unions and Employers agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on the Project and of apprenticeship and employment opportunities for the Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

ARTICLE 14 - SAFETY PROTECTION OF PERSON AND PROPERTY

SECTION 1. SAFETY REQUIREMENTS

Each Contractor will ensure that applicable OSHA requirements and other requirements set forth in the contract documents are at all times maintained on the Project and the employees and Unions agree to cooperate fully with these efforts. Employees must perform their work at all times in a safe manner and protect themselves and the property of the Contractor and the Owner from injury or harm. Failure to do so will be grounds for discipline, including discharge.

SECTION 2. CONTRACTOR RULES

Employees covered by this Agreement shall at all times be bound by the reasonable safety, security, and visitor rules as established by the Contractors and the GC for this Project. Such rules will be published and posted in conspicuous places throughout the Project.

SECTION 3. INSPECTIONS

The Contractors and GC retain the right to inspect incoming shipments of equipment, apparatus, machinery and construction materials of every kind.

ARTICLE 15 - NO DISCRIMINATION

SECTION 1. COOPERATIVE EFFORTS

The Contractors and Unions agree that they will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or age in any manner prohibited by law or regulation. It is recognized that special procedures maybe established by Contractors and Local Unions and the New Jersey State Department of Labor for the training and employment of persons who have not previously qualified to be employed on construction projects of the type covered by this Agreement. The parties to this Agreement will assist in such programs and agree to use their best efforts to ensure that the goals for female and minority employment are met on this Project.

SECTION 2. LANGUAGE OF AGREEMENT

The use of the masculine or feminine gender in this Agreement shall be construed as including both genders.

ARTICLE 16 - GENERAL TERMS

SECTION 1. PROJECT RULES

The GC and the Contractors shall establish such reasonable Project rules as are appropriate for the good order of the Project, provided they do not violate the terms of this agreement. These rules will be explained at the pre-job conference and posted at the Project site and may be amended thereafter as necessary. Failure of an employee to observe these rules and regulations shall be grounds for discipline, including discharge. The fact that no order was posted

prohibiting a certain type of misconduct shall not be a defense to an employee disciplined or discharged for such misconduct when the action taken is for cause.

SECTION 2. TOOLS OF THE TRADES

The welding/cutting torch and chain fall, are tools of the trade having jurisdiction over the work performed. Employees using these tools shall perform any of the work of the trade. There shall be no restrictions on the emergency use of any tools or equipment by any qualified employee or on the use of any tools or equipment for the performance of work within the employee's jurisdiction.

SECTION 3. SUPERVISION

Employees shall work under the supervision of the craft foreperson or general foreperson.

SECTION 4. TRAVEL ALLOWANCES

There shall be no payments for travel expenses, travel time, subsistence allowance or other such reimbursements or special pay except as expressly set forth in this Agreement and in Schedule A.

SECTION 5. FULL WORKDAY

Employees shall be at their staging area at the starting time established by the Contractor and shall be returned to their staging area by quitting time after performing their assigned functions under the supervision of the Contractor. The signatories reaffirm their policy of a fair day's work for a fair day's wage.

SECTION 6. COOPERATION

The General Contractor and the Unions will cooperate in seeking any NJ State Department of Labor approvals that may be required for implementation of any terms of this Agreement.

ARTICLE 17 - SAVINGS AND SEPARABILITY

SECTION 1. THIS AGREEMENT

In the event that the application of any provision of this Agreement is enjoined, on either an interlocutory or permanent basis, or otherwise found in violation of law, the provision involved shall be rendered, temporarily or permanently, null and void but the remainder of the Agreement shall remain in full force and effect. In such event, the Agreement shall remain in effect for contracts already bid and awarded or in construction where the Contractor voluntarily accepts the Agreement. The parties to this Agreement will enter into negotiations for a substitute provision in conformity with the law and the intent of the parties for contracts to be let in the future.

SECTION 2. THE BID SPECIFICATIONS

In the event that the General Contractor's bid specifications, or other action, requiring that a successful bidder become signatory to this Agreement is enjoined, on either an interlocutory or permanent basis, or otherwise found in violation of law such requirement shall be rendered, temporarily or permanently, null and void but the Agreement shall remain in full force and effect to the extent allowed by law. In such event, the Agreement shall remain in effect for contracts already bid and awarded or in constructions where the Contractor voluntarily accepts the Agreement. The parties will enter in to negotiations as to modifications to the Agreement to reflect the court action taken and the intent of the parties for contracts to be let in the future.

SECTION 3. NON-LIABILITY

In the event of an occurrence referenced in Section 1 or Section 2 of this Article, neither the Owner, the Architect, the Construction Manager, the GC, or any Contractor, or any signatory Union shall be liable, directly or indirectly, for any action taken, or not taken, to comply with any court order, injunction or determination. Project bid specifications will be issued in conformance with court orders in effect and no retroactive payments or other action will be required if the original court determination is ultimately reversed.

SECTION 4. NON-WAIVER

Nothing in this Article shall be construed as waiving the prohibitions of Article 7 as to signatory Contractors and signatory Unions.

ARTICLE 18 - FUTURE CHANGES IN SCHEDULE A AREA CONTRACTS

SECTION 1. CHANGES TO AREA CONTRACTS

A. Schedule A to this Agreement shall continue to full force and effect until the Contractor and/or Union parties to the Area Collective Bargaining Agreements which are the basis for Schedule A, notify the General Contractor in writing of the mutually agreed upon

changes in provisions of such agreements which are applicable to the Project, and their effective dates.

B. It is agreed that any provisions negotiated into Schedule A collective bargaining agreements will not apply to work on this Project if such provisions are less favorable to this Project than those uniformly required of contractors for construction work normally covered by those agreements; nor shall any provisions be recognized or applied on this Project if it may be construed to apply exclusively, or predominantly, to work covered by this Project Agreement.

C. Any disagreement between signatories to this Agreement over the incorporation into Schedule A of provisions agreed upon in the renegotiations of Area Collective

Bargaining Agreements shall be resolved in accordance with the procedure set forth in Article 9 of this Agreement.

SECTION 2. LABOR DISPUTES DURING AREA CONTRACT NEGOTIATIONS

The Unions agree that there will be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity or other violations of Article 7 affecting the Project by any Local Union involved in the renegotiations of Area Local Collective Bargaining Agreements nor shall there by any lock-out on the Project affective a Local Union during the course of such renegotiations.

IN WITNESS WHEREOF the parties have caused this Agreement to be executed and effective as of the _____ day of _____, 20____.

United Building Trades Council of Southern New Jersey

By: _____ **By:** _____

General Contractor

_____

SCHEDULE A

A COPY OF EACH UNION'S CURRENT COLLECTIVE BARGAINING AGREEMENT IS INCLUDED AS PART OF SCHEDULE A BY REFERENCE, UPON EXECUTION BY THE SIGNATORY LOCAL

The term "Local Unions" or "Unions" as used in the Project Labor Agreement are

1. **Insulators, Local 14**
2. **Boilermakers, Local 28**
3. **Bricklayers and Allied Crafts. Local 45**
4. **Carpenters, Local 255 and 251**
5. **Dockbuilders, Local 1456**
6. **Electrical Workers, Local 351**
7. **Elevator Workers, Local 5**
8. **Heavy Construction Laborers, Local 172**
9. **Ironworkers, Local 399**
10. **Laborers, Local 77**
11. **Millwrights, Local 715**
12. **Operating Engineers, Local 825**
13. **Operative Plasterers & Cement Masons, Local 592**
14. **Painters and Allied Trades, District Council 21**
15. **Plumbers, Local 322**
16. **Roofers, Local 30**
17. **Sheet Metal Workers, Local 19**
18. **Sprinkler Fitters, Local 692**
19. **Teamsters, Local 676**
20. **Tile/Marble/Terrazzo Workers, Local 7**

SCHEDULE B

SCOPE OF WORK

Schedule C

PROJECT LABOR AGREEMENT

COVERING _____

LETTER OF ASSENT

Re: Project Labor Agreement
United Building Trades Council of Southern New Jersey and _____
(the "Agreement')

The undersigned, as a General Contractor, Contractor(s) or Subcontractor(s) on a Contract which is part of large project construction for the _____ Project, for and in consideration of the award of a Contract to perform work on said Project, and in further consideration of the mutual promises made in the Project Labor Agreement, a copy of which was received and is acknowledged, hereby:

(1) On behalf of itself and all its employees, accepts and agrees to be bound by the terms and conditions of the Project Labor Agreement, together with any and all amendments and supplements now existing or which are later made thereto, and understands that any act of non-compliance with all such terms and conditions will subject the non-complying Contractor or employee(s) to being prohibited from the Project Site until full compliance is obtained.

(2) Certifies that it has no commitments or agreements that would preclude its full compliance with the terms and conditions of said Projects Labor Agreement.

(3) Agrees to secure from any Contractor(s) (as defined in said Project Labor Agreement) which is or becomes a Subcontractor(s) (of any tier), a duly executed Letter of Assent in form identical to this document prior to commencement of any work.

_____
Company Name

By: _____ **Contract Number**_____

Title: _____ **General Contractor:**_____

Date: _____

cc: Unions employed by Contractor

PROJECT LABOR AGREEMENT

COVERING _____

TEAMSTERS LOCAL 676 ADDENDUM

Notwithstanding the provisions of Article 11, Section 2 of the Project Labor Agreement, a Contractor who becomes signatory to this Project Labor Agreement who is not already a participating and contributing employer to the pension fund(s) specified in the Exhibit A collective bargaining agreement (currently the Teamsters Local 676 Pension Plan), shall make direct all contributions required by the Exhibit A collective bargaining agreement exclusively to the Teamster Union Local 676 Annuity Fund, a defined contribution plan. Any such Contractor shall not participate in nor contribute to the Teamsters Local 676 Pension Plan and shall have no obligation to the Teamsters Local 676 Pension Plan.

Any Contractor who is already participating in and contributing to the Teamsters Local 676 Pension Plan, separately from this Project Labor Agreement, shall pay contributions as provided for in Article 11, Section 2 of this Project Labor Agreement.

Agreed to and accepted this _____ day of _____, 2026:

For: _____ For Teamsters Local 676

_____ _____

By: **By:**

STEELWORKERS ADDENDUM

PROJECT LABOR AGREEMENT

COVERING _____ PROJECT

IN _____, NEW JERSEY

STEELWORKERS, LOCAL 318 ADDENDUM

The undersigned, United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union, AFL-CIO and its Local 318 hereby agrees:

On behalf of itself and its affiliates and members, accepts and agrees to be bound by the terms and conditions of the Project Labor Agreement, together with any and all amendments and supplements now existing or which are later made thereto, as a signatory union.

Agreed to and accepted this _____ day

of _____ , 2027:

For the Prime Contractor,:	For United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service, Workers International Union, AFL-CIO and its Local 318
_____	_____

cc: United Building and Construction Trades Council of Southern New Jersey