WBA
ARCHITECTURE

September 3, 2021

Pearl High School Indoor Training Facility
Pearl, Mississippi

ADDENDUM NO. 01

NOTICE TO ALL DOCUMENT HOLDERS:
The following additions, deletions, changes and clarifications to the drawings and specifications are to be included as part of the Contract Documents.

SPECIFICATIONS

ITEM NO. 01 **00.2113 INSTRUCTIONS TO BIDDERS**
Invitation – 1. Bid Submission
Revise *"14"* to read **"16".**
Bids shall be received on September 16, 2021

ITEM NO. 02 **00.7300 SUPPLEMENTARY CONDITIONS**
Para. 9.11 LIQUIDATED DAMAGES
Clarification: The amount of liquidated damages per day shall be **Five Hundred Dollars ($500.00)**

ITEM NO. 03 **00.4100 Bid Form**
Replace Bid form in its entirety with the enclosed form.

ITEM NO. 04 **01.2300 ALTERNATES**
Add this Specification Section in its entirety per enclosed.

ITEM NO. 05 **09.3000 TILING**
Part 2 Products, Para. 2 Trim and Accessories, Sub Para. D Thresholds
Revise Item 2 to read **" 2. Material: Stainless Steel – See Finish Legend on Drawings."**

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ITEM NO. 06 **DIVISION 20 FIRE PROTECTION, PLUMBING, AND HVAC GENERAL PROVISIONS**

Add the following Specification Sections as originally indicated on the Specification Index**.**

These sections were not included in the original Project Manual

20.0010 – Mechanical General Provisions
20.0020 – Basic Mechanical Requirements
20.0030 – Mechanical Submittals and Shop Drawings
20.0035 – Mechanical Systems and Equipment Warranties
20.0040 – Mechanical Close-Out Requirements
20.0050 – Basic Mechanical Materials and Methods
20.0060 – Pipes and Pipe Fittings
20.0100 – Valves
20.0120 – Piping Specialties
20.0140 – Supports and Anchors
20.0170 – Electrical Requirements
20.0190 – Mechanical Identification
20.0240 – Mechanical Sound and Vibration Control
20.0250 – Mechanical Insulation

ITEM NO. 07 **DIVISION 21 FIRE SUPPRESSION**

Add the following Specification Section as originally indicated on the Specification Index.

This section was not included in the original Project Manual

21.0330 – Fire Suppression System

ITEM NO. 08 **DIVISION 22 PLUMBING**

Add the following Specification Sections as originally indicated on the Specification Index.

These sections were not included in the original Project Manual

22-0430 – Plumbing Specialties
22.0440 – Plumbing Fixtures, Trim, and Accessories
22.0450 – Domestic Water Heaters and Accessories

ITEM NO. 09 **DIVISION 23 HEATING, VENTILATION AND AIR CONDITIONING**

Add the following Specification Sections as originally indicated on the Specification Index.

These sections were not included in the original Project Manual

23.0670 – Packaged Air Conditioners
23.0860 – Fans
23.0885 – Air Cleaning / Treatment
23.0890 – Ductwork
23.0910 – Ductwork Accessories
23.0980 – Controls and Instrumentation
23.0990 – Testing, Adjusting, Balancing

ITEM NO. 10 **DIVISION 26 ELECTRICAL AND LIGHTING**

Add the following Specification Sections as originally indicated on the Specification Index.

These sections were not included in the original Project Manual

26.0511 – Electrical General Work in Existing Facilities
26.0519 – Low-Voltage Power Conductors and Cables
26.0526 – Grounding and Bonding for Electrical Systems
26.0533 – Raceways, Outlet Boxes, and Junction Boxes for Electrical Systems
26.0573 – Electrical Studies
26.0923 – Switches and Receptables
26.0926 – Vacancy Sensors
26.2400 – Panelboards
26.2800 – Disconnects and Separately-Mounted Circuit Breakers
26.5100 - Lighting

ITEM NO. 11 **DIVISION 27 COMMUNICATIONS**

Add the following Specification Section as originally indicated on the Specification Index.

This section was not included in the original Project Manual

27.3000 – Telephone and Data Systems

ITEM NO. 12 **DIVISION 28 ELECTRONIC SAFETY AND SECURITY**

Add the following Specification Sections as originally indicated on the Specification Index.

These sections were not included in the original Project Manual

28.1614 – Security Conduit System
28.2302 – Camera Conduit System
28.3100 – Fire Alarm System

DRAWINGS

ITEM NO. 13 **R100 PROJECT INFO**

Revise per the enclosed sheet.

ITEM NO. 14 **C101 EROSION CONTROL PLAN**
C111 DEMOLITION PLAN
C112 OVEREXCAVATION PLAN
C121 SITE PLAN
C131 GRADING PLAN
C141 UTILITY PLAN
C202 CIVIL DETAILS
C203 CIVIL DETAILS
C207 CIVIL DETAILS

Revise per the enclosed sheets.

ITEM NO. 15 **A001 ARCHITECTURAL SITE PLAN**
A103 REFLECTED CEILING PLAN

Revise per the enclosed sheets.

ITEM NO. 16 **A106 FINISH FLOOR PLAN**

Add sheet A106 per the enclosed sheets.

ITEM NO. 17 **A201 EXTERIOR ELEVATIONS**
Revise per the enclosed sheets.

ITEM NO. 18 **A210 ENGLARGED SECTIONS**
Revise per the enclosed sheets.

ITEM NO. 19 **A301 WALL SECTIONS**
A303 WALL SECTIONS
Revise per the enclosed sheets.

ITEM NO. 20 **A401 EXTERIOR DETAILS**
Revise per the enclosed sheet.

ITEM NO. 21 **A501 DOORS & WINDOWS**
Revise per the enclosed sheet.

ITEM NO. 22 **A701 ENLARGED PLANS & INTERIOR ELEVATIONS**
A702 ENLARGED PLANS & INTERIOR ELEVATIONS
Revise per the enclosed sheets.

ITEM NO. 23 **E0.0 ELECTRICAL LEGEND**
E1.1 PARTIAL LIGHTING PLAN – PART A
Revise per the enclosed sheets.

Encl: Revised 00.4100 Bid Form (2 pages)
Section 01.2300 Alternates (1 page)
Divisions 20, 21, 22 & 23 Specifications (114 pages)
Divisions 26, 27 & 28 Specifications (32 pages)
Revised Sheet #s C101, C111, C112, C121, C131, C141, C202, C203 & C207 (9 sheets)
Revised Sheets R100, A001, A103 (3 sheets)
Sheet A106
Revised Sheet A201
Revised Sheet A210
Revised Sheets A301, A303 (2 sheets)
Revised Sheet A401
Revised Sheet A501
Revised Sheets A701 & A702 (2 sheets)
Sheets E0.0 & E1.1 (2 sheets)

cc: All Document Holders
File 5820

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Bid Form

THE PROJECT AND THE PARTIES

1. TO:
   A. Owner: Pearl Public School District.
2. FOR:
   A. Project: PEARL HIGH SCHOOL FOOTBALL TRAINING FACILITY
3. DATE: _____ (BIDDER TO ENTER DATE)
4. SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)
   A. Bidder's Full Name _____
      1. Address _____
      2. City, State, Zip_____
5. OFFER
   A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Bid Documents prepared by [_____] for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:
   B. _____
      _____ dollars
      ($_____), in lawful money of the United States of America.
   C. We have included the required security deposit as required by the Instruction to Bidders.
   D. We have included the required performance assurance bonds in the Bid Amount as required by the Instructions to Bidders.
   E. All applicable federal taxes are included and State of [_____] taxes are included in the Bid Sum.
   F. All Cash and Contingency Allowances described in Section 01.2100 - Allowances are included in the Bid Sum.
   G. ALTERNATES:
      1. ALTERNATE #1 (ADD or DEDUCT): $_____
         a. (amount in words)_____
6. ACCEPTANCE
   A. This offer shall be open to acceptance and is irrevocable for sixty days from the bid closing date.
   B. If this bid is accepted by Owner within the time period stated above, we will:
      1. Execute the Agreement within seven days of receipt of Notice of Award.
      2. Furnish the required bonds within seven days of receipt of Notice of Award.
      3. Commence work within seven days after written Notice to Proceed of this bid.
   C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.
   D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.
7. CONTRACT TIME
   A. If this Bid is accepted, we will:
   B. Complete the Work in 365 calendar days from Notice to Proceed.
8. UNIT PRICES
   A. The following are Unit Prices for specific portions of the Work as listed. The following is the list of Unit Prices:

B. ITEM DESCRIPTION - UNIT QUANTITY - UNIT PRICE - ITEM VALUE

C. [_____] - [_____] - [_____] - $ .....

9. ADDENDA

A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

1. Addendum # _____ Dated _____.
2. Addendum # _____ Dated _____.
3. Addendum # _____ Dated _____.
4. Addendum # _____ Dated _____.

10. BID FORM SIGNATURE(S)

A. The Corporate Seal of

B. _____

C. (Bidder - print the full name of your firm)

D. was hereunto affixed in the presence of:

E. _____

F. (Authorized signing officer, Title)

G. (Seal)

H. _____

I. (Authorized signing officer, Title)

11. IF THE BID IS A JOINT VENTURE OR PARTNERSHIP, ADD ADDITIONAL FORMS OF EXECUTION FOR EACH MEMBER OF THE JOINT VENTURE IN THE APPROPRIATE FORM OR FORMS AS ABOVE.

12. RESIDENT BIDDER

A. The Bidder is a : (check which applies) _____ RESIDENT or _____ NON-RESIDENT of the state of Mississippi.

B. Phone No.: _____

C. Email: _____

END OF SECTION

Alternates

PART 1 GENERAL

1. SECTION INCLUDES
   - A. Description of Alternates.
   - B. Procedures for pricing Alternates.
2. RELATED REQUIREMENTS
   - A. Document 00.2113 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.
   - B. Document 00.4323 - Alternates Form: List of Alternates as supplement to Bid Form.
3. ACCEPTANCE OF ALTERNATES
   - A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
   - B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.
4. SCHEDULE OF ALTERNATES
   - A. Alternate No. 1 - Termperature Reduction Infill at Synthetic Playing Field Surfacing:
     1. See Specification Section 32.1815 Outdoor Synthetic Playing Field Surfacing. Provide Temperature Reduction Infill as specified in lieu of the Base Bid infill.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Mechanical General Provisions

PART 1 GENERAL

1.1 SCOPE

Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Contract Drawings.

1.2 MECHANICAL SPECIFICATION SECTION INDEX

Division 20 – Fire Protection, Plumbing and HVAC General Provisions
Section 200010 – Mechanical General Provisions
Section 200020 – Basic Mechanical Requirements
Section 200030 – Mechanical Submittals and Shop Drawings
Section 200035 – Mechanical Systems and Equipment Warranties
Section 200040 – Mechanical Close-out Requirements
Section 200050 – Basic Mechanical Materials and Methods
Section 200060 – Pipes and Pipe Fittings
Section 200100 – Valves
Section 200120 – Piping Specialties
Section 200140 – Supports and Anchors
Section 200170 – Electrical Requirements
Section 200190 – Mechanical Identification
Section 200240 – Mechanical Sound and Vibration Control
Section 200250 – Mechanical Insulation

Division 21 – Fire Suppression
Section 210330 – Fire Sprinkler System

Division 22 – Plumbing
Section 220430 – Plumbing Specialties
Section 220440 – Plumbing Fixtures, Trim and Accessories
Section 220450 – Domestic Water Heaters and Accessories

Division 23 – Heating, Ventilating and Air Conditioning (HVAC)
Section 230670 – Packaged Air Conditioners
Section 230860 – Fans
Section 230885 – Air Cleaning/Treatment
Section 230890 – Ductwork
Section 230910 – Ductwork Accessories
Section 230980 – Controls and Instrumentation
Section 230990 – Testing, Adjusting and Balancing

1.3 DEFINITIONS

A. ARCHITECT: Architectural Design firm or ARCHITECT OF RECORD, meaning general building designer whose professional seal appears on the majority of general construction Contract Documents, or their authorized representative.

B. ENGINEER (ENGINEER-OF-RECORD): ENGINEER whose professional stamp appears on Contract Drawings, etc. In general, unless specifically denoted otherwise, ENGINEER-OF-RECORD in Division 20, 21, 22 and 23 Specification Sections denotes MECHANICAL ENGINEER-OF-RECORD.

C. Exposed, or exposed to view: Those installations which can be seen, in whole or

part.

D. Finished Spaces: Inside the building extents.

E. Inspect and/or Inspection: Utilized for the PROFESSIONAL'S construction period services and defines as "visits by the PROFESSIONAL to the Project at appropriate intervals during construction to become generally familiar with the progress and quality of the CONTRACTOR'S work and to determine if the work is proceeding in accordance with the Contract Documents."

F. Outside: Synonymous with outdoors, outside of building, exposed to weather, etc.

G. Plans: Denotes general Construction Drawings prepared by the A/E.

H. PROFESSIONAL: Authorized representative of ENGINEER-OF-RECORD'S firm.

I. Provide: Unless specifically denoted otherwise, the CONTRACTOR referred to shall be responsible for furnishing, providing, installing, connecting, and making item or system fully functional in a safe manner as recommended by the manufacturer and by Industry Standards.

1.4 APPLICABLE STANDARDS

A. The intent is that the complete installation shall comply with applicable laws and ordinances, utility company regulations, and applicable requirements from the latest edition of the following:

ANSI	American National Standard Institute
ASHRAE	ASHRAE guides, Latest Editions
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
ICC	International Code Congress
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
UL	Underwriters Laboratories

City of Pearl, Mississippi, Fire, Building, Gas, Plumbing and Mechanical Codes and Regulations, and governing authority having jurisdiction.

B. Other applicable building, safety or fire codes having jurisdiction over equipment, materials or methods. The decision of the ENGINEER will be final in event of dispute over Code to use or its interpretation.

1.5 GENERAL CONDITIONS

A. The General Conditions, Information to Bidders, Special Conditions, and other pertinent documents issued by the ARCHITECT are a part of these Specifications and shall be complied with in every respect.

B. By the act of submitting a bid, this CONTRACTOR agrees that all of the Contract Documents and each of the divisions of the complete Specifications have been reviewed and studied, and all requirements and coordination resulting there from are included.

C. This CONTRACTOR shall conform to standards prescribed by City, County, and State regulations or ordinances having jurisdiction. Any changes that may be necessary to conform to such regulations or ordinances shall be made by this CONTRACTOR without extra costs to the OWNER. Where code requirements are less than those shown on the Plans or in the Specifications, the Plans and Specifications shall be followed. Where applicable, NFPA requirements shall be met.

D. The CONTRACTOR shall comply with all applicable provisions of the William-Steiger Occupational Safety and Health Act (O.S.H.A.).

E. Permits required for the installation of the work, as well as all authorized code inspections, including all fees and assessments, shall be borne by and arranged for by the CONTRACTOR. The CONTRACTOR shall verify specific mechanical related provisions for permitting in advance, especially where additional design/installation documentation may be required, and include provisions and/or cost of same in this bid.

F. This CONTRACTOR shall provide all items, articles, materials, operations or methods listed, mentioned, or scheduled on the Drawings and/or herein including all labor, materials, equipment and incidentals necessary, required or implied, for the completion of the various systems.

1.6 EXPLANATION AND PRECEDENCE OF DRAWINGS

A. For purposes of clearness and legibility, Drawings are essentially diagrammatic and, although size and location of equipment are drawn to scale whenever possible, the CONTRACTOR shall make use of all data in the contract documents and shall verify this information at building site.

B. Do not scale drawings having 1/4" or smaller scale. The Drawings indicate required size and points of termination of pipes and ducts, and suggest proper routes of pipe to conform to structure, avoid obstructions and preserve clearances. Because of small scale, it is not intended that Drawings indicate all necessary offsets, and it shall be the work of this Section to install work in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear without further instruction or cost to the OWNER.

C. It is intended that all apparatus be located symmetrically with architectural elements, and shall be installed at exact height and locations as shown on the Architectural Drawings.

D. The CONTRACTOR shall be solely responsible for taking his own measurements and installing his work to suit conditions encountered.

1.7 SPECIAL CONDITIONS, MECHANICAL

A. The right is reserved to move any element as much as ten (10') feet at no increase in cost provided CONTRACTOR is notified before work in question is fabricated or installed.

B. The CONTRACTOR shall fully inform himself regarding any and all peculiarities and limitations of spaces available for the installation of all work and materials furnished and installed under the contract. He shall exercise due and particular caution to determine that all parts of his work are made quickly and easily accessible. The CONTRACTOR shall be guided by the architectural details and conditions existing at the job, correlating this work with that of the other trades, and report to the

OWNER any discrepancies or interferences that are discovered. Failure to report such discrepancies and interferences shall result in the correcting of these errors or omissions by the CONTRACTOR at his own expense. All work which deviates from the Drawings and Specifications without prior approval of the OWNER, shall be altered by the CONTRACTOR at his own expense to comply with the Drawings and Specifications as directed.

C. If equipment or fixtures to be furnished by OWNER and/or OWNER'S vendor are not delivered prior to final acceptance, services shall be capped or plugged at walls or floor as directed by ARCHITECT, ready for future connection.

D. The CONTRACTOR shall coordinate his work with that of the OWNER, in order that there will be no delay in the proper installation and completion of the work. If, in the opinion of the OWNER, any piping, equipment, etc., has been improperly placed or installed due to lack of coordination with the other trades, such piping and equipment shall be relocated as directed by the OWNER at the CONTRACTOR'S expense.

1.8 SITE SAFETY

CONSULTANT'S site responsibilities are limited solely to the activities of CONSULTANT and CONSULTANT'S employees on site. These responsibilities shall not be inferred by any party to mean that CONSULTANT has responsibility for site safety. Safety in, on, or about the site is the sole and exclusive responsibility of the CONTRACTOR alone. The CONTRACTOR'S methods of work performance, superintendence of the CONTRACTOR'S employees and sequencing of construction are also the sole and exclusive responsibilities of the CONTRACTOR alone. The CONTRACTOR shall, to the fullest extent permitted by law, waive any claim against CONSULTANT and his employees and indemnify, defend, and hold CONSULTANT harmless from any claim or liability for injury or loss arising from CONSULTANT'S alleged failure to exercise site safety responsibility. The CONTRACTOR also shall compensate CONSULTANT for any time spent or expenses incurred by CONSULTANT in defense of any such claim. Such compensation shall be based upon CONSULTANT'S prevailing fee schedule and expense reimbursement policy. The term "any claim" used in this provision means "any claim in contract, tort or statute alleging negligence, errors, omissions, strict liability, statutory liability, breach of contract, breach of warranty, negligent misrepresentation, or other acts giving rise to liability.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 WORKMANSHIP, MATERIALS AND EQUIPMENT

A. All work shall be performed in a workmanlike manner and shall present a neat and mechanical appearance when completed. All materials shall be of type, quality and minimum rating prescribed herein or indicated on the Contract Drawings.

B. If equipment or fixtures to be furnished by OWNER and/or OWNER'S vendor are not delivered prior to final acceptance, services shall be capped or plugged at walls or floor as directed by ARCHITECT, ready for future connection.

3.2 CLEAN-UP

A. Do not allow mechanical related waste material or rubbish to accumulate in or about job site.

B. At completion of work, remove all rubbish, tools, scaffolding and surplus materials

from and about building, leaving work clean and ready for use without further cleaning required. Clean all equipment, piping, valves, fixtures, and fittings of grease, metal cuttings, insulation cement, dust, dirt, paper labels, etc.

C. Any discoloration or other damage to parts of building, its finish or furnishings due to failure to properly clean or keep clean mechanical systems shall be repaired without additional cost to OWNER.

D. All equipment, fixtures and installations, especially where installations are exposed to view, shall be thoroughly cleaned, polished, seams smoothed and/or sealed for a neat appearance.

3.3 INSPECTION OF PROPOSED CONSTRUCTION

Prior to submitting his bid, the CONTRACTOR shall visit the site of the proposed construction and shall thoroughly acquaint himself with existing utilities, working conditions to be encountered, etc. No additional compensation shall be allowed for conditions increasing the CONTRACTOR'S cost which were not known or appreciated by him when submitting his proposal if the condition was obvious and could have been discovered by him if he had visited the project site and thoroughly informed himself of all existing conditions which would affect his work, including requirements of local authorities to meet their procedures, special requirements, codes, etc.

3.4 TEMPORARY ENVIRONMENTAL CONDITIONING

Temporary heating, cooling and dehumidification capability shall be provided for this project beginning a minimum of 90 days prior to the original contract scheduled substantial completion date and maintained until the OWNER'S final acceptance of the project, or any phase thereof. The beginning of this temporary HVAC period is intended to align with general industry standard construction practice of providing a minimum suitable indoor environment for the installation and curing of adhesives, finishes, wall covering(s), tile ceiling/floors, etc. It is highly dependent upon the CONTRACTOR's comprehensive project coordination and scheduling efforts and shall be lengthened (begun earlier) should the CONTRACTOR install such systems and/or finishes which are recommended by the system and/or finish manufacturer to be installed and/or maintained in a minimum environmental condition. This interior space conditioning, known hereafter as "temporary HVAC", includes all areas of the project where the space will be similarly conditioned with heating, cooling and/or dehumidification capability after the project or any portion/phase thereof is completed.

During this minimal temporary HVAC period, the interior space shall be continuously monitored and controlled to provide the following:

1. maximum 85 degrees Fahrenheit dry bulb temperature.
2. minimum 60 degrees Fahrenheit dry bulb temperature.
3. maximum 60% relative humidity.

In effect, automatic controls for refrigeration, dehumidification, and heating shall be provided such that the indoor building environment, as described above, can be continually maintained. If a system and/or finish manufacturer recommends a more stringent requirement for conditioning, same shall be provided.

The CONTRACTOR shall coordinate such temporary provisions with the all trades and utility companies to accomplish this requirement including adequate temporary power to equipment, etc. All cost and coordination for these temporary HVAC provisions shall be the

responsibility of the CONTRACTOR and included in his base bid.

While operating the systems, the intent is to protect the installations from dirt, dust, debris, etc. such that at substantial completion the systems are new, clean and ready for the OWNER's beneficial use. The CONTRACTOR is responsible for protection of the WORK to meet the design intent identified herein. The following minimum requirements shall be met: The CONTRACTOR is responsible for protection of the WORK to meet the design intent identified herein. The following minimum requirements shall be met:

1. Completed manufacturer equipment start-up forms must be filled out completely for each and every piece of equipment. Copy of same shall be maintained on file at the project site for verification. Failure to complete the form entirely or maintain copy at project site will result in equipment operation being discontinued without exception.
2. The exterior building envelope is complete including installation of all permanent doors, windows, walls, louvers, roof openings, etc.
3. ALL interior and exterior dust generating activities and subsequent cleanup is complete and approved by the ARCHITECT. Examples of this are exterior sitework around the building, interior sheet rock installation/finishing, floor grinding, spray application of paints/sealers, etc.
4. HVAC Systems shall have pleated air filters of types indicated in Section Air Cleaning/Treatment installed, monitored and periodically replaced when loaded.
5. All R/A grilles and/or openings into ductwork/plenums are fully covered, and protected with filter material of types indicated in Section Air Cleaning/Treatment. These filters shall be continually monitored and periodically replaced when loaded.
6. There is no reduction in specified equipment warranty, capacity, performance, or life of the equipment.
7. HVAC equipment manufacturer's recommendations don't indicate construction practices and installations are harmful to systems, equipment, etc.
8. HVAC equipment manufacturer start-up tests have been performed and accompanying forms have been transmitted to Professional for review. See HVAC equipment specification sections for more information. A copy of same shall be included in Close-out Documents. See Section *MECHANICAL CLOSE-OUT REQUIREMENTS*.

If new HVAC equipment cannot be utilized for providing indoor environmental control during construction for finishes, etc., the CONTRACTOR shall arrange for other temporary HVAC capacity as required.

If the CONTRACTOR fails to adhere to these guidelines for operation of the permanent building mechanical systems, corrective action by the CONTRACTOR will be required. Corrective action will be determined by the ENGINEER but may include any combination of the following:

1. Cleaning or Replacing Ductwork should it be found with visible dust/debris. A third-party testing/inspection representative may be required depending upon the extent of contamination.

2. Replacement or Cleaning of Equipment should it be found with visible dust/debris/damage. The respective equipment manufacturer's representative will be required to inspect and make written recommendations as to the corrective actions necessary to return the equipment to like new conditions.

The CONTRACTOR will be solely responsible for and include all cost associated with any required corrective actions.

However, permanent HVAC equipment, as described above, shall be fully operational during the last 30 days of the temporary HVAC period such that system performance and controls can be tested, adjusted and balanced per Section Testing, Adjusting and Balancing.

3.5 EXISTING UTILITIES AND SERVICES

A. When encountered in work, protect existing active sewer, water, gas, electric, other utility services, structures; where required for proper execution of work, relocate them as directed. If existing active services are not indicated, contact PROFESSIONAL for instructions.

B. When encountered in work area, whether or not indicated, cap or plug or otherwise discontinue existing inactive sewer, water, gas, electric, other utility service structures, of which action should be taken. If removal is required, request instructions from PROFESSIONAL.

C. While work is in progress, except for designated short intervals during which connections are to be made, continuity of service shall be maintained to all existing utilities and systems. Interruptions shall be scheduled and coordinated with ARCHITECT and OWNER and approved in advance with the OWNER and serving utilities. If requested, downtime shall be limited to weekends and/or night periods to least disrupt normal use of these utilities. The CONTRACTOR shall be responsible for any interruptions to service and shall promptly repair any damages to existing systems caused by his operations.

D. The accuracy of the location of existing underground, and otherwise concealed, HVAC, domestic, fire protection, sanitary and storm drainage utilities is not guaranteed. The CONTRACTOR shall, early in the project, prior to demolition of existing work and layout of new work, verify all underground and concealed work in the proximity of connections to existing services and routings.

E. Immediately upon commencing construction, and prior to construction of any part of the facility involved in any way with utilities, the CONTRACTOR shall investigate thoroughly the size, capacity, arrangement and location of all mechanically related utilities. The CONTRACTOR shall immediately report any discrepancies or apparent problem involving the project that pertains to utilities. This applies to private as well as public utilities. This CONTRACTOR shall coordinate and utilize the services of public and private "locators" to ascertain the whereabouts of all underground utilities in the area where work is to be performed.

END OF SECTION

Basic Mechanical Requirements

PART 1 – GENERAL

1.1 SCOPE

Furnish all labor, materials, services, and equipment required to complete the installation of complete and acceptable mechanical systems in accordance with these specifications and the contract drawings.

1.2 TESTS

A. This CONTRACTOR shall conduct such tests as required to determine that systems and equipment, which he installs, conform to Specifications. CONTRACTOR shall supply all labor, materials, instruments, operations, etc., required to facilitate testing.

B. Gauges, thermostats, and instruments used in testing shall be accurate, recently calibrated and approved by the PROFESSIONAL prior to test. Instruments installed permanently in systems as specified herein may be used in testing when approved by the ENGINEER.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 MISCELLANEOUS WORK REQUIRED

A. The CONTRACTOR shall provide foundations for equipment, chases, furring, framed openings in walk, partitions, etc., installation of wall louvers and grilles in doors, finish painting and all other similar work of a general construction nature. All roof flashing by CONTRACTOR.

B. The CONTRACTOR shall bring adequate power to and make final connections to all equipment furnished under this Contract.

C. All items of labor, materials and equipment not specifically stated herein or on Contract Drawings to be by others are required to make the systems complete and operative, shall be by this CONTRACTOR.

3.2 PROTECTION OF EQUIPMENT AND MATERIALS

A. Responsibility for care and protection of equipment and materials under this Contract rests with this CONTRACTOR until equipment or materials have been tested and accepted.

B. All pipe ends, valves, ductwork and parts of equipment left unconnected, permanently or temporary, shall be capped, plugged or properly protected at the end of each working day to prevent entry of foreign matter. During the construction process, cover ductwork exposed to weather and/or when not yet installed, with sheet metal caps screwed in place and sealed.

C. Store equipment, ductwork including pipe and valves, off the ground and under cover. For storage outdoors, minimum 6-mil thick plastic shall be fitted to withstand splattering, ground water, precipitation and wind.

D. Protect air handling unit coils by use of protective sheet metal panels or plywood.

E. Damaged equipment shall be repaired or replaced at the option of the PROFESSIONAL. Finishes and/or scratched paint on equipment, etc., shall be repaired and repainted to match new condition(s).

F. Do not bring insulated equipment or ductwork to job site until same can be

adequately protected from wind, rain and damage, etc. In general, store ductwork in building(s) not yet fully enclosed, off the ground and under minimum 6-mil plastic sheeting, etc. This includes dual wall spiral and interior lined rectangular ductwork, and other similar equipment with liners, controls, etc., not recommended to be exposed to wind and water, etc. Such ductwork and equipment found damaged and/or damp shall be immediately replaced and shall not be utilized for this project.

G. This CONTRACTOR shall protect his work at all times from danger by freezing, breakage, dirt, foreign materials, etc., and shall replace all work so damaged. The CONTRACTOR shall use every precaution to protect the work of others, and he will be held responsible for all damage to other work caused by his work or through the neglect of his workmen.

3.3 INSTALLATION COORDINATION

A. The mechanical plans do not give exact elevations or locations of lines, nor do they show all the offsets, control lines, or other installation details. The CONTRACTOR shall carefully lay out his work at the site to conform to the structural conditions, to provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and to thereby provide an integrated, coordinated and satisfactory operating installation. In general ductwork has the right-of-way.

B. If the CONTRACTOR proposes to install equipment, including piping and ductwork requiring space conditions other than those shown, or to rearrange the equipment, he shall assume full responsibility for the rearrangement of the space and shall have the ARCHITECT review the change before proceeding with the work. The request for such changes shall be accomplished by Shop Drawings of the space in question.

C. The CONTRACTOR shall so coordinate the work of the several various trades that it may be installed in the most direct and workmanlike manner without hindering the other trades. Piping interferences shall be handled by giving precedence to pipe lines, which require a stated grade for proper operation. For example, sewer lines and condensate piping shall take precedence over water lines in determination of elevations. Where there is interference between sewer lines and condensate lines, the sewer lines shall have precedence and provisions shall be made in the condensate lines for looping them around the sewer lines. In all cases, lines requiring a stated grade for their proper operation shall have precedence over electrical conduit and ductwork.

D. Piping, equipment, or ductwork shall not be installed in electrical equipment rooms or elevator machine rooms except as serving only those rooms. Outside of electrical equipment rooms, do not run piping or ductwork, or locate equipment, with respect to switchboards, panel boards, power panels, motor control centers or dry type transformers:

1. Within 42” in front (and rear if free standing) of equipment; or
2. Within 36” of sides of equipment.
3. Clearances apply vertically from floor to structure/ceiling.

3.4 INSTALLATION DIRECTIONS

Obtain manufacturer's printed installation directions to aid in properly executing work on equipment requiring such directions. Submit such directions and installation details to PROFESSIONAL for approval prior to time of installation for use in supervising work. If the

manufacturer's installation instructions or details conflict with the Contract Document requirements, CONTRACTOR shall promptly make PROFESSIONAL aware in writing and request clarification.

3.5 MECHANICAL VERIFICATION AND INSPECTIONS

A. The CONTRACTOR shall coordinate, with the A/E with a minimum ten (10) days advance notice, the inspection of mechanical sub-systems for the following:

1. in-wall piping/ductwork
2. above ceiling piping/ductwork

B. These inspections shall be coordinated prior to wall and/or ceiling/attic insulation installation, (concealment) etc., such that these mechanical installations can be easily visually inspected by A/E for general conformance with Contract requirements. These installations shall not be concealed until such time the A/E indicates these mechanical installations are acceptable. If a re-inspection is required, an A/E revisit and a follow-up inspection shall be similarly coordinated with sufficient advance notice as approved by the A/E. Therefore, it is pertinent for the CONTRACTOR to inspect these type installations himself and verify that these installations are complete and in conformance with specified standards to minimize any time delays and/or coordination of construction sequencing, etc.

C. The CONTRACTOR should note the following requirement for administering the punch list(s) and mechanical closeout documents associated with a substantial completion and/or final, etc.

D. In general, the punch list(s) will be furnished with blanks for the CONTRACTOR and/or his Sub-Contractor(s) to initial and date, adjacent to each item, for coordination and verification efforts. The completed punch list shall be transmitted to A/E to allow them to thereafter schedule a follow-up visit for re-inspection and verification. It is, therefore, prudent for the CONTRACTOR, to administer the overall process, and verify that all punch list items are complete and in compliance with Contract requirements, prior to requesting a follow-up A/E inspection effort.

E. The CONTRACTOR shall be liable for inspections and further administrative involvement required of the A/E after 30 days of the original scheduled completion date, and for re-inspections and involvement by the A/E caused by the CONTRACTOR'S negligence and failure to fully complete punch lists and Closeout Documents when required and/or requested.

END OF SECTION

Mechanical Submittals and Shop Drawings

PART 1 – GENERAL

1.1 SUBMITTALS AND SHOP DRAWINGS

A. The submittal data to be furnished for this project shall comply with the Specifications and Contract Documents in their entirety. See *Division 01* for more information.

B. Reproduction of design documents in any portion for use in a submittal is not acceptable.

C. Provide all additional documentation required to obtain permanent permit for this project as may be required by Authorities Having Jurisdiction. All such additional documentation shall be considered a normal part of the shop drawing with the cost of same included.

D. Selection of Materials and Equipment:

1. Where a definite material or brand name is specified, it is not the intent to discriminate against any product of another manufacturer. Reference to a specific manufacturer's product by name, make or catalog number is intended to establish standards of quality, design, dimensions and appearance.

2. Open competition is expected, but in all cases, complete data must be submitted for comparison and test when requested by the PROFESSIONAL. Burden of "proof of equality" lies solely with the CONTRACTOR.

3. The products of various manufacturers have been used as the basis of design in preparation of these documents. It shall be the responsibility of the CONTRACTOR to ensure the submitted materials and equipment will fit into the space allotted. Furthermore, verify and maintain adequate access to equipment, valves, filters, lubrication outlets, etc. Any changes to the building or system design necessary shall be arranged for in writing before the materials and equipment is ordered. All costs involved in making such changes shall be borne by the CONTRACTOR.

4. When submitting materials and equipment other than the basis of design, note the following minimum considerations:

   a. Capacities shown are absolute minimum and must be equaled

   b. Physical size, weight, etc. limitations

   c. Noise and vibration levels

   d. Interchangeability

   e. Accessibility for maintenance and replacement

   f. Compatibility with other materials, assemblies

   g. Similar items shall be furnished by the same manufacturer and style whenever possible.

5. The availability of service is of prime importance to the OWNER and was a major consideration in selecting the materials and equipment that are listed as the basis for design. Competent service must not only be available, but must, in the case of specialty HVAC equipment and control systems, be a

direct arm of the manufacturer. Further, the service agency, as a representative of this manufacturer, must have been in continuous operation in this area sufficient time to indicate a degree of permanence.

1.2 SAMPLES AND MOCK-UPS OF PROPOSED INSTALLATION

A. Samples:

1. Provide samples of equipment, components, control devices, etc. as requested by the PROFESSIONAL.

2. These samples are intended to demonstrate quality of construction of proposed installation materials and/or equipment.

3. In general, each substitution request made by the CONTRACTOR will likely require a sample be furnished for review. However, in some cases, samples will be requested of specified equipment, components, control devices, etc. to demonstrate to the Owner the proposed installations.

B. Mock-ups:

1. Provide mock-ups of the proposed installations as requested by the PROFESSIONAL.

2. These mock-ups shall be either in-place or separately constructed at the direction of the PROFESSIONAL.

3. In general, mock-ups shall be of completed proposed installations as coordinated between CONTRACTOR and PROFESSIONAL. In some cases, this will require different levels of completion or staged mock-up construction (i.e. ductwork with taps installed and sealant applied in one section without insulation and insulation applied in another). Some examples of these mock-ups are as follows:

a. Packaged air conditioning units on concrete pad

b. Concrete pad mounted piping support

c. Ductwork including rectangular interior lined and exterior wrapped with round taps and run-outs

d. Plumbing fixture(s)

e. Trapeze piping installation including valves, fittings, insulation and saddles

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 SUBMITTALS AND SHOP DRAWINGS

A. The following product data submittals for materials and equipment shall be submitted to PROFESSIONAL for approval:

1. SECTION *PIPE AND PIPE FITTINGS*

a. Sanitary Waste and Vent Piping Fittings and Connections

b. Condensate Drain Piping Fittings and Connections

c. Domestic Water Piping Fittings and Connections

d. Natural Gas Piping Fittings and Connections
e. Refrigerant Piping Fittings and Connections
f. Equipment Utility and Relief Drain Piping Fittings and Connections
g. Fire Protection Piping Fittings and Connections

2. SECTION *VALVES*
   a. Ball Valves
   b. Gas Valves
   c. Check Valves
   d. Manual Balancing Valves
3. SECTION *MECHANICAL INSULATION*
   a. Insulation for all piping applications
   b. Insulation for all ductwork applications
4. SECTION *FIRE SPRINKLER SYSTEM*
   a. Sprinkler Hydraulic Calculations
   b. Sprinkler Shop Drawing(s)
   c. Copy of State Rating Board of Certification (Letter)
   d. OS&Y Valves
   e. Fire Department Connection
   f. Electric Alarm Bells
   g. Tamper Switches
   h. Flow Switches
   i. Sprinkler Heads
   j. Spare Sprinkler Head Cabinet
   k. Backflow Preventer
   l. Hangers
   m. Copy of Local Fire Marshall Approval Letter
   n. Installation and Material Certificate. Note: Submittal must be transmitted to the Professional 5 days prior to request for substantial completion inspection.
5. SECTION *PLUMBING SPECIALTIES*
   a. Cleanouts
   b. Floor Drains
6. SECTION *PLUMBING FIXTURES, TRIM & ACCESSORIES*
   a. Plumbing Fixtures and Trim
   b. Carriers

c. Handicapped Drain/Water Supply Insulation Protectors

d. Hose Bibbs

e. Water Hammer Arrestors

7. SECTION *DOMESTIC WATER HEATERS AND ACCESSORIES*

a. Water Heaters and Installation Accessories

b. Potable Water Expansion Tanks

c. Circulating Pump

8. SECTION *PACKAGED AIR CONDITIONERS*

a. Self-contained Packaged Units

b. Thermostats, Humidistats and Protective Covers

c. Ductless Mini-Splits

9. SECTION *FANS*

a. All Fans, Construction, Accessories, and Finishes

10. SECTION *AIR CLEANING/TREATMENT*

a. Air Filters for Construction Period and Spares for Permanent use.

11. SECTION *DUCTWORK*

a. Round to Rectangular Duct Adapters (Bell mouth)

b. Joint Sealant

c. Flexible Duct

12. SECTION *DUCTWORK ACCESSORIES*

a. Volume Dampers

b. Air Distribution Devices

c. Wall louvers

13. SECTION *CONTROLS AND INSTRUMENTATION*

a. Relays

b. Thermostat and Humidistat and Covers

14. SECTION *TESTING, ADJUSTING AND BALANCING*

a. Testing, Adjusting and Balancing Agency, Certification Credentials, Sample Forms, Instrument List with Calibration History.

b. TAB Report – Preliminary with certification of mechanical systems safety and operating controls. Note: Submittal must be transmitted to the Professional 5 days prior to request for substantial completion inspection.

END OF SECTION

Mechanical Systems and Equipment Warranties

PART 1 – GENERAL

1.1 SCOPE

Furnish all labor, materials, services, and equipment warranties as outlined herein for mechanical systems and equipment.

1.2 GUARANTEE AND WARRANTY

A. See Division 01 for warranty start date.

B. INDUSTRY STANDARD GUARANTEE:

See Architectural Specifications.

C. Test Period:

Each piece of equipment shall meet performance specifications after three months' actual operation to OWNER'S satisfaction.

D. CONTRACTOR shall replace, or make good, any defect due to faulty workmanship or material, which shall develop within one year from the beginning of the warranty period. This guaranty shall cover both material and labor. Leaking pipe work is considered faulty workmanship. This warranty shall include repair, removal of defective parts and installation of replacements. The CONTRACTOR shall also be responsible for property damage that results from defects in materials, improper controls or setup, and/or installation during the warranty period.

E. For first year after the warranty begins, CONTRACTOR shall provide, at no cost to the OWNER, any required maintenance and service necessary to assure the proper operation of the installations and systems. Latent defects arising during this period shall, upon notification by the OWNER, be promptly corrected at no additional cost to the OWNER. This shall include:

1. Refrigerant and Oil Replacement in Refrigeration Systems: Leaking refrigerant systems shall be repaired, proved tight, and charged with manufacturer’s recommended refrigerant and lubricant, within any standard warranty period.

2. Any adjustments and service required, excluding filter monitoring and replacement.

3. Any necessary adjustments in system control set points when required, excluding filter monitoring.

F. The CONTRACTOR shall make inspections at end of 6th and 11th months after beginning of warranty related to the HVAC control system. During these inspections, the CONTRACTOR shall verify all control settings and recalibrate controls and sensors to match requirements as can be coordinated with PROFESSIONAL based on historical trend by data and to optimize system performance. Temperature and safety controls shall be adjusted as necessary to insure continuous, trouble free, safe, and automatic operation of systems including gas burner, refrigerating equipment, etc.

G. Extended Equipment Warranties

1. Definitions and General Requirements

a. Extended warranties, defined as a warranty after the standard one

(1) year warranty.

b. "Comprehensive" is defined as a complete warranty except for acts of God and negligent maintenance or operation of the specified equipment as required of the OWNER.

c. All comprehensive equipment warranties shall include all parts, labor, shipping, postage, freight, handling fees, etc., to accomplish any repair and/or replacement at no additional cost to OWNER. These warranty provisions will be binding on any CONTRACTOR and/or supplier/manufacturer unless specifically approved otherwise in writing by OWNER.

d. Lack of specific action on any manufacturer's, supplier, and/or CONTRACTOR submitted alternate warranty shall not be construed as approval of same and shall not void the manufacturer and/or CONTRACTOR'S contractual obligation to provide specified warranty.

e. Third party insurance and/or split CONTRACTOR labor/manufacturer's equipment/material warranties shall not be acceptable. Only manufacturer's comprehensive warranties shall be acceptable.

2. Extended Warranties Required

a. Section *Packaged Air Conditioners* – 4 years compressor parts only non-prorated.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 GUARANTEE AND WARRANTY

All certificates shall first be presented to the ARCHITECT for approval. After approval, copies of the certification(s) shall be forwarded to the OWNER by the CONTRACTOR.

END OF SECTION

Mechanical Close-Out Requirements

PART 1 – GENERAL – NOT APPLICABLE

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 AS BUILT DRAWINGS

Project Record Documents and As Built Drawings:

A. Maintain at job site a set of contract record documents kept current by indicating thereon all changes, substitutions, etc., between work as specified and as installed.

B. Show on record documents actual air quantities, water flow rates, valve or damper positions after balancing, etc.; also show, by actual dimension, location of all new and known existing underground work.

C. At the completion of the project, furnish the OWNER three (3) set(s) of bluelines and three (3) complete, clean sets of specifications showing installed location, size, etc., of all work and material as taken from record documents. All as-built (on record) drawings shall be labeled “As-Built Drawings,” dated and certified accurate by CONTRACTOR with his signature, on front page of all Drawing Blueline sets and Specifications.

3.2 OPERATION AND MAINTENANCE MANUALS

A. Include in these brochures written submittal data, manufacturers operating and maintenance procedures and recommendations, spare parts lists and suppliers and any interlocking control or wiring diagrams for all equipment. The information listed herein is to be bound in the following order:

1. First sheet to list ARCHITECT, ENGINEER, CONTRACTOR and Sub-Contractors with addresses for each.

2. Second sheet to list type of equipment with sequential number, the manufacturer, make, model and serial number of the actual equipment nameplate data rated horsepower, full load rated amps, voltage and phase.

3. Next, actual copy of approved submittal data including all manufacturers published information on capacities, capacity curves or tables, accessory and control item lists, and other pertinent information as requested by ENGINEER. Cross-reference all equipment to Contract Documents.

4. Next, copy of all spare parts list and suppliers’ contact information.

5. Next, include the manufacturer's published operating and maintenance procedures.

a. Include instructions to stop and start each piece of equipment including reference to controls and interlocks and an itemized maintenance schedule detailing procedure and interval of periodic maintenance items. Start this log of the maintenance list(s) by accomplishing the initial required maintenance procedure(s) for each and every maintenance item.

b. Operating instructions shall also include recommended periodic maintenance and seasonal changeover procedures, and suggested procedures in operation of all systems in this particular building to promote energy conservation. These instructions must be written

expressly for this project and shall refer to equipment, valves, etc., by mark number from project schedules. Operating instructions and procedures shall be submitted in draft form, for approval prior to final issue of complete brochures. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions. Bulletins shall be clearly marked for the equipment furnished. Where a bulletin contains more information than that for the installed equipment, such extended information shall be deleted by crossing it out or by stripping it from the bulletin.

6. All system operating instructions that were earlier approved by PROFESSIONAL and utilized for OWNER personnel education shall also be inserted herein.

B. This bound information will require the PROFESSIONAL'S signed approval before this contract is complete. No exceptions will be granted.

C. A copy of HVAC and Plumbing equipment, and sprinkler system operation and maintenance (O & M) Manufacturer's recommended brochures shall be transmitted to the TAB Agent within ninety (90) days after Notice to Proceed such that TAB Agent shall utilize same in preparation of Owner's Personnel Education/Agenda.

D. The manuals shall be previously approved by the PROFESSIONAL and transmitted to the OWNER at least one week prior to the final inspection.

3.3 OWNER EDUCATION

A. OWNER Representative Education and Operating and Maintenance instructions

1. During the last phase of the project, the CONTRACTOR, in conjunction with the applicable SUB-CONTRACTORS shall coordinate and facilitate the start-up, Testing, Adjusting and Balancing, and subsequent OWNER'S representatives' education and instruction.

2. The OWNER education shall be administered by the CONTRACTOR, with special instructions from equipment technical representatives, CONTRACTOR qualified representatives, etc.

a. The instructions for the OWNER will include a complete walk-through of the facility, review of all mechanically related systems, and comprehensive education of the pertinent operating and maintenance requirements.

b. This shall include an overview of system components and descriptions, seasonal provisions/changes required, major valve location/function, safety provisions and concerns, normal operating and energy conservation techniques, actions to be taken with system failure or malfunction, start-up and shut-down instructions, reaction to fire and safety alarm annunciation, normal operating parameters, etc.

c. The education shall include all pertinent data from industry standards, minimal recommendations indicated herein and further as recommended by each manufacturer's O&M manuals.

d. All equipment and material suppliers will also be expected to participate. The CONTRACTOR shall schedule with the A/E and

designated OWNER'S Representative(s).

e. Additional instruction and education sessions shall be provided subsequent to the initial session to provide additional instruction as required to fully educate the OWNER'S operators.

3. The CONTRACTOR shall submit to the PROFESSIONAL in draft form, an outline of the contents of this education, with agenda and list of pertinent personnel, a minimum of thirty (30) days prior to project completion date and scheduling said instruction with the OWNER and PROFESSIONAL.

4. When the seminar and subsequent instruction periods are completed, CONTRACTOR shall furnish ARCHITECT a letter signed by the OWNER certifying that his representative(s) has received adequate instruction in operation of installed equipment and systems. <u>This letter shall be furnished prior to final acceptance of this project.</u>

B. Some suggestions for pertinent subject matter to include in the administration of the education of OWNER'S operation and maintenance personnel, is as follows:

1. Nominal Split and Packaged Direct Expansion Cooling and Heating Systems:

a. Air filter size, monitoring and changeout (note that CONTRACTOR is to provide a schedule to OWNER, indicating all systems, filter grilles, etc., and matched sizes) and number of air filters.

b. Periodic bearing lubrication

c. Periodic belt monitoring and adjustment

d. Periodic evaporator and condenser coil inspection and cleaning

e. Periodic monitoring of refrigerant charge by (1) visual observation of site glass, and (2) discharge air temperature monitoring

f. Normal temperature and fan controls setpoints for occupied and unoccupied periods.

g. Normal indoor humidity setpoints for all periods

h. Condensate drain periodic inspection and maintenance

i. Smoke detection and fire alarm interaction

2. Potable Water Heaters and Accessories:

a. Normal setpoint and adjustment for water temperature from heater

b. Function and periodic maintenance of T&P relief valve.

3. Exhaust Fans:

a. Periodic bearing lubrication

b. Periodic belt monitoring and adjustment

c. Periodic fan blade & grille inspection for excessive dust build-up, etc.

4. Fire Protection Sprinkler:

a. Replacement heads and tools

b. Alarm and annunciation with fire alarm panel

c. Periodic maintenance

d. Go thru procedures for alarm and false alarm, water turn-off in case of problem, etc.

e. Annual certification of system

f. Backflow prevention and annual inspection

5. Controls:

a. Describe setup and operation (including override functions) of programmable thermostats.

b. Calibration of sensors (temperature, humidity, etc.)

c. Describe purpose of duct smoke detection, HVAC unit shut-down, and remote smoke detector alarm panels and reset procedures.

6. General:

a. Warranties: Explain the various warranties. Explain to OWNER his role during the warranty period(s), his limitations who he is to call when a problem tied to a warranty issue occurs, for both the one-ear standard warranty and extended warranties, etc.

b. Special tools and spare parts

c. Air filter spares

d. Purpose of O & M Manuals (spare parts, O & M manufacturer's recommendations, trouble-shooting, etc.)

3.4 CLOSEOUT DOCUMENTATION

A. Seven (7) days prior to requesting a final inspection, the CONTRACTOR shall submit all O&M and closeout documentation to the ARCHITECT, to be turned over to the OWNER at the end of the project.

B. The following checklist shall be utilized for compiling documentation and shall be included behind front cover of O&M manuals.

C. CONTRACTOR shall initial and date each line item once completed and shall fax or email copy of the completed checklist to the PROFESSIONAL prior to final inspection request.

CLOSEOUT DOCUMENTATION CHECKLIST FIRE SPRINKLER		
PROJECT NAME:		
INITIALS OF PERSON COMPLETING TASK	**DATE TASK COMPLETED**	**DESCRIPTION OF CONTRACTOR'S SUBMITTAL**
		Signed Letter Record of Owners Personnel O & M Education
		Valve tag and floor plan location charts. See Section *Mechanical Identification*.
		Provide copy of Installation and Material Certificate per NFPA 13.

CLOSEOUT DOCUMENTATION CHECKLIST PLUMBING		
PROJECT NAME:		
INITIALS OF PERSON COMPLETING TASK	**DATE TASK COMPLETED**	**DESCRIPTION OF CONTRACTOR'S SUBMITTAL**
		Signed Letter Record of Owners Personnel O & M Education
		Plumbing Operation & Maintenance Manuals (3 each)
		As-Built Drawings with Contractor's Stamp (3 each)
		Potable Water Sanitation Report and Certification
		Pipe Test Log - Form in Section *Pipe and Pipe Fittings* to be comprehensively filled out.
		Keys to plumbing stops and hose bibb boxes per Section *Basic Mechanical Materials and Methods* and Section *Plumbing Fixtures, Trim and Accessories* (provide written receipts with Owner's acceptance).

CLOSEOUT DOCUMENTATION CHECKLIST **MECHANICAL**		
PROJECT NAME:		
INITIALS OF PERSON COMPLETING TASK	**DATE TASK COMPLETED**	**DESCRIPTION OF CONTRACTOR'S SUBMITTAL**
		Final TAB Report (3 each required)
		Signed Letter Record of Owners Personnel O & M Education
		Mechanical HVAC Operation & Maintenance Manuals (3 ea)
		As-Built Drawings with Contractor's Stamp (3 each)
		Completed HVAC equipment factory start-up forms for each individual unit.
		Extended Warranties: (See Section *Mechanical Systems and Equipment Warranties*)
		Provide list of all spare air filter sets per Section *Air Cleaning/Treatment*. List number, size, type and location/equipment match-up.
		Pipe Test Log - Form in Section *Pipe and Pipe Fittings* to be comprehensively filled out.
		Duct Test Log - Form in Section *Ductwork* to be comprehensively filled out.
		Keys to control panels and sensor/controller covers per Section *Basic Mechanical Materials and Methods* and Section *Controls and Instrumentation* (provide written receipts with Owner's acceptance).

END OF SECTION

Basic Mechanical Materials and Methods

PART 1 – GENERAL

1.1 SCOPE

A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Contract Drawings.

B. The requirements of this section apply to all sections of Division 20, 21, 22 and 23.

C. Definitions:

1. Exposed: Piping, ductwork, and equipment exposed to view in finished rooms, including mechanical and/or equipment rooms.

2. Option or Optional: CONTRACTOR'S choice of an alternate material or method.

1.2 PRODUCTS CRITERIA

A. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

B. Assembled Units: Manufacturers of equipment assemblies, which use components made by others, assume complete responsibility for the final assembled product.

C. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or otherwise permanently marked on each item of equipment.

1.3 FLAME SPREAD AND SMOKE DEVELOPED PROPERTIES OF MATERIALS

A. Materials and adhesives used throughout the mechanical and electrical systems for insulation, and jackets or coverings of any kind, or for piping or conduit system components, shall have a flame spread rating not over 25 without evidence of continued combustion and with a smoke developed rating not higher than 50. If such materials are to be applied with adhesives, they shall be tested as applied with such adhesives, or the adhesives used shall have a flame spread rating not over 25 and a smoke developed rating not higher than 50. (Note: Materials need not meet these requirements where they are entirely located outside of a building and do not penetrate a wall or roof, and do not create an exposure hazard.)

B. “Flame-Spread Rating” and “Smoke Developed Rating” shall be as determined by the “Method of Test of Surface Burning Characteristics of Building materials,” NFPA No. 255, ASTM E84, Underwriter’s Laboratories, Inc., Standard”. Such materials are listed in the Underwriters’ Laboratories, Inc., “Building Materials List” under the heading “Hazard Classification (Fire)”.

1.4 HAZARDOUS MATERIALS

A. No products shall be used that contain any known hazardous or carcinogenic materials. Products with asbestos or radioactive content shall not be used.

B. Handling of any hazardous material is not covered in this specification Division.

1.5 EQUIPMENT FURNISHED BY OWNER

A. The CONTRACTOR shall unload, uncrate, assemble, and connect any and all equipment shown on the Drawings or called out in the Specifications to be furnished by the OWNER for installation by the CONTRACTOR.

B. The CONTRACTOR shall protect and take full charge of such equipment from the time the items are delivered to the job, set in place, connected, tested, adjusted, and placed into operation.

PART 2 – PRODUCTS

2.1 EQUIPMENT ACCESSORIES

A. Provide removable guards to enclose all rotating or moving elements. Construct of galvanized steel to withstand 250 lbs. static load.

B. Wall/Ceiling Access Doors

1. Panels in non-rated applications shall be galvanized steel, 18-gauge frame, 16-gauge door with mounting accessories, piano hinges, screwdriver operated lock, and prime coat paint.

a. Acudor Model UF-5000 for acoustic tile or exposed masonry

b. Acudor Model PS-5030 for plaster finishes

c. Acudor Model UF-5000 (stainless steel) for ceramic or glazed structural tile.

2. Panels in fire rated applications shall be painted steel type, 1 hour rated, piano hinged, exterior key lock, nominal size 24" x 36" at equipment installations as approved, Air Balance, Inc. - Model "F".

2.2 FIRE, SMOKE AND SOUND STOPPING

A. UL listed penetration sleeve assembly and/or firestop that meets ASTM E-814 E119, and E84, as "3M" systems for the intended applications.

B. All fire, smoke and sound stopping to be done by a separate licensed and certified Subcontractor as approved by Professional.

2.3 PIPE SLEEVES

A. Galvanized sheet metal sleeves shall have lock seam joints and comply with the following minimum thickness:

1. 24 Gauge for 3 inches and smaller.

2. 22 Gauge for 4 inches to 6 inches inclusive.

3. 20 Gauge for sizes over 6 inches.

B. Galvanized steel sleeves shall be constructed from schedule 40 grade A53 pipe.

C. PVC sleeves shall be constructed from solid core Schedule 40 PVC pipe.

D. Water tight sleeves/seals shall be equal to “Link-Seal”.

2.4 WALL, FLOOR, AND CEILING PLATES

A. Chrome plated brass or chrome plated steel, one piece or split type with concealed hinge, with set screw for fastening to pipe, or sleeve.

B. The thickness shall conform to the following requirements:

1. Not less than 3/32 inch for floor plates.

2. For wall and ceiling plates, not less than 0.025” for up to 3 inch pipe and 0.035” for larger pipe.

C. All escutcheons shall be equal to Beacon, Caldwell or approved equal.

2.5 PROTECTIVE DRIP PANS

A. Fabricate pans of 20-gauge galvanized sheet metal, stainless steel (if shown) or PVC, minimum two inches deep with rolled top edges.

B. Solder all seams watertight, and cross brace pans to prevent sagging and warping.

C. Provide dielectric union at copper pipe/galvanized pan connection point. Water heater drain pans shall have minimum one inch (1") drain outlet.

2.6 PAINTING OF MECHANICAL WORK

A. See Division 09 for more information.

B. See Section *Mechanical Identification* for color-coding of piping, etc. All other metal structure and hangers to be color of adjacent finish.

PART 3 – EXECUTION

3.1 EQUIPMENT ACCESSORIES

A. Provide access panels, or doors, at concealed dampers, valves, vents, equipment, inspection points, etc., and where noted. Where ceiling is "lift out" construction, ceiling access panels are not required. Panels shall be 15" square, or larger as approved for service intended.

B. CONTRACTOR shall provide substantial metal angle frame and support at all ceiling access doors.

3.2 ROOF CURBS

A. All roof mounted equipment shall be furnished with a roof curb compatible with both the equipment configuration and roofing system. Curbs shall be installed level by either shimming or sloped curb construction. See detail on Drawings for more information on curb construction requirements.

B. Provide auxiliary support under all roof mounted equipment under curb base and at all penetrations as approved by ARCHITECT.

3.3 FIRE, SMOKE AND SOUND STOPPING

A. Fire and smoke stopping shall be provided and installed at all locations where mechanical Work passes thru rated assemblies. This includes all ductwork, piping and controls related conduit.

B. Penetrations in “sound” walls shall be similarly acoustically sealed, both sides of wall with caulk or other approved material. New and existing walls extending to the roof/floor structure above are considered sound walls.

3.4 PIPE SLEEVES

A. Pipe sleeves shall be constructed of galvanized sheet steel except where noted below or in individual work sections.

B. Pipe sleeves shall be constructed of galvanized steel or schedule 40 PVC pipe when pipes are located within or passing through the following:

1. concrete beams

2. outside walls

3. foundations

4. footings

5. waterproofed floors

6. In locations where sleeve is extended above finished floor

C. Where pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe.

D. Where pipes are insulated, make sleeves of sufficient diameter to pass pipe insulations.

E. Check floor and wall construction and finish to determine proper length of sleeves for various locations, make actual length to suit following:

1. Terminate sleeve flush with walls, partitions, and ceilings.

2. In areas where pipes are concealed as in chases, terminate sleeves flush with floor.

3. In finished areas where pipes are exposed, extend sleeves 1/4" above finished floor except in kitchen, toilets, equipment rooms, and other areas where water may accumulate on floor, extend 1 1/2".

F. Interior openings shall be caulked tight with fire, smoke or sound stopping material and sealant to prevent the spread of fire, smoke, and sound. Contractor shall coordinate specific requirements to ensure fire, smoke or sound ratings are maintained.

G. For drilled penetrations in existing floors provide one-inch angle rings set in silicone sealant and bolted to the floor in lieu of pipe sleeves with one inch extension above floor.

H. Below grade exterior wall penetrations into habitable spaces, including crawlspaces shall include sleeves with water tight seals as “Link-Seal”.

3.5 WALL, FLOOR, AND CEILING PLATES

A. Exposed piping passing through walls, floors and ceilings, shall be fitted with escutcheons.

B. Inside diameter shall fit around insulation or around pipe when not insulated; outside diameter shall cover sleeve.

C. Use plates that fit tight around insulation or pipes when not insulated.

D. Plates shall cover openings around pipes/insulation and cover the entire pipe sleeve projection.

3.6 PROTECTIVE DRIP PANS

A. Provide pitched drip pans where shown under all fluid conducting piping that is over electric switchgear, elevator controllers, busways or electric motor starters or as indicated. Pans shall extend minimum two inches beyond each side of the mechanical equipment, pipe or group of pipes being contained. Pans shall extend six inches beyond electrical equipment below.

B. Pitch pans shall be routed to a drain connection with discharge piped utilizing ¾” or larger of copper tube to the nearest available open drain or outside as directed by

PROFESSIONAL. Open-end slices discharging to intercepting pans are not acceptable.

C. Provide drip/overflow pans under water heaters, air conditioning equipment, pumps, etc., and where shown.

3.7 PAINTING OF MECHANICAL WORK

A. All equipment shall present a clean painted appearance; touch up or repair as required.

B. All surfaces shall be properly prepared prior to painting. CONTRACTOR must contact PROFESSIONAL, such that all tests, installations etc., are approved prior to painting.

C. The CONTRACTOR shall prime (where applicable) and paint the following mechanical related Work:

1. Piping of the following types which are outdoors and indoors when exposed to view, including mechanical rooms:

a. New Natural Gas Piping.

b. Domestic Water Piping.

c. Sanitary and Vent Piping.

d. Fire Sprinkler Piping.

2. All exposed ferrous metal non-galvanized hangers, auxiliary supports, braces, etc., in all locations.

3. All exposed and exterior galvanized ductwork, plenums, access doors, and control conduit, fitting, boxes, etc.

4. All insulated refrigerant piping, pumps, valve bodies, etc., where exposed to view outdoors.

5. All new or modified fire hydrants, metal valve and metal box covers, post indicator valves, gas meter/regulators, and the like. This includes items provided and installed by others, and existing on-site installations.

D. Refer to Section *Mechanical Identification* for color-coding of piping, etc. All other metal structure and hangers to be color of adjacent finish.

3.8 WELDING

Before any welding is performed submit a copy of the Welding Procedure Specification (WPS) together with the Procedure Qualification Record as required by Section IX of the ASME Boiler and Pressure Vessel Code for each and every welder intended for use on this project and with qualifications and certifications suitable for work classification intended.

A. Before any welder performs any welding, submit a copy of the Manufacturer's Record of Welder Operator Qualification Tests as required by Section IX of the ASME Boiler and Pressure Code. The letter or symbol (as shown on the qualification test form) shall be used to identify the work of that welder and shall be affixed, in accordance with appropriate construction code, to each completed weld. Submit certification according to Section *Mechanical Submittals and Shop Drawings* for each and every welder and welding associated with the project.

B. The types and extent of non-destructive examinations required for pipe welds are

shown in Table 146.4 of the Code of Pressure Piping ANSI/ASME B31.1.

3.9 TOOLS AND KEYS

A. Furnish, and turn over to the OWNER, special tools not readily available commercially, that are required for disassembly or adjustment of equipment and machinery furnished.

B. Provide OWNER, at end of project with spare keys to stops, hose bibbs, control cabinets, tamper-proof controls covers, etc. Provide the following spares, and label with function/locations:

1. Plumbing Stops – 8 keys
2. Hose Bibbs – 8 keys
3. Tamper-proof Controls Cover – 2 keys per cover

3.10 LUBRICATION

A. During construction, all bearings and shafts shall be kept thoroughly greased and protected.

B. After equipment has been operated seven days and before final acceptance, all bearings shall be inspected and filled to operating level with lubricant recommended by manufacturer. Tag each piece of equipment with cloth tag showing: proper type of lubricant, and period between lubrications, date of lubrication, and worker's initials. Have space for ten (10) lubrication notations.

3.11 WORK IN AND AT EXISTING BUILDING AND/OR BUILDING SITES

A. Perform as described or shown on Contract Drawings, for relocation of existing equipment, alterations and restoration of existing building(s).

B. As specified on Contract Drawings, make alterations to existing service piping at times that will least interfere with normal operation of the facility.

C. It is important that CONTRACTOR thoroughly investigate existing conditions, utilities, services, finishes, sized, connections, etc., prior to bidding this project. The Designer’s responsibility included only a cursory review of existing conditions and/or installations. It is the CONTRACTOR’S responsibility to coordinate a more thorough investigation and ascertain and confirm pertinent installation connections, etc., prior to his bid. This investigation shall be coordinated in a minimum seven (7) days advance of any published bid date such that the CONTRACTOR immediately thereafter can advise Designer in writing of any design discrepancies and/or changes required; otherwise, the CONTRACTOR shall be required to remedy any such peculiarities at his own expense and at no additional cost to the OWNER. It is the CONTRACTOR’S responsibility to verify existing size and/or location, etc., any time replacement and/or modifications to existing are included as a part of this project.

D. Prior to excavation, investigation shall be made to the extent necessary to determine the location of existing underground services, structures and conflicts. Care should be exercised by the CONTRACTOR during excavation to avoid damage to existing structures.

E. The CONTRACTOR shall be responsible for obtaining the services of an “Independent Locator” whose function shall include location and identification of all underground service wiring, piping, coax, fiber optics, etc. The CONTRACTOR shall

make every effort to protect and avoid conflicts with existing installations. Damage caused to existing installation by CONTRACTOR, or his Sub-contractor, etc., shall be promptly remedied and put back into service, per serving utility requirements.

F. When obstructions that are not shown on the Contract Drawings are encountered during the progress of work and interfere so that an alteration of the Drawings is required, the ENGINEER will alter the Drawings or order a deviation in line and grade or arrange for removal, relocation, or reconstruction of the obstructions.

G. When crossing existing pipelines or other structures, alignment and grade shall be adjusted as necessary, with the approval of the PROFESSIONAL, to provide clearance as required by federal, state or local regulations or as deemed necessary by the ENGINEER to prevent future damage or contamination of either structure.

3.12 PROTECTION AND CLEANING

A. Equipment and materials shall be carefully handled, properly stored, and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the PROFESSIONAL. Damaged or defective items, in the opinion of the PROFESSIONAL, shall be replaced.

B. Protect all finished parts of equipment, such as shafts and bearings where accessible, from rust prior to operation by means of protective grease coating and wrapping. Close pipe openings with caps or plugs during installation. Tightly cover and protect fixtures and equipment against dirt, water chemical, or mechanical injury. At completion of all work thoroughly clean fixtures, exposed materials and equipment.

C. Do not store insulation materials in building until it is enclosed and dry. Wet insulation shall not be installed.

D. Fixtures, piping, ducts, equipment, etc., shall be cleaned per manufacturer's printed instructions and PROFESSIONAL'S instructions.

E. Piping shall be: (1) flushed with clean water, (2) "blown out" with steam or compressed air, or (3) "swabbed out" as required, except where specified otherwise. All temporary connections required for flushing shall be provided and subsequently removed by the CONTRACTOR. See Section *Pipe and Pipe Fittings* for further instructions.

F. Before final building interior finish is applied:

1. Interior of air handling equipment shall be thoroughly cleaned.

2. Drain pans shall be cleaned and then flushed with water after which all fans will run with air filters in place, etc., for 24 hours.

3.13 CUTTING AND PATCHING

A. Do not cut into any major structural element without written approval of the ARCHITECT.

B. Cut required openings through existing masonry or reinforced concrete with diamond core drills. Use of pneumatic hammer type drills, impact type electric drills, and hand or manual hammer type drills, will be permitted only with approval of the ARCHITECT. Locate openings that will least affect structural slabs, columns, ribs or beams. Refer to the ARCHITECT for determination of proper design for openings

through structural sections and opening layouts for approval prior to cutting or drilling into structure. After ARCHITECT'S approval, carefully cut openings through construction no larger than absolutely necessary for the required installation.

C. Patching shall be (1) of quality equal to, and of appearance matching existing construction, and (2) shall restore all services and construction that remains in use, to its condition prior to this contract, unless otherwise noted.

3.14 FLASHING

A. Where pipes, ducts, etc., pass through roof or walls, flash and caulk.

B. Provide flashing or caulking as required at each opening through outside walls or roof. Flashing through roof of same materials and methods as under Moisture Protection Division; through walls shall be aluminum unless noted otherwise.

END OF SECTION

Pipes and Pipe Fittings

PART 1 – GENERAL

1.1 SCOPE

A. Provide all material, equipment and labor, etc., required to complete installation specified and/or shown or scheduled on Contract Drawings.

B. Work included: Pipes, fittings, unions, couplings, flanges, gaskets, and other materials and instructions.

1.2 PIPING SCHEDULE

Piping systems for this project shall include the following:

A. Sanitary Waste and Vent Piping.

B. Condensate Drain Piping.

C. Domestic Water Piping.

D. Natural Gas Piping.

E. Refrigerant Piping.

F. Equipment Utility and Relief Drain Piping.

G. Fire Sprinkler Piping

1.3 MANUFACTURER'S ASSISTANCE

Manufacturer shall provide, if required, to the CONTRACTOR a factory trained service man to properly train CONTRACTOR'S personnel in all phases of installation.

PART 2 – PRODUCTS

2.1 PIPING MATERIALS

All piping installed on this project shall be new and of full weight and size indicated and of proper specification for service intended. Only domestic pipe may be used. Pipe and pipe fittings for the various systems shall be as follows:

A. Sanitary Waste and Vent Piping.

1. Piping above and below slab on grade extending to five (5) feet outside building perimeter, shall be solid core Schedule 40 PVC with solvent weld joints and DWV fittings.

2. Sanitary waste piping below grade outside building shall be as specified in *Civil Division*.

B. Condensate Drain Piping.

1. Condensate drain piping routed indoors shall be solid core Schedule 40 PVC with solvent weld joints and DWV fittings.

2. Piping exposed outside of building shall be Schedule 40 galvanized steel with threaded joints and fittings, or Schedule 40 PVC with solvent weld joints and fittings, paying close attention to spacing of piping supports in Section *Supports and Anchors*.

C. Domestic Water Piping.

1. Piping above slab on grade inside building shall be Type "L" copper with

95/5 soldered joints or specialty piping systems such as “ProPress” by Viega. “T-drill” or “pulled” taps/outlets shall NOT be utilized; only full body fittings will be allowed.

2. Underground service entrance at building shall be single extended 90 degree fitting of fabricated 304 stainless steel, maximum working pressure of 200psi.

   a. Sizes 2”-3” equal to Watts Series TR2. Provide with grooved or MNPT connections on inside of building. Provide with grooved, MNPT or flanged connections outside of building.

   b. Sizes 4”-10” equal to Ames Series IBR. The assembly shall be UL/FM approved and meet AWWA C900 Inlet/DIP coupler fitting on outside end and a grooved end connection on the indoor end and shall include tie-rod restraining brackets.

3. Piping routed outside building below grade, shall be as specified in Section *Civil Division*.

D. Natural Gas Piping

1. Piping above slab on grade and extending from meter or regulator shall be Schedule 40 black steel pipe complying with ANSI B36.10, ASTM A53 or ASTM A106 with class 150# Malleable iron or steel fittings. Joints in piping sizes 2" and smaller shall be screwed type. Joints in piping sizes 2 ½" and larger shall be welded with flanges at valves.

2. Connections to gas-fired equipment, such as furnaces, shall include gas cock, drip leg and union and be rigid as detailed above. Other gas fired equipment may be connected similarly with flexible stainless-steel connections where allowed by governing code and authority.

3. Flexible connections to equipment with input less than 75 MBH may be corrugates stainless steel tested, listed and installed in accordance with ANSI/AGA LL-1. Flexible connections shall not extend through unit cabinet. Flexible connectors in Kitchen and food prep/serving area applications shall be additionally PVC coated and NSF approved.

E. Refrigerant Piping

1. Piping shall be Type "L" ACR copper with brazed joints. All joints, fittings and piping shall be brazed connection type. No flared or compression piping accessories allowed except at equipment connections.

F. Equipment Utility and Relief Drain Piping

1. Indoor water heater T & P, backflow preventer and miscellaneous equipment relief and drain piping shall be full size connection Type 'L' copper with solder joints.

2. Piping exposed outside of building shall be Schedule 40 galvanized steel with threaded joints and fittings.

G. Fire Sprinkler Piping

1. Wet Pipe: Piping from fire protection riser to new wet pipe sprinkler distribution system shall be black steel, with joints and connections either welded, screwed, or by mechanical gasketed grooved couplings, as per

NFPA 13.

Sprinkler piping shall have antibacterial coating on inside of piping to resist microbial colonization of pipe/fitting wall(s) preventing the onset of microbiological influenced corrosion (MIC), as “Dynathread” by Allied Tube and Conduit.

2. All screwed piping shall be minimum schedule 40 and all rolled groove piping shall be a minimum of schedule 10 piping. No piping less than schedule 10 shall be allowed anywhere in the project.

3. Underground service entrance at building shall be single extended 90 degree fitting of fabricated 304 stainless steel, maximum working pressure of 200psi.Sizes The assembly shall be UL/FM approved and meet AWWA C900 Inlet/DIP coupler fitting on outside end and a grooved end connection on the indoor end and shall include tie-rod restraining brackets. Assembly equal to Ames Series IBR.

2.2 PIPE FITTINGS, UNIONS, FLANGES, AND GASKETS

A. All fittings shall conform to pipe as to black steel, galvanized steel, copper, PVC or cast iron, etc. or as indicated. Fittings and accessories shall have equal or greater pressure rating than piping specified for particular application.

B. Malleable steel fittings shall be minimum 150 psi class.

C. Steel pipe unions shall be malleable iron having bronze to iron ground joints.

D. Steel nipples shall be extra heavy type. All thread nipples prohibited. Provide a minimum of 1” of bare pipe between threaded ends of nipples.

E. Flange bolts: Galvanized Alloy steel, ASTM #A 196, Galvanized GR. B 7; nuts' ASTM #S 194, GR. 2 H; both hex head style.

F. Flange gaskets serving piping below 250 degrees F shall be synthetic composition type; serving above 250 degrees F gaskets shall be corrugated metallic type. Utilize gasket suitable for service intended.

G. Couplings, steel pipe malleable iron, Grade II.

H. Provide factory made reducers and increasers, and nipples of comparable materials as the piping. The use of bushings is not acceptable to obtain reduction or increase in sizes.

I. Galvanized steel pipe shall be assembled with galvanized screw fittings unless specifically indicated otherwise.

2.3 DIELECTRIC FITTINGS

Provide where copper and ferrous metal are joined.

A. 2-inch and less: Threaded dielectric union.

B. 2 ½-inch and larger: Flange union with dielectric gasket and bolt sleeves.

C. Temperature Rating, degree F: 210 for water systems.

2.4 BEDDING AND BACKFILL MATERIALS

A. Type S1 – Select Fill

1. Material shall consist of select, non-organic, debris-free silty clays or sandy

clays with no more than 55 percent fines passing a No. 200 sieve.

2. The plasticity index shall be within the range of 8 to 20.

3. The liquid limit shall be less than 40.

B. Type S2 – Course Aggregate

1. Material shall consist of washed stone free of shale, clay, friable material, sand and debris.

2. The aggregate shall be graded in accordance with ANSI/ASTM C33, size number 467.

C. Type S3 – Pea Gravel

1. Material shall consist of natural stone free of shale, clay, friable material, sand and debris.

2. The material shall be graded to be between a minimum of 1/4” and a maximum of 5/8” in size.

D. Type S4 – Sand

1. Material shall consist of natural river or bank sand, washed free of silt, clay, or organic matter, loam friable or soluble materials.

2. The material shall be graded in accordance with ANSI/ASTM C33.

E. Type S5 – Crushed Stone

1. Crushed limestone, No. 610 gradation.

2.5 BEDDING AND BACKFILLING MATERIAL QUALITY CONTROL

A. Tests and analysis of soil material shall be performed in accordance with ASTM D4318 or ASTM C136.

B. Materials tested which do not meet the specified requirements shall be removed and replaced with acceptable material at no cost to Owner.

C. Maximum dry density of the soil materials shall be determined by ASTM D698 and field density of in-place materials by ASTM D2922.

PART 3 – EXECUTION

3.1 PIPING INSTALLATION

A. General

1. Arrange and install piping approximately as indicated, straight, plumb and as direct as possible; form right angles or parallel lines with building walls. Keep pipes close to walls, partitions, ceilings, offset only where necessary to follow walls as directed. Locate groups of pipes parallel to each other; space them at distance to permit applying full insulation and to permit access for servicing valves. The PROFESSIONAL reserves the right to require this CONTRACTOR to make minor changes in pipe locations where conflicts occur with other trades or equipment. Such changes shall be made without extra cost to OWNER.

2. Install horizontal piping as high as possible without sags or humps. Grade drainage piping at uniform slope of 1/8” per foot minimum and maximum 1/4”

per foot, or as noted. Where this is impossible, maintain slope as directed, but in no case less than 1/16" per foot. Pitch piping in direction of flow.

3. When piping is cut, it shall be reamed with pipe reamer and all burrs, scale, trash and foreign matter removed. If any piping is found installed without being reamed, cleaned, deburred, etc., or in any way contrary to above, it shall be sufficient reason for related erected piping to be removed, inspected by the PROFESSIONAL, corrected and reinstalled, all at CONTRACTOR'S expense.

4. Where size changes on horizontal lines, use reducing fittings; bushings are prohibited. On liquid lines have eccentricity down, hold the top level. On gas or vapor lines have eccentricity up, hold the bottom level.

5. Sufficient space shall be allowed in erecting piping for proper application of thermal installations including fittings. In no case shall any insulation be cut or reduced thickness because of inadequate space.

6. Offset equipment connections to allow valving off for maintenance and repair with minimal removal of piping.

7. Locate valves for easy access and operation. Concealed valves shall be provided access doors. Do not locate any valves with stems below horizontal.

8. Install gauges, thermometers, valves and other devices with due regard for ease in reading or operating and maintaining said devices. Locate and position thermometers and gauges to be easily read by operator or staff standing on floor or walkway provided. Servicing shall not require dismantling adjacent equipment or pipe work.

9. Furnish and install unions or mating flanges at all connections to each piece of equipment conveniently located to facilitate quick and easy disconnecting of equipment. Flanges or union connections shall be used on both sides of traps, control valves, pressure reducing valves and meters and the like.

B. Steel Piping

1. Where piping is threaded, dies shall be clean and sharp. Threads shall conform to ANSIU B2.1; joint compound shall be applied to male threads only and joints made up so no more than three threads show. Coat exposed threads or steel pipe with joint compound and red lead paint for corrosion protection. The caulking of these joints will not be tolerated. Pipe joint compound must be approved by the PROFESSIONAL.

2. Where welding is specified or done, it shall be by electric arc by mechanics skilled in operation and holding a test certificate acceptable to the ENGINEER. All scale and flux shall be removed from piping after welding. Welding, beveling, spacing and other details shall conform to ANSI B31.1.

C. Plastic Piping

1. Install all fittings and joints as per manufacturer's recommendation.

2. Utilize purple pipe cleaning compound on all solvent weld joints.

3. Utilize manufacturer's recommended colored (non-purple) solvent glue on all solvent weld joints, unless manufacturer's installation instructions do not

allow or if solvent glue is not rated for specific application.

4. Install all underground plastic and fiberglass glass piping outside building perimeter with tracer identification tape (per Section Mechanical Identification) and minimum 12-gauge bare copper wire for future location reference.

D. Copper Piping

1. Copper tubing shall be thoroughly reamed, cleaned with steel wool or emery cloth and a non-corrosive flux used before soldering or bracing.

2. Copper tubing shall be thoroughly reamed and de-burred before joining with specialty piping systems such as Viega “Pro-Press”.

3. Where solder joints are specified, use solder having 95% tin and 5% antimony. Each roll of solder shall be clearly stamped as to grade and content.

4. Where brazing joints are specified, use a brazing filler metals having a melting point above 1100 degrees F and containing at least 5% silver.

5. Where copper tubing extends through concrete slab on grade, tubing shall have an "Armaflex" or "Rubatex" type.

6. Provide PVC isolation wrap where copper pipe extends through masonry walls to connect plumbing fixtures or valves, etc.

E. Refrigerant Piping

1. Braze joints in the presence of an inert gas.

2. Verify pipe size and configuration and provide same based on HVAC equipment manufacturer’s recommendation to provide scheduled capacity, performance and maximize equipment life.

3. Refrigerant piping systems shall be installed in accordance with applicable chapters of the ASHRAE “Applications" handbook. Particular attention shall be given to suction gas, velocities and requirements for liquid sub cooling.

3.2 PIPE EXPANSION

A. In the installation of all pipe runs where shown or where necessary, install swing joints, flexible couplings, turns, expansion loop or long offsets to allow for expansion. Broken pipe or fittings due to rigid connections must be removed and replaced at no additional cost to the OWNER.

B. All lines shall be securely anchored where required. Where such anchors occur, they shall be securely fastened to the steel or concrete structure of the building in a manner approved by the PROFESSIONAL. Drawings shall be submitted before installation.

3.3 ANCHORS

Plastic pipe shall be jointed to steel systems with flanges. Steel system shall be anchored within five (5') feet of connection point to eliminate any thrust, stress, or torque from steel system to fiberglass and/or plastic system.

3.4 THRUST BLOCKS

All changes in direction of fiberglass or plastic pressure systems for 2" and larger systems

shall be encased in concrete (3000 psi) thrust blocks to provide anchor points for direct expansion and contraction.

3.5 TESTS

A. Cooperation/Scheduling:

The ARCHITECT shall be notified no less than ninety-six (96) hours prior to any pipe test. The ARCHITECT shall also be notified in adequate time for an inspection of the test before the test is completed. The PRIME CONTRACTOR'S Superintendent shall be responsible for administering and witnessing all tests, log it for permanent record and transmit to ARCHITECT at completion of project. CONTRACTOR shall refer to and make additional copies of the “Pipe Test Log Form” at the end of this section to use as standard test log forms. The PRIME CONTRACTOR’S Superintendent shall keep this on-going log on jobsite and shall include the following:

1. Date of Test
2. Duct/Piping Description (EX: “Sanitary Sewer”)
3. Location (EX: “Northwest Quadrant First Level”)
4. Results (EX: “Held 10 ft. of head for eight hours without leakage”, etc.)

B. Tests shall be as follows: (New and Existing Modified Piping shall be tested and all leaks repaired)

1. Gravity Flow Sanitary, Waste and Vent piping above and below slab: Minimum 10 feet static head and as required by ASA A40.8 or local code, for a minimum period of four (4) hours, without discernable loss. All below grade piping and joints shall be clearly visible during test.
2. Gravity Flow Condensate Drain piping above and below slab: Minimum 10 feet static head and as required by ASA A40.8 or local code, for a minimum period of four (4) hours, without discernable loss. All below grade piping and joints shall be clearly visible during test.
3. Water Piping: (Domestic and circulating systems) 125 psi hydrostatic or 100 psi air, in conjunction with manufacturer’s recommendations, with no discernable pressure loss for a period of eight (8) hours. Potable water piping shall be pressurized with water or air during all phases of construction such that leaks can be promptly identified and remedied.
4. Natural Gas Piping: All gas piping shall be tested at twice the operating pressure, but not less than 30 psig, with compressed air or nitrogen, with no discernable pressure loss, for a period of not less than eight (8) hours. Oxygen shall not be used. All factory coated and wrapped piping below grade to be tested and proven tight with Holiday Leak Detector. All new and/or modified piping shall be tested to a minimum of 1.5 times the operating pressure or a minimum of 3 psig, whichever is greater.
5. Refrigerant piping: 450 psig nitrogen for 8-hour period unless more stringent requirements are recommended by the equipment manufacturer. Test piping with all piping accessories such as charging valves and filter/driers in place, unless not recommended by equipment manufacturer’s installation instructions. Refrigerant piping shall be left with minimum 60 psi pressure during all phases of construction such that leaks can be promptly identified

and remedied.

6. Backflow Preventers: Per local and state governing authority requirements.

7. Fire Sprinkler System: Test fire lines hydrostatically for two (2) hours at 200 psi for steel piping system. Obtain certificate of approval from local Fire Marshal. In addition, dry pipe systems shall also be pressure tested with air at 40 psi for a minimum of 24 hours without loss of more than 1.5 psi. Provide additional acceptance testing per NFPA 13.

3.6 SYSTEM CLEANING, TREATMENT AND PROTECTION

A. Potable Water System: All new and modified existing potable water lines shall be thoroughly flushed and sterilized with a solution containing not less than 50 ppm available chlorine for eight (8) hours. During sterilization, operate all valves, faucets, etc., so that all portions of the system are reached. Flush system with clear water until concentration drops to 0.5 ppm. CONTRACTOR shall furnish sample to State Health Department attesting to satisfactory condition of water. Submit copy of test reports to ARCHITECT near end of project and prior to OWNER'S use of potable water distribution system.

3.7 BELOW GRADE PIPING INSTALLATION

A. Preparation

1. Prior to excavation, investigation shall be made to the extent necessary to determine the location of existing underground structures and conflicts. This CONTRACTOR shall coordinate and utilize the services of public and private "locators" to ascertain the whereabouts of all underground utilities in the area where work is to be performed.

2. When obstructions that are not shown on the Contract Drawings are encountered during the progress of work and interfere so that an alteration of the Drawings is required, the PROFESSIONAL will alter the Drawings or order a deviation in line and grade or arrange for removal, relocation, or reconstruction of the obstructions.

3. Appropriate traffic control devices shall be provided in accordance with federal, state, or local regulations to regulate, warn, and guide traffic at the work site.

4. Trees, shrubs, fences, and all other property and surface structures shall be protected during construction unless their removal is shown on the Contract Drawings and Specifications or approved by the OWNER.

B. Excavation

1. During excavation, material meeting the Type S1 requirements shall be stock piled in an orderly manner and at a sufficient distance from the banks of the trench to avoid over-loading and to prevent slides or cave-ins. Submit test reports to verify soil properties.

2. All excavated materials not required or suitable for backfill shall be removed and disposed of off-site at CONTRACTOR's expense.

3. Excavation and trenching shall be performed to allow utilities to be installed to lines and grades established by the Contract Drawings and Specifications with fittings and valves at the required locations unless otherwise approved

by the PROFESSIONAL.

4. All excavation of every description and of whatever substances encountered shall be performed to the depths indicated or as otherwise specified.

5. Excavated material shall be placed in a manner that will not obstruct sidewalks, driveways, or other structures.

6. Care should be exercised by the CONTRACTOR during excavation to avoid damage to existing structures and utilities.

7. When excavation of rock is encountered, all rock shall be removed to provide a clearance of at least 9 inches below and on each side of all pipe, valves, and fittings. The same shall also be performed when pieces of concrete or masonry and other debris or subterranean structures, such as masonry walls, piers, or foundations are encountered during excavation.

8. When crossing existing pipelines or other structures, alignment and grade shall be adjusted as necessary, with the approval of the PROFESSIONAL, to provide clearance as required by federal, state or local regulations or as deemed necessary by the PROFESSIONAL to prevent future damage or contamination of either structure.

9. Removal of pavement and road surfaces shall be a part of the trench excavation and the amount removed shall depend upon the width of trench required for the installation of structures. The dimensions of pavement removed shall not exceed the dimensions of the opening required for installation of pipe and other structures by more than 6 inches in any direction unless required or approved by the OWNER.

10. Should the trench pass over a sewer or other excavation, the trench bottom shall be sufficiently compacted to provide support equal to that of the native soil or conform to other regulatory requirements in a manner that will prevent damage to the existing installation.

11. Temporary support, adequate protection, and maintenance of all underground and surface structures, drains, sewers, and other obstructions encountered in the progress of the work shall be furnished by the CONTRACTOR. All properties that have been disturbed shall be restored as nearly as practical to their original condition.

12. When the sub grade is found to be unstable or to include ashes, cinders, refuse, organic material, or other unsuitable material, such material shall be removed, to a minimum of at least 12 inches below the pipe level and backfilled up to original trench depth with Type S1 material.

13. Ditches shall be kept free of water during piping installation. Grading shall be done as necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved methods. Discharge from any trench dewatering pumps shall be conducted to natural drainage channels, storm sewers, or an approved reservoir.

C. Bedding and Backfilling

1. General Requirements:

a. The trenches shall not be backfilled until the installation conforms to

the requirements specified.

b. Do not install backfill over porous, wet, frozen or spongy sub-grade surfaces.

c. In areas where less than 16" of ground cover exists, the piping shall be encased in concrete. Concrete shall be minimum 3000 PSI with reinforcing as indicated or required. Backfill shall be provided above concrete to original grade or sub-grade.

d. Pavement, base course, and compacted sub grade disturbed by trenching operations shall be replaced in an acceptable manner with materials equal to the adjacent compacted sub grade, base course, and pavement for a minimum distance of 12 inches on each side of the trench.

e. If compaction tests indicate Work does not meet specified requirements, CONTRACTOR shall remove Work, replace and retest until specified requirements are met.

2. Bedding and Backfilling Requirements:

a. Bedding shall be provided for all piping, valves, etc.

b. Bedding material shall be either Type S3 or S4.

c. Bedding shall extend from 4” below bottom of pipe to 12” above top of pipe.

d. Backfill shall extend from 12” above top of pipe up to top of trench or original grade/sub-grade.

3. Placement and compaction of bedding and backfilling materials under roads, parking areas, etc. shall be performed as follows:

a. Place materials in continuous 6” thick horizontally placed loose layers and compact to 98% ASTM D698 maximum density with stability (stability shall be the absence of significant pumping or yielding of the soils while compaction is being performed).

b. Adjust moisture content of materials utilized for bedding and backfilling with lime or other Professional approved method of restoring stability as required to obtain specified compaction requirements.

c. Compaction tests shall be performed for each lift of bedding and/or backfilling per 200 linear foot of piping length.

4. Placement and compaction of bedding and backfilling materials under grassy areas, sidewalks, etc. shall be performed as follows:

a. Place materials in continuous 9” thick horizontally placed loose layers and compact to 95% ASTM D698 maximum density with stability (stability shall be the absence of significant pumping or yielding of the soils while compaction is being performed).

b. Adjust moisture content of materials utilized for bedding and backfilling with lime or other Professional approved method of restoring stability as required to obtain specified compaction

requirements.

c. Compaction tests shall be performed for each lift of bedding and/or backfilling per 200 linear foot of piping length.

PIPE TEST LOG

DATE	SYSTEM	LOCATION OF TEST	TEST PRESSURE	LENGTH OF TEST	RESULTS	CONTRACTOR' S SUPERINTENDENT WITNESS INITIALS	
						PRIME	MECHANICAL

Note: Turn in all forms filled out with project closeout documentation. Copy this form if more sheets are needed. These forms and/or log shall be kept at jobsite and upon request made available to ARCHITECT and/or PROFESSIONAL.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE

Provide all material, equipment and labor, etc., required to complete installation as specified herein and/or shown or scheduled on Contract Drawings.

1.2 APPLICABLE STANDARDS

Insofar as possible, all valves of the same type shall be of the same manufacturer.

1.3 VALVE DESCRIPTION AND IDENTIFICATION

A. Valves shall have name or trademark of manufacturer and working pressure cast or stamped on valve body.

B. Valve hand wheels shall be oriented when installed to provide maximum accessibility for operation.

C. Valve discs shall be the manufacturer's standard material for the service in which the valve is used unless otherwise indicated under the individual type valve specification.

PART 2 PRODUCTS (**OTHER VALVES FROM THOSE LISTED MAY BE SUBMITTED FOR APPROVAL**)

2.1 VALVES FOR DOMESTIC WATER APPLICATIONS

A. All valves shall be NSF 61 compliant and contain less than 0.25% lead (Pb) by weight.

B. Ball Valves:

1. Valves 2" and smaller shall be two-piece brass or stainless-steel construction, 1-1/4" extended neck, chrome plated ball with full port, P.T.F.E. seals and seats. Heavy duty steel handle with vinyl grip, quarter turn operation. Valves shall be suitable for working pressure of 200 psig and maximum 250deg F.

2. Valves 2-1/2” and larger shall be same as above except that two or three-piece brass or stainless-steel construction may be utilized.

C. Silent Check Valves:

1. Silent check valves 2" and smaller shall be horizontal or vertical silent spring check type. Valves shall be rated for 200# WOG.

D. Balancing Valves:

1. Manual Type:

a. Combination balancing and positive shut-off valves shall incorporate a position indicator and memory stop or locking device so the valve can be closed without disturbing the setting, and be returned to the balanced position without further adjustment.

b. Balancing valves for sizes 3" and smaller shall be calibrated bronze balancing valves with provisions for connecting a portable differential pressure meter. Meter connections shall have built-in check valves and knurled caps. Valves shall have integral pointers to indicate the degree of valve opening.

2.2 VALVES FOR NATURAL GAS SYSTEM

A. Plug Valves (for sizes 1¼" and larger, and at main service valves):

1. Valves shall be iron body (semi steel) lubricated, bolted glad type with Teflon coated plug. Flange unit for installation between 150# ASA steel flat-faced slip on weld flanges. All valves shall be wrench operated and wrench shall be furnished with each size valve. Each plug valve shall be serviced with the silicone sealant/lubricant recommended by the valve manufacturer. Valves 2" and smaller shall be short pattern type with threaded end connections. Valves shall be rated at 175# WOG.

2. Valves shall be equal to:

a. Nordstrom Fig. 142

b. Walworth No. 655

c. Powell No. 2200

B. Ball Valves (for sizes 1" and smaller)

C. Valves shall be one quarter turn shut-off, listed for gas service, bronze construction, CSA B16.44 5 psig rated, UL 842 5 psig rated and ANSI Z21.15 ½ psig rated.

D. Provide lever handle for equipment connections equal to McDonald Model 10710.

2.3 CHROME PLATED VALVES

Valves in exposed domestic plumbing connections to equipment shall have chrome plated finish.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installation shall be such that the valve can be fully opened and have at least 6" clearance beyond valve stem handle and sufficient clearance to remove stem for repair.

B. Locate and orient valves to permit proper operation and access for maintenance of packing, seat and disc. Generally, locate valve stems in overhead piping in horizontal position. Provide a union adjacent to one end of all threaded end valves. Control valves usually require reducers to connect to pipe sizes shown on the drawings. Install butterfly valves with the valve open as recommended by the manufacturer to prevent binding of the disc in the seat.

3.2 DISCHARGE FROM SAFETY AND/OR RELIEF VALVES

Relief valves relieving steam, gas of any type, including compressed air, or liquid above 120 degrees F., shall be piped full size to outside building or as indicated so that discharge cannot hit any person or structure.

3.3 RELIEF VALVE CAPACITY

Valve relieving capacity shall meet all code requirements and also be equal to at least 1.25 of possible heat input to be relieved.

END OF SECTION

Piping Specialties

PART 1 – GENERAL

1.1 SCOPE

A. Provide all labor, equipment, materials, etc., required to complete installation as specified herein and/or shown or scheduled on Contract Drawings.

B. Work Included: Piping specialties to connect fire protection and plumbing equipment.

PART 2 – PRODUCTS

2.1 BACKFLOW PREVENTERS

A. Install a backflow prevention device at main service entrance for potable water and at any point in the domestic water system where the potable water supply comes in contact with a potential source of contamination. Devices shall be certified by a recognized testing laboratory and be AWWA C-511-89 FCCCHR of USC, UPC, and IPC compliant. Listed below is a partial list of connections to the water system which shall be protected against backflow or back siphonage.

1. Double Check Backflow Preventer:

a. Fire Protection water service/riser to building

2. Atmospheric Vacuum Breaker:

a. Hose bibbs and sink faucets w/threaded outlets.

B. Fire sprinkler water backflow preventers shall be provided with the following:

1. UL/FM OS&Y shut-off valves on both sides of assembly with tamper switches

2. Provide pressure gauges both sides of backflow device.

3. Flanged connections on both ends.

4. Valves 2-1/2” and larger shall be equal to Watts Series 709-OSY.

2.2 GAUGES, PRESSURE

A. Type 1, (pressure for water), initial mid-scale accuracy one-percent of scale (Qualify grade), metal or phenolic case, 4-1/2 inches in diameter, 1/4-inch NPT bottom connection, white dial with black graduations and pointer, clear glass or acrylic plastic window, suitable for board mounting. Provide red “set hand” to indicate normal working pressure.

B. Provide brass, lever handle union cock. Provide brass/bronze pressure snubber for gauges in water service. Gauge cocks shall be Weksler Type A, Trecise No. 880 or Weiss Type LC.

C. Range of Gauges: For services not listed provide range equal to at least 130 percent of normal operating range:

Domestic Water.....0 to 100 psig

2.3 THERMOMETERS

A. Light powered, liquid crystal display, °F or °C selector switch and 6” brass stem with adjustable angle as required to read display from eyelevel.

B. Separable Socket (Well): Brass, extension neck type to clear pipe insulation.

C. Scale range may be slightly greater than shown to meet manufacturers' standard. Required ranges in degrees F:

Domestic Water.....30 to 180

D. Equal to Weiss Instruments, Inc “Digital Vari-angle” or Weksler “AAD” series.

PART 3 – EXECUTION

3.1 INSTALLATION

All equipment shall be installed as per manufacturer's recommendation and applicable codes and standards. Provide appurtenances as required for a complete system. Provide all appurtenances as indicated on Contract Drawings, where specified or not.

END OF SECTION

Supports and Anchors

PART 1 – GENERAL

1.1 SCOPE

Provide all labor, equipment, material, etc., required to complete installation as specified herein and/or shown or scheduled on Contract Drawings.

1.2 SUPPORT

Supports shall be installed in one of the following methods: (1) from wood using coach screw on open construction and hanger flanges on sheeting, (2) from concrete using inserts, (3) from steel using beam clamps, rivets or bolts, (4) from concrete blocks using toggle or through bolts. Fasten supports to building in following order of preference: (1) steel framing, (2) concrete, (3) wood framing, (4) masonry, (5) wood sheathing. Do not support from roof deck without approval. All hangers, rods, and inserts shall be Underwriters' Laboratories approved for the service intended and meet MSS #SP 58 and 69.

PART 2 – PRODUCTS

2.1 HANGERS, SUPPORTS, ANCHORS AND GUIDES

A. All hangers, fasteners and accessories exposed to view indoors shall be galvanized or zinc plated. Similar installations outdoors shall be hot dipped galvanized materials and fasteners.

B. Supports, hangers, anchors and guides shall be provided for all horizontal and vertical piping. Selection and application shall be in accordance with ANSI/MSS SP-69.

C. All pipe supports shall be of type and arrangement hereinafter specified. They shall be so arranged as to prevent excessive bending stresses between supports. Specifically designed hangers shall be fabricated and installed in accordance with ANSI/MSS SP-69.

D. All bracket clamp and rod sizes indicated in this specification are minimum size only. The CONTRACTOR under this section shall be responsible for structural integrity of all supports. All structural hanging materials except variable spring units shall have a safety factor of 5 built in.

E. All piping routed on trapeze hangers shall be attached rigidly to same unistrut hanger bar with clamps designed by unistrut manufacturer as approved by PROFESSIONAL. Insulated piping clamps shall encapsulate piping, insulation and saddle.

2.2 BASES AND PADS

A. Concrete equipment pads shall be constructed of minimum 3000 psi reinforced concrete. Provide ¾” chamfer on all exposed top perimeter edges of pads.

B. Top of equipment pads outdoors shall be minimum 3” above and below worst case finished grade and be reinforced and of a strength suitable for application.

C. Pads shall be provided in the following applications:

1. Air conditioning equipment outside building. Size pads to extend from building perimeter and extend minimum eighteen (18) inches around equipment on remaining three sides, or as indicated.

2. Provide similar concrete surrounds at cleanouts, etc., and as indicated.

PART 3 – EXECUTION

3.1 PIPING SUPPORT

A. All hangers for insulated piping shall be sized to accommodate insulation and shield. No hangers for insulated piping may be installed directly below or unto pipe itself except domestic cold water, and condensate drain piping where insulation is for condensation and/or freeze protection only.

B. Provide hanger spaced per International Plumbing Code, International Fuel Gas Code, and International Mechanical Code requirements for piping type and size.

C. Support horizontal PVC pipe with hanger or pier, located close to hub; use one support for each pipe length, or every other joint, whichever is closer. Where maintenance requirements may impose torque, as at a cleanout, support on both sides of torque point.

D. Provide hanger within 18" of each elbow, also provide hanger with 18" of connection to each piece of equipment.

E. Support vertical pipe at base and at each floor. In addition, 1" or smaller copper pipe shall be supported at 5' intervals or midway between floors, whichever distance is shorter.

F. Provide PVC or other approved coating for steel, cast iron or PVC pipe riser clamps. See applicable details.

G. Pipes passing thru walls shall not bear on building construction. Provide sleeves and fire proofing sealant as per Section *Basic Mechanical Materials and Methods*.

H. Maximum weights on hanger rods assuming a maximum operating temperature of 450 degrees F. shall be such that stress in tension shall not exceed 9000 psi, using root area of threaded portion.

I. For copper pipe, supports shall follow schedule and specifications. Supports for uncovered lines shall be especially designed for copper tubing, and shall be of exact O.D. diameter of tubing and shall be copper plated.

J. Shields at Hangers: Insulated pipe shall be protected at the point of support by a 180 degree insert of high density, 100 psi, waterproofed calcium silicate encased in a 180-degree galvanized sheet metal inverted saddle. Insert to be same thickness as gauges shown in chart below. Insulation insert to extend 1" beyond sheet metal on all insulated water lines. If pipe hanger spacing exceeds 12 feet, use double layer sheet metal shields. Check Section *Mechanical Insulation* for Alternatives.

PIPE SIZE	SHIELD LENGTH	MINIMUM GAUGE
1/2" - 2"	8"	24
2-1/2" - 4"	12"	20
6" - 8"	16"	16

K. Provide all steel required for support of pipes and equipment other than steel shown on STRUCTURAL ENGINEER'S Drawings.

L. All pipe supports shall be designed to avoid interferences with other piping, hangers, electrical conduits and supports, building structures and equipment.

3.2 OTHER MOUNTINGS

A. Any piece of equipment installed in a finished ceiling or wall area shall be supported independently of the building finish. Ceiling mounted items shall be supported directly from the building structure.

B. Support piping from structural steel members by malleable iron or formed steel beam clamps. Where suspended from concrete slabs, install inserts of malleable iron during building construction.

C. Wire or perforated hangers will not be permitted. Provide adjustable split ring swivel malleable iron hangers for horizontal runs up to and including 3" pipe size. Provide adjustable steel clevis type hangers for pipes over 3".

D. Provide malleable iron split ring hanger with copper finish and copper plated malleable iron adjuster for use with copper piping. For insulated piping, provide hangers sized to accommodate insulation.

END OF SECTION

Electrical Requirements

PART 1 – GENERAL

1.1 MECHANICAL WORK

All work performed under this Contract shall be in accordance with Division Electrical.

PART 2 – PRODUCTS

2.1 STARTERS

A. For each and every motor provided by CONTRACTOR, a new proper motor starter shall be furnished for installation, except that all starters for ½ horsepower single phase and smaller motors as specified and/or required shall be manual type.

B. Heaters shall be of the melting alloy type, sized to the exact nameplate running current of the motor. Manually operated motors with magnetic controllers shall be provided with oil tight pushbutton stations and automatically controlled motors shall be provided with oil tight "hands off auto" automatic switches. All magnetic starters shall be provided with red bull's eye pilot light in cover. Energy for controlled circuits shall be taken from the load contacts from the starters. All power wiring and control wiring shall be run in rigid conduit in damp locations or electrical metallic tubing in dry locations, and shall conform to NEC Standards. Provide two sets each of normally open and normally closed auxiliary contacts for all magnetic starters.

C. For all starters for three phase motors, provide both overload and under voltage and over-voltage protection in all phases and protection from phase loss and phase reversal.

D. For manual and automatic controlled operation of 3/4 HP and larger motors, furnish magnetic motor starter with:

1. Maintained contact starter with "hand off auto" switches.
2. Trip free, thermal overload relays.
3. Capable of accepting 3 external electric interlocks.
4. "Red" run pilot bulb indicator.

E. Where interlock or automatic operation is specified, regardless of HP, provide magnetic starter complete with "run off auto" switch so connected that in "run" or "auto" all safety controls shall stop the motor. Provide number and type of auxiliary normally open and/or closed contacts as required by specified control sequence.

F. Size 2 and larger starters shall have control circuits individually fused from line side of starter, or lead side of breaker, on combination unit. Starters on service above 240 volts shall have 120 volts, built in control circuit transformer fused from line side.

G. Each electrically operated item of equipment shall be suitable for proper operation on the electrical supply to which it is to be connected as directed on the Electrical Drawings. Prior to delivery on job site, it shall be the responsibility of the CONTRACTOR and any Sub-Contractors, equipment suppliers, etc. to determine from the Electrical Drawings the characteristics of the electrically operated item, and to furnish each item accordingly. CONTRACTOR shall pay the cost due to any modifications resulting from differences as compared to Basis of Design products.

H. Provide soft start and soft stop magnetic motor starters for all motor three phase loads above 5 HP, as Magnetek Series RVS–DN with digital microprocessor circuitry, and include the safeties as detailed above, with auto reset.

2.2 MOTORS

A. All motors under this Contract shall be provided with thermal overload protection.

B. Equipment shall operate properly under a 10% plus or minus voltage variation, and a 5% plus or minus frequency variation.

C. Unless noted otherwise, motors shall be squirrel cage induction type with ball bearings. Motors ½ HP and smaller shall be 120 volts, single phase, with permanently lubricated bearings; 3/4 HP and larger shall be 3-phase, Design "B" or "C", drip proof type, of minimum power factor and energy efficiency as listed herein.

D. Motors shall be premium efficiency type as defined by energy policy act of 1992 (EPACT) and latest version of IEEE Standard 112, Test Method B.

HP	EFFICIENCY	POWER FACTOR
1	84	72
1.5	85.5	73..5
2	85.5	70.6
3	89.5	77.5
5	89.5	81
7.5	91.7	78.9
10	91.7	83
15	93	81
20	93.6	84
25	93.6	83.5
30	94	85.1
40	95.5	76
50	95.5	84.2
60	95.5	84.5
75	96	83.4
100	96	84.4

E. Motors shall be rated for continuous, full load duty and capable of withstanding momentary overloads of 50%. Select motors so actual load does not exceed nameplate ratings, and does not use motor "service factor". All motor furnished for this project shall have minimum service rating factor of 1.15. All motors shall be highest energy efficient type for all mechanical applications.

F. Except where interlock or automatic control is required, single speed single phase motors, ½ HP and smaller shall have manual motor switch with pilot light and thermal overload protection.

G. Each motor to be installed outdoors shall be of the totally-enclosed fan-cooled type, or housed in a weatherproof housing. Motors for hazardous locations shall be properly furnished to suit application.

H. Multi-speed motors shall, except as noted, be consequent pole, variable torque, single winding. When the speed ratios or the load characteristic dictates, the multispeed motors shall be separate winding types. Variable speed motors operating over an adjustable range of speeds shall be motors specifically designed and rated for this duty.

2.3 ELECTRICAL FOR EQUIPMENT

A. Motor controllers, protection devices, etc., for control and protection of equipment shall be furnished with the equipment, but installed and electrically connected to power source under Division Electrical.

B. NEMA Standards shall be taken as minimum requirements for Electrical equipment.

C. CONTRACTOR shall provide and install all disconnects for all MECHANICAL motors and loads unless equipment is provided with integral disconnect(s).

D. All three phase motors in occupied areas shall be "quiet" rated and so marked.

E. On all three phase motors, provide both overload and under voltage and over-voltage protection in all phases and protection from phase loss and phase reversal.

F. Suitable enclosures for all electrical equipment shall be provided to suit environment as per NEMA and NFPA standards.

G. Clearances of 36” shall be maintained around equipment less than 400V. Clearances of 48” shall be maintained around equipment greater than 400V.

PART 3 – EXECUTION

3.1 GENERAL

A. Where electrical voltage and phase characteristics are specified hereinafter, verify them with the Electrical Drawings. In case of discrepancy between the Specifications and the Electrical Drawings, the Electrical Drawings shall govern.

B. The CONTRACTOR shall provide power to all circuits, controls, and safety devices to every piece of mechanical equipment specified or shown on Drawings whether a power source is indicated or not on Electrical Drawings.

C. The CONTRACTOR shall provide and extend fire alarm connections to all larger air handling equipment and provide code required smoke/heat detection sensors, etc., and automatic shutdown in the event of positive fire/smoke detection from any fire alarm sensor in same zone as served by same air system.

D. Control wiring (120V. and less) shall be provided under *Division 20, 21, 22 and 23* and extended from the 120V. power circuits indicated on the Electrical Drawings. All wiring for voltages higher than 30 volts shall be done by a licensed electrician.

END OF SECTION

Mechanical Identification

PART 1 – GENERAL

1.1 SCOPE

A. Piping System Identification

B. Valve Identification System

C. Equipment Identification

D. Miscellaneous Identification

1.2 REFERENCES

ANSI A13.1 – Scheme for the Identification of Piping Systems

PART 2 – PRODUCTS – SPECIFIED AS PER INDIVIDUAL APPLICATION IN PART 3

PART 3 – EXECUTION

3.1 IDENTIFICATION OF PIPING SYSTEMS

A. Identify all pipe after final painting and/or insulation with manufacturer's preprinted labels at the following minimum locations:

1. Straight runs of piping with a maximum spacing of twenty (20) feet.
2. Adjacent to each valve.
3. Adjacent to each branch takeoff point.
4. On each side of where piping passes through walls/floors.

B. Letter shall be sized in accordance with the following:

OUTSIDE DIAMETER OF PIPE COVERING	MINIMUM WEIGHT OF LEGEND LETTERS
Up to 3/4"	1/2"
1" to 1-1/4"	3/4"
1-1/2" to 2"	1"
2-1/2" to 6"	1-1/2"

C. At each legend, include a manufacturer's label with an arrow to show normal flow.

D. Identify location of outside underground piping by: (1) 4" x 18" concrete stakes, flush with finish grade, located above lines at end and/or corners or (2) by 2" x 2" brass plates embedded in building walls above pipes.

E. Identify all non-metallic piping below grade with 2" wide metalized tracer continuous roll identification tape, with service, as Brimar Industries "Underground Tape 2" Detectable". Install tape ± 12" below finished grade directly atop buried pipe, and 12-gauge bare copper tracer wire taped continuously to top of piping service. All tracer tape/wire shall be extended continuously between concrete stakes, and tied to stakes ± 6" below finished grade.

3.2 IDENTIFICATION OF PIPING ABOVE GRADE

A. All piping exposed to view or concealed shall include manufactured labels on pipe in a visible location. Label shall be attached to pipe every twenty feet (20'). Labels shall be installed after piping has been painted and/or insulated.

B. Labels to be utilized as follows.

1. In exposed applications, CONTRACTOR shall utilize pre-coiled, snap in place type markers as Seton “Setmark”. On 6” and larger pipe, CONTRACTOR shall utilize nylon ties to secure marker to piping.

2. In concealed applications, CONTRACTOR shall utilize a pressure-sensitive tape manufactured legend on all installations. Tape shall be tamper resistant vinyl tape for indoor as Seton “Opti-Code” and outdoor installations as Seton “Ultra-mark.”

3. Tape legend colors shall meet ANSI recommendations.

4. On piping where markers do not include directional arrows, CONTRACTOR shall include similar manufactured stick-on flow arrows on all pumped circulating systems as Seton “Arrows On A Roll” with colors to match pipe legend tape identification.

C. All insulated piping exposed to view everywhere and in mechanical rooms shall be painted in accordance with DIVISION 09 (colored coded as follows). (Verify colors with ARCHITECT prior to painting).

SERVICE	SYMBOL	COLOR
Domestic Cold Water	DCW	Dark Green
Domestic Hot Water (115°)	DHW (115)	Light Blue
Natural Gas	N. Gas	Yellow
Fire Protection Sprinkler	Fire Sprinkler	Red

3.3 EQUIPMENT IDENTIFICATION

A. All equipment, starters, controls panels, switches, thermostats, humidistats and other control devices shall be permanently labeled with equipment being served. Equipment labels shall correspond to those shown on the Contract Documents.

B. Individual functions and equipment on indicators and controllers on control panels shall be clearly permanently identified. Color code of labels, marking and identification shall be approved by PROFESSIONAL. This applies to the HVAC system, override panel, microprocessor time clocks and specialty annunciation specified in Section Controls and Instrumentation.

1. Labels for equipment, starters and control panels shall be phenolic type with minimum 3/4-inch tall engraved lettering.

2. Identification for individual controls devices including thermostats, humidistats, relays, switches, etc. shall be labeled with either phenolic type with minimum 1/2-inch tall engraved lettering or stick-on type from lettering machine.

3.4 FIRE PROTECTION IDENTIFICATION

See Section *Fire Sprinkler System.*

END OF SECTION

Mechanical Sound and Vibration Control

PART 1 – GENERAL

1.1 SCOPE

Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Contract Drawings.

1.2 APPLICABLE STANDARDS

A. ASHRAE, 2007 HVAC Applications Handbook, Chapter 47, "Sound and Vibration Control".

B. The CONTRACTOR shall be responsible for providing and installing vibration isolation of the appropriate type and size for proper weight loading to meet the requirements of the specifications, and in accordance with instructions of the equipment manufacturer or vibration isolator manufacturer or its vendor.

C. On completion of the work, the ENGINEER shall carry out an inspection and shall inform the installing CONTRACTOR of any further work that must be completed before final approval is obtained.

1.3 MANUFACTURER

A. All vibration isolators shall be supplied by a single approved manufacturer.

B. The manufacturer's standard vibration isolation will be acceptable only if it meets this specification.

1.4 VIBRATION AND SOUND CONTROL

A. All rotating equipment shall be isolated from correcting piping, ductwork, structure or other rigid utilities, etc., by means of the appropriate vibration isolation. The CONTRACTOR shall provide and install the appropriate vibration isolation on any equipment, etc., with moving parts, whether indicated on Plans or not.

B. The CONTRACTOR shall provide and install appropriate sound isolation as required to restrict sound production or transmission. CONTRACTOR shall install this insulation, baffle, etc., where indicated or as directed by ENGINEER.

PART 2 – PRODUCTS

2.1 VIBRATION ISOLATOR TYPES

A. Unit FN (Floor Neoprene) - Smaller floor mounted equipment and for spacing between equipment and drain pans.

1. These isolators shall be double deflection neoprene waffle pad. Pads shall be a minimum of 5/16” thick with size cut as required for particular equipment weight being supported.

2. Isolators shall be Mason Type W – Neoprene Waffle Pads or approved equal.

2.2 EXTERIOR METAL PARTS

A. All metal parts of vibration isolation units installed out of doors shall be hot dip galvanized after fabrication.

B. Galvanizing shall comply with ASTM A123, A153 and 386 as applicable.

C. At the time of shipment to the job site, submit to the CONTRACTOR with copy to the

ENGINEER, a certified statement by the galvanizer indicating conformity of galvanizing to ASTM Specification.

PART 3 – EXECUTION

3.1 GENERAL

A. Minimum static deflection of each vibration isolator unit shall be as shown in the equipment schedules and/or as described for each specific piece of equipment in these Specifications.

B. Locations of all vibration isolation devices shall be selected for ease of inspection and adjustment.

3.2 EQUIPMENT MOUNTING

A. No equipment unit shall bear directly on vibration isolators unless its own frame is suitably rigid to span between isolators and such direct support is approved by the equipment manufacturer. All support frames shall be sufficiently stiff and rigid so as to prevent distortion and misalignment of components installed thereon.

B. All wiring and other connections to vibration-isolated units shall be made flexible in order to avoid short-circuiting the isolators. A minimum 4-foot length of armored flexible conduit or cable installed in the shape of a U is acceptable for electrical connections.

C. Under no conditions shall piping, ductwork or conduit be suspended from one another or physically contact one another. Vibrating systems shall be kept free from non-vibrating systems.

D. Vibration isolation hangers shall be positioned so that hanger housings may rotate a full 360 degrees without contacting any object.

3.3 DUCTS

A. The AHU returns, OSA, and discharge shall be connected to the ductwork with a flexible connector as described below, in order to prevent short-circuiting, and for sound and vibration isolation. Weatherproofing material shall be utilized when installed on exterior installations. Install connectors with slack, avoiding tight or misaligned connections.

B. All other ducts connecting fans, etc., shall have a flexible connector as described above.

C. Flexible duct connectors shall be:

APPLICATION	METAL END CONNECTIONS	FABRIC
Split systems and fans less than 2200 CFM air delivery capacity.	Minimum 3" wide 28 gauge galvanized, as Duro Dyne "Econo Fab" Series with minimum 4" wide fabric.	Indoors: Minimum 15 oz./sq. yd., as Duro-Dyne "Excelon" Series with vinyl coated woven nylon/polyester blend. Outdoors: Minimum 17 oz./sq. yd., as Duro-Dyne "Therma Fab" Series with Silicon Rubber coated woven fiberglass fabric.
Larger Commercial HVAC Systems with air delivery above 2200 CFM air delivery capacity.	Minimum 3" wide 24 gauge galvanized, as Duro Dyne "Super Metal Fab: Series, with minimum 6" wide fabric.	Indoors: Minimum 22 oz./sq. yd., as Duro-Dyne "Excelon" Series with vinyl coated woven nylon/polyester blend. Outdoors: Minimum 24 oz./sq. yd. As DD "Durolon" Series with Hypalon coated woven fiberglass.

END OF SECTION

Mechanical Insulation

PART 1 – GENERAL

1.1 SCOPE

A. It is intended that all heating and/or air conditioning ductwork, all storm drain piping above slab on grade and all domestic water piping above slab on grade throughout this project be insulated, except as specifically stated otherwise hereafter.

B. Insulation shall include all insulating materials their applications, bands, tie wire, and weather protection for all pipe, fittings, valves, and equipment as indicated and as specified herein.

C. Piping systems requiring insulation, types of insulation required, and insulation thickness shall be as listed herein. All fittings, flanges, and valves (except valve stems, hand wheels, and operators) in piping systems requiring insulation shall be insulated unless otherwise specified. Fitting, flange, and valve insulation shall be premolded, precut, or job fabricated insulation of the same thickness and conductivity as used on adjacent piping. Insulation exterior shall be cleanable, grease resistant, non-flaking and non-peeling.

PART 2 – PRODUCTS

2.1 PIPING INSULATION

A. Fiberglass pipe insulation (FG)

1. Insulation shall have a thermal conductivity k=0.23 at 75 degrees F.
2. Insulation shall include a white ASJ with self-sealing overlap joints and seams.
3. Insulation shall be equal to Johns Manville "Micro-Lok" or approved equal.

B. Flexible elastomeric pipe insulation (FU)

1. Insulation shall have a thermal conductivity k=0.25 at 75 degrees F.
2. Insulation shall be equal to Armacell “AP Armaflex”.

C. Phenolic (P)

1. Insulation shall have a thermal conductivity k=0.15 (density 10 pcf nominal)
2. Insulation shall be equal to Insul-Phen.

D. PVC pipe and fitting covers.

1. Pipe and fitting covers shall be 20 mill thick flame retardant PVC. Fitting covers shall be neat, tight fitting radius type.
2. Pipe and fitting covers shall be equal to Zeston type 300 or approved equal.

E. Metal Protective Jacket

1. Sheet Aluminum: ASTM B209, 3003 alloy, H 14 temper, 0.016 inch thick.
2. Fitting Covers: Factory fabricated from not lighter than 0.020-inch thick type 3003 sheet aluminum.
3. Bands: 3/4-inch wide .007 aluminum (or .005 stainless steel.

2.2 DUCTWORK INSULATION

A. Rectangular Ductwork Interior Acoustical Liner

1. See Section *Ductwork*.

B. External Duct Wrap Insulation (Duct Wrap)

1. Insulation shall be 2.2" thick and 3/4 pcf density fiberglass material with FSK facing. The "k" factor at 75° F., mean temperature shall not exceed 0.31 and shall meet NFPA 90A & 90B Standards.

PART 3 – EXECUTION

3.1 GENERAL INSULATION INSTALLATION REQUIREMENTS

A. The insulation shall be applied by licensed insulation applicators and all work shall be performed in a neat and workmanlike manner.

B. No insulation shall be applied over pipes, fittings, or other surfaces, which are not clean.

C. Insulation shall be applied after pipes have been thoroughly tested and proven tight by the CONTRACTOR.

D. Piping insulation thru rated walls shall be coordinated with Section *Basic Mechanical Materials and Methods* and approved pipe sleeve and fire stop with UL Listing.

E. Insulation shall be clean and dry when installed and during the application of any finish.

F. Install materials neatly with smooth and even surfaces with jackets drawn tight and smoothly cemented down on longitudinal and end laps.

G. Scrap pieces shall not be used where a full-length section will fit.

H. Pipe insulation shall be continuous through sleeves, wall and ceiling openings.

I. A PVC grommet shall be utilized at metal stud penetrations of piping, and insulation shall be installed snug to both sides of penetration with ends of piping insulation vapor sealed if specified.

J. Piping and ductwork shall be individually insulated.

K. Chrome plated pipes and pipes used solely for fire protection shall not be insulated.

L. Equipment nameplates, access plates in fan housings and ductwork and the like for ventilating and air heating systems, shall not be insulated but insulation must be carefully beveled and sealed around it.

M. Ductwork insulation shall be continuous through sleeves, wall and ceiling openings except at fire dampers in ductwork systems.

N. Vapor Barrier Installation

1. A complete moisture and vapor seal shall be provided wherever insulation terminates against metal hangers, anchors and other projections through insulation on cold surfaces for which a vapor seal is specified as identified in Part 3 paragraph 3.03 of this specification section.

2. Seam and fitting covers shall be sealed with two (2) generous brush coat of fire resistant vapor barrier coating, applied at all longitudinal and

circumferential laps.

3. Ends of sections of insulation that butt against flanges, unions, valves, and fittings, and joints at intervals of not more than 12 feet on continuous runs of pipe shall be coated with a vapor barrier coating.

4. Breaks and punctures in the jacket material shall be patched by wrapping a strip of jacket material around the pipe and cementing, coating as specified for butt strips. The patch shall extend not less than 1½" past the break in both directions.

5. At penetrations such as thermometers, valve stems, etc., the voids in the insulation shall be filled with vapor barrier coating and the penetration sealed with a brush coat of the same coating.

6. PVC fitting jackets in concealed applications shall be with a strip of insulation jacket and brush coat of vapor barrier sealant.

7. PVC fitting jackets in exposed applications shall be neatly covered with a PVC/vinyl tape neatly smoothed.

O. Installation at Hangers and Anchors

1. Pipe insulation shall be continuous through pipe hangers.

2. Where pipe is supported by the insulation, galvanized sheet metal shields or saddles 12 inches long shall be provided. Shields/saddles shall be 20-gauge galvanized sheet metal for pipes 6" and smaller and 18 gauge for pipes 8" and larger.

3. Where shields are used on pipes 2 inches and larger, insulation inserts shall be provided at points of hangers and supports.

a. Insulation inserts shall be of calcium silicate, cellular glass (minimum 8 pcf), molded glass fiber (minimum 8 pcf), or other approved material of the same thickness as adjacent insulation.

b. Inserts shall have sufficient compressive strength to adequately support the pipe without compressing the inserts to a thickness less than the adjacent insulation.

c. Insulation inserts shall cover the bottom half of the pipe circumference 180 degrees and be not less in length than the protection shield.

d. Vapor barrier facing of the insert shall be of the same material as the facing on the adjacent insulation.

e. Seal inserts into the insulation with vapor barrier coating.

4. Where protection saddles are used, fill all voids with the same insulation material as used on the adjacent pipe.

5. Insulate and vapor seal insulation at anchors same as piping for a distance not less than four times insulation thickness to prevent condensation.

3.2 PIPING INSULATION INSTALLATION

A. Fiberglass pipe insulation (FG)

1. Install insulation with longitudinal laps and butt strips additionally smoothly

secured with Benjamin-Foster 85-20 adhesive.

2. Fittings and valves on pipe shall be similarly insulated with thickness equal to the adjacent pipe.

B. Flexible elastomeric pipe insulation (FU)

1. Miter 90 degree turns and elbows, tees, and valve insulation.

2. Secure longitudinal joints with vinyl tape on 9-inch centers.

3. Bond cuts, butt joints, ends, and longitudinal joints with adhesive. After adhesive cures, apply 2-inch wide pressure sensitive adhesive vinyl tape over bonded cuts, joints, and ends.

C. PVC pipe and fitting covers.

1. PVC pipe and fitting covers shall be installed with a smooth appearance and no visible wrinkles.

2. All longitudinal seams shall be installed such the joints facing up or to the back of the finished product.

3. All longitudinal and circumferential PVC jacket joints and connections shall be spot welded every 12" with Perma Weld Adhesive and subsequently neatly sealed with tight fitting pressure sensitive vinyl tape, installed without wrinkles.

D. Metal Jacket Installation

1. Metal jackets shall have side and end laps at least 2 inches wide with the cut edge of the side lap turned under one inch to provide a smooth edge.

2. Secure jackets in place with aluminum or stainless-steel bands on 9 inch centers.

3. Place laps to shed water.

4. Seal laps with weatherproof coating.

5. Where pipes penetrate exterior walls, continue the increased insulation thickness required for piping exposed to weather and the metal jackets through the sleeve to a point 2 inches beyond the interior surface of the wall.

6. In outside locations protect fittings, flanges, and valves with a weatherproof coating prior to installation of metal covers. Secure metal covers for fittings, flanges, and valves in place with metal bands and seal with a weatherproof coating.

3.3 PIPING INSULATION APPLICATIONS

PIPING INSULATION MATERIAL TYPE, SERVICE JACKET, VAPOR BARRIER AND THICKNESS TABLE

SERVICE	INSULATION MATERIAL (NOTE 'A')	TYPE OF SERVICE JACKET REQ'D (NOTE 'B')	VAPOR BARRIER REQ'D	INSULATION THICKNESS (INCHES) ½" – 1 ¼"	1 ½" – 3"	3 ½" – 6"	8" – 10"	11" – 36	NOTES
DOMESTIC HOT AND RECIRCULATING	FG	B	YES	1	1.5	1.5	1.5	1.5	1,2,3,4,8
	FU	C	NO	1	1.5	1.5	1.5	1.5	
	P	B	NO	0.5	1	1	1	1	
DOMESTIC COLD WATER	FG	B	NO	0.5	1	1	1	1	1,2,3,4,8
	FU	C	NO	0.5	0.5	0.5	0.5	0.5	
A/C CONDENSATE DRAIN LOCATED INSIDE BUILDING	FG	A OR B	YES	1	1	1	1	1	4,5
	FU	C	NO	0.75	1	1	1	1	
DRINKING FOUNTAIN DRAIN PIPING (ON SEWER TIE-ON)	FG	B	YES	1	1	1	1	1	5
	FU	C	NO	1	1	-	-	-	
REFRIGERANT PIPING	FU	C	NO	SEE NOTES	SEE NOTES	-	-	-	6, 8

NOTE 'A' – INSULATION MATERIAL

MATERIAL		SPEC	TYPE	CLASS / GRADE
FU	FLEXIBLE UNICELLULAR	ASTM C 534	-	-
FG	FIBER GLASS	ASTM C 547	I	1
P	PHENOLIC	ASTM C 552	-	-
CG	CELLULAR GLASS	ASTM C 1126	III	1

NOTE 'B' – TYPE OF SERVICE JACKET REQUIRED

A	FOIL BACKED ALL SERVICE JACKET (ASJ)
B	PAPER ASJ
C	NONE

TABLE NOTES:

1. Flexible unicellular insulation shall be utilized on domestic piping concealed within interior and exterior walls and plumbing chases. After the building is completely in the dry, the Contractor may utilize fiberglass insulation in these applications.
2. Note that higher density insulation inserts shall be utilized on all water piping larger than 1-1/2" size, at all hanger/saddle supports, etc.
3. Insulation located outside shall be one inch thicker than shown in table above.
4. A full coverage PVC jacket shall be required on insulated piping and fittings exposed in mechanical rooms, in crawlspace, and in interior exposed applications everywhere. See Section *Mechanical Identification* for color requirements.
5. Drain piping in concealed applications may be insulated with flexible

unicellular or fiberglass.

6. Refrigerant piping shall be insulated as follows. Conventional heat pump or 2-pipe variable refrigerant systems shall have the larger pipe (hot gas line during heating operation) based upon the thickness corresponding to hot gas lines below and NOT the suction line thickness.

   a. Suction lines - ¾" thick for pipes less than 1" in size, 1" thick for pipes equal to or greater than 1" in size.

   b. Liquid lines – 1" thick for pipes less than 1-1/2" in size, 1.5" thick for pipes equal to or greater than 1-1/2" in size.

   c. Hot gas lines – 1.5" thick for pipes less than 1-1/2" in size, 2.0" thick for pipes equal to or greater than 1-1/2" in size.

7. Not used.

8. Provide metal jackets over insulation on all insulated piping exposed to outdoor weather (including refrigerant piping).

3.4 DUCTWORK INSULATION INSTALLATION

A. Rectangular Ductwork Interior Acoustical Liner

1. See Section *Ductwork*.

B. External Duct Wrap Insulation

1. Insulation shall be installed in a manner to prevent compression of the insulation.

2. When ductwork (rectangular or flat oval) with any vertical or bottom side is greater than 18", install pins and clips in a 12" o.c. grid, with pins within 4" of any longitudinal edge. Excess length of pins shall be snipped and top of pin/washer covered with pressure UL 181 pressure sensitive tape.

3. All longitudinal and circumferential insulation seams shall be sealed with 3" wide pressure sensitive tape bearing the UL 181 label.

3.5 DUCTWORK INSULATION APPLICATIONS

DUCTWORK INSULATION MATERIAL TYPE, VAPOR BARRIER AND THICKNESS TABLE				
DUCTWORK FUNCTION/TYPE	**INSULATION MATERIAL**	**VAPOR BARRIER REQ'D**	**INSULATION THICKNESS (INCHES)**	**NOTES**
Rectangular Low Pressure Supply Air	DUCT WRAP	YES	2.2	1
Round/Oval Low Pressure Supply Air	DUCT WRAP	YES	2.2	
Rectangular Low Pressure Return Air	DUCT WRAP	YES	2.2	1
Round/Oval Low Pressure Return Air	DUCT WRAP	YES	2.2	
Rectangular Low Pressure Exhaust Air	SEE NOTES	-	-	3
Round/Oval Low Pressure Exhaust Air	NONE	-	-	
Rectangular Low Pressure Transfer Air	SEE NOTES	-	-	1
Round/Oval Low Pressure Transfer Air	DUCT WRAP	YES	2.2	
Miscellaneous Ductwork and Accessories	DUCT WRAP	YES	2.2	4

TABLE NOTES:

1. See Section *Ductwork* for:
   a. Additional acoustical internal insulation required in addition to specified external insulation. Omit external duct wrap insulation on indoor exposed ductwork.
   b. Interior liner required on ductwork located outdoors.
2. Not used.
3. See Section *Ductwork* for acoustical internal insulation required.
4. Miscellaneous Insulation and Acoustical Treatment Requirements:
   a. Air Distribution Devices (Grilles, Registers and Diffusers):
      i. The concealed frame and housing of all such devices above ceilings, in attics, walls, crawlspaces, etc., shall be factory insulated.
      ii. When factory insulation is not available, duct wrap insulation shall be installed on any concealed frame, housings, plenums, etc.
   b. Control and Manual dampers shall be insulated such that automatic or manual operator is not impeded.
5. See Details on Drawings for more information and construction requirements.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Contract Drawings.

B. The CONTRACTOR shall provide a new fire sprinkler arrangement including piping and heads, and other appurtenances as shown on Contract Drawings or as specified, to provide wet pipe system coverage to the entire facility, including riser, piping and heads, with new as required to suit new areas, as shown on Contract Drawings.

C. The system shall include all piping, valves, fittings, fire alarm interface, and heads required for the type of construction and as required by OWNER'S insurance and local fire authority requirements.

D. Standard Products:

1. Equipment furnished under this Specification is essentially the standard product of the manufacturer. Where two or more units of the same class of equipment are required, these units shall be products of a single manufacturer; however, the component parts of the system need not be the products of the same manufacturer.

E. System shall include general wet pipe area sprinkler piped arrangement, including new heads of type indicated hereinafter, per NFPA-13 (latest edition) requirements for all new interior (and exterior covered) space(s), and interstitial spaces, attics, etc., as required for comprehensive fire sprinkler protection.

F. It is the CONTRACTOR’s responsibility to review the plans, available as-builts, and visit the site to familiarize themselves with the conditions for installation.

G. The CONTRACTOR shall be responsible for verifying static and residual and flow of existing water distribution system and design requirements of the local governing authority which vary from the minimum code standards imposed by these Specifications, and include same in his bid and install same in this project. Should an ENGINEER’s stamp be required, same will be coordinated and cost for same included in his bid.

1.2 APPLICABLE STANDARDS

A. All equipment used must meet the requirements of the National Board of Fire Underwriters for the service intended.

B. The CONTRACTOR shall conform to standards prescribed by City, County and State regulations or ordinances having jurisdiction and be approved by the OWNER'S insurance company. Any changes that may be necessary to conform to such regulations or ordinances shall be made by the CONTRACTOR without extra cost to the OWNER.

C. The interior sprinkler system shall be designed for type occupancy and hazard protection per NFPA 13, newest edition, or as applicable.

D. It is the CONTRACTOR’S sole responsibility to ascertain and verify the specifics of the characteristics (pressure and flow) of the water service available and include same in the hydraulic calculations for design and installation. The review of the sprinkler Shop Drawings by the A/E does not relieve the CONTRACTOR of this

responsibility.

1.3 GENERAL REQUIREMENTS

A. The entire work must be executed in a neat, substantial, and workman like manner, according to the true intent and meaning of the plans and specifications, which are intended to include everything dependent upon them and required for the completion of the work with materials best adapted to the purpose.

B. Unless otherwise shown, specified, or approved by the ENGINEER, use materials and equipment in the installation of the sprinkler system listed as approved by the Underwriters' Laboratories Inc. List of Inspected Fire Protection Equipment and Materials, or approved by any other appropriate nationally known and recognized testing laboratory for use in sprinkler systems, and of the latest design of the manufacturer.

C. In general, ductwork and other graded piping drainage systems have the right-of-way. The CONTRACTOR shall provide, install, and arrange his piping layout to avoid conflicts with other installations.

PART 2 PRODUCTS

2.1 SPRINKLER HEADS

A. Unless otherwise specified or shown, provide and install sprinkler heads of regular automatic closed type, or new spray type heads, for ordinary degree temperature rating except that type and temperature ratings of sprinkler heads installed in the vicinity of heating equipment shall be as required for such locations by NFPA 13, where, in the opinion of the OWNER's insurance company, special occupancies and installations indicate the need for special heads, high temperature rating, etc., for such heads by actual tests at the site. Provide quick response heads in all applications.

B. Utilize chrome plated semi-recessed pendant type heads in areas with lay-in ceilings.

C. Utilize concealed pendent-type heads with flush mounted covers in areas with hard ceilings.

D. Utilize chrome plated upright heads, with the deflectors parallel to ceiling or roof slope, in areas without ceilings. Clearances between the deflectors and the ceilings, roof decking, or roof joists to be in accordance with NFPA 13, unless otherwise shown on Drawings.

E. All heads in lay-in acoustical tile ceiling areas shall be installed with swing joints so as to be able to center same in ceiling tile. (No exceptions). An accepted alternative to swing joints are flexible stainless-steel hoses and lay-in or sheetrock mounting brackets manufactured by FlexHead®.

2.2 DRAINS

A. Install main drains on main risers and auxiliary drains at low points in the system. Install inspector's test drains on each sprinkler system as near the outer end of system as possible. Drain valves to be of the angle type. Install in accordance with NFPA 13. Pipe drain valves to a safe place of discharge; discharge to be visible either by open end drain pipe or sight drain fitting. Provide permanent metal signage at each test valve installation.

2.3 WATER PIPING ACCESSORIES:

A. FIRE DEPARTMENT CONNECTIONS: Shall be cast brass body with drop clappers and pin lug swivels. Provide factory lettering reading “AUTO. SPKR.” Connection shall be as follows:

1. Post type equal to Potter-Roemer fig. 5731 (4”x2-1/2”x2-1/2”, 2-way)

2.4 TAMPER SWITCHES

A. Provide tamper switches for all above grade and interior building shut-off valves and coordinate fire alarm connections for all switches.

2.5 WATER FLOW INDICATOR SWITCHES

Provide water flow indication switches for all zones and systems of the sprinkler installations. Coordinate all fire alarm connections and zones.

2.6 FIRE ALARM

The CONTRACTOR shall provide all wiring and interlocks as required for connection to the building fire alarm system for new tamper and flow switches. See *Division 28* for further requirements.

2.7 MISCELLANEOUS EQUIPMENT AND ACCESSORIES

A. Piping and fittings: Refer to Section *Pipes and Pipe Fittings*.

B. Pipe Hangers: Use types indicated as acceptable in NFPA 13 and Section *Supports and Anchors*. Galvanized hanger materials and fasteners shall be utilized in outdoor and exposed to view indoor applications.

C. Provide separate NEMA 1 box with two (2) spare sprinkler heads of each type utilized, wrench(es) to install same, and wall mount in a location adjacent to main building riser.

D. Piping Identification: See Section *Mechanical Identification*. All piping exposed to view and concealed everywhere shall be properly labeled.

E. Signage at riser and Inspector’s Test Station - per NFPA 13 and Section *Mechanical Identification*.

F. Backflow Preventer: Section *Piping Specialties*. Include pressure drop in hydraulic calculations.

G. Backflow Preventer Testing and Certification: Section *Piping Specialties*

H. Fire Stopping: Section *Basic Mechanical Materials and Methods*

I. Coordination: Section *Basic Mechanical Requirements* and *Basic Mechanical Materials and Methods*

J. Fire Alarm Interactions: *Division 28* Specifications and NFPA requirements.

PART 3 EXECUTION

3.1 WATER CONNECTION

A. CONTRACTOR to coordinate and connect to nearby utility system as shown on mechanical site plan. Utilize thrust blocking at all turns in service piping routing.

3.2 GENERAL PIPING INSTALLATION:

A. Install pipe, fittings, and hangers where shown on drawings in accordance with NFPA No. 13 and NFPA 231C.

B. Cutting Structural Members: Cutting of structural members for the passage of sprinkler piping or for pipe hanger fastenings will not be permitted unless approved by metal building vendor and/or STRUCTURAL ENGINEER.

C. Holes through Walls, Floors, and Ceilings: Where sprinkler pipes pass through walls, floors, and ceilings, the holes shall be large enough to accommodate pipe expansion. Provide chrome plated escutcheon at each hole to ensure the effectiveness of the floor or wall as a fire stop. Provide fireproof material around pipes to maintain fire integrity as per Section *Basic Mechanical Materials and Methods*. Expansion and Contraction: Provide long runs of pipe with means to permit free movement resulting from expansion and contraction.

D. Reducers: Make reductions in pipe sizes with one piece reducing fittings. Bushings not acceptable, except that when one piece reducing fittings of proper size are not obtainable, single bushings of the face type will be permitted up to 5 percent of total number of reducing fittings in the system. Where face bushings are used, install with outer face flush with the face of fitting opening being reduced.

E. Couplings: Couplings not to be used except where length of pipe between fittings exceeds 20 feet.

F. Flanged Fittings: Use flanged fittings in the control valve and drain assembly at base of risers of multiple-story sprinkler systems at each floor-system connection. Where part of a sprinkler system is on the opposite side of a wall or partition, a flanged connection may be used.

G. Unions and Companion Flanges: Use ground joint malleable iron unions in looped sprinkler systems where pipe is 2" in diameter or smaller. Where loops are larger than 7" are used, install companion flanges.

3.3 TESTS

A. Upon completion and prior to the acceptance of the installation, subject the system to the tests required by Fire Department Authorities and the OWNER'S insurance company and NFPA 13, and subsequently furnish the OWNER with a certificate as acceptable by same, indicating the CONTRACTOR certifies the sprinkler system is completely operable and conforms to local and national code requirements, specifically NFPA 13 (Material and Test Certificates).

3.4 SYSTEM TESTING

A. The CONTRACTOR shall test the system and controls, relief valves, etc., as it pertains to proper operation in conjunction with a fire alarm, system, etc. CONTRACTOR shall provide any and all equipment and installations necessary to provide a fully operable system conforming to the latest codes and standards. CONTRACTOR to report all discrepancies and concerns to ENGINEER-OF-RECORD.

3.5 OWNER’S EDUCATION

A. The CONTRACTOR in conjunction with the requirements of Section *Mechanical Close-out Requirements*, shall educate the OWNER’S personnel in the proper use, testing, operation and maintenance of all new fire protection sprinkler systems.

These instruction session(s) shall be coordinated with designated OWNER'S representative and A/E.

B. The CONTRACTOR shall furnish to the ARCHITECT, a letter from the OWNER indicating his staff has received adequate instruction in the proper use and maintenance of the fire protection sprinkler systems.

3.6 GUARANTEE: SEE PARAGRAPH "GUARANTEE AND WARRANTY" IN SECTION *MECHANICAL SYSTEMS AND EQUIPMENT WARRANTIES*.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE

A. Domestic water, sewer, roof drainage and condensate drains, including piping, equipment and all necessary accessories as designated in this section.

B. Furnish all cleanouts and/or test tees as shown on Contract Drawings and required by Code. Cleanouts shall be the same size as the pipe they serve, except that 4 inches shall be the largest size required. Cleanouts shall be provided at the foot of each soil stack and of each run, change in direction, and mains, not to exceed 50 feet apart inside of building and 80 feet apart outside of building. The smallest flush floor cleanout shall be 3" unless otherwise noted.

PART 2 – PRODUCTS

2.1 FLOOR DRAINS

A. Floor drains shall be in accordance with ANSI A112.21.1. Provide caulking flange for connection to cast iron pipe, screwed outlets for connection to steel pipe, and side outlet when shown. Provide suitable clamping device and extensions if required, where installed in connection with waterproofing membrane. (Submit detailed shop drawings of these drains). Double drainage pattern floor drains shall have integral seepage pan for embedding in floor construction, and weep holes to provide adequate drainage from pan to drain pipe.

B. The following plumbing drains are Jay R. Smith Models, however equal Zurn, Wade, Jonespec, MIFAB, Watts or Josam models are acceptable. Note: Provide flashing clamp when required with waterproofing membrane.

1. FD-1 - Floor Drain: (Toilet Areas) Zurn Model Z415-7B, duco coated cast iron body with polished bronze 7" round strainer, clamping collar. Drain shall have trap primer connections where indicated. Size as indicated.

2. FD-2 - Floor Drain: (Commercial Washer) Zurn Model ZN1995-13, fabricated duco steel body with acid resistant coated interior, flashing collar, 24”x16"x17” deep rectangular body with nickel bronze ¾ grate and slotted sediment bucket.

3. FD-3 - Floor Drain: (Recessed Grate) Zurn Model Z415-7I, duco coated cast iron body with polished bronze 7" diameter extended rim strainer, clamping collar. Size as indicated. Top lip to be installed flush with finished floor.

4. FD-4 - Floor Drain: (Area Mechanical Room Traffic Type) Zurn Model Z539, duco cast iron body (10” deep), flashing collar, 12" square cast iron traffic ½ grate and slotted sediment bucket.

2.2 TRAPS

A. Provide traps on all sanitary branch waste connections from fixtures or equipment not provided with traps. Exposed brass shall be polished brass chromium plated with nipple and setscrew escutcheons. Concealed traps may be wrought cast brass. Slip joints not permitted on sewer side of trap. Traps shall correspond to fittings on cast iron soil pipe or steel pipe respectively, and size shall be as required by connected service or fixture, or as scheduled.

B. All drains, overflow, condensate and relief, to be routed to a trapped hub or floor drain. If plans are not specific, check with PROFESSIONAL over routing of such

drains.

2.3 OTHER DRAINS

Other required drains, including condensate drain piping, relief and overflow drain piping shall be provided and installed by CONTRACTOR. See BASIC MECHANICAL MATERIALS AND METHODS for piping specifications. Drains with outlets outdoors shall include insect screen neatly attached over opening.

2.4 CLEANOUTS

A. Cleanouts shall be as manufactured by Wade, Jay R. Smith, Zurn, Watts, or Josam, and shall be as follows:

1. Inside building, exposed on walls Zurn Model Z1446.
2. Inside building where tile floors occur Zurn Model Z1400.
3. Inside building where ceramic or quarry tile occurs Zurn Model Z1400.
4. Outside building where concrete occurs Zurn Model Z1406.
5. Outside building, no paving Zurn Model Z1449 with 18" x 18" x 4" concrete pad poured around cleanout with sloped top to shed water.

B. All interior cleanouts to have polished bronze finish and exterior cleanouts a brass finish unless otherwise noted. All flush grade cleanouts and cleanouts in walks, etc., shall have inset square key stainless-steel covers.

PART 3 – EXECUTION

3.1 INSTALLATION: (DRAINS)

A. Floor drains shall be installed according to manufacturer's recommendations. Provide and install all flashing and weatherproofing as required. Adjust extension sections on all drains as required for proper height adjustment.

B. All floor drains connected to sanitary waste system to be trapped. Connect floor drains to sanitary waste piping as indicated on Contract Drawings.

C. Each AC equipment drip and drain opening which normally or frequently discharges water (such as air conditioning unit drains, pump base and stuffing box drips, overflows, and similar drips and drains) shall be connected to the drain openings or piped down directly over the floor drains which are provided for the purpose, as applicable, whether indicated on the Drawings or not.

D. Each water relief valve discharge shall be piped down to 6" above floor, but not necessarily over a floor drain or connected to a drain opening, unless otherwise indicated. No drain piping is required from the discharges of drain valves, unless otherwise indicated.

E. The top of all floor drain strainer covers shall be cleaned and polished prior to final inspection by the PROFESSIONAL.

F. Drains shall be provided at all coils, receivers, pump suction lines, pump plates where facilities are provided and at all low points of the systems. Such drains shall consist of the necessary pipe, valves and fittings required in the opinion of the PROFESSIONAL to permit servicing of equipment, systems, etc.

3.2 INSTALLATION: (CLEANOUTS)

A. Install cleanouts such that each type is flush with floor, walls, outside grade, etc. Except as explicitly noted, all inside floor cleanouts shall be flush with finished floor surface.

B. Flush grade cleanouts shall include a concrete pad surrounding cleanout as indicated above concrete pad and cleanout top shall be flush with finished grade.

C. All cleanout plug threaded sections to be installed with appropriate lubricant and sealant for future maintenance and access.

D. The top and faceplate of all cleanouts indoors shall be cleaned and polished prior to final inspection by the PROFESSIONAL.

END OF SECTION

Plumbing Fixtures, Trim & Accessories

PART 1 – GENERAL

1.1 SCOPE

A. Provide all labor, equipment, materials, etc., required to complete installation as specified herein and/or shown or scheduled on plans.

B. Work Included: Plumbing fixtures, associated trim and fittings necessary to make a complete installation from wall or floor connections to rough piping, and certain accessories.

PART 2 – PRODUCTS

2.1 FIXTURE TRIM

A. All exposed metal parts of all fixtures, including faucets, waste fittings, waste plugs, flush valves, traps, supplies, nipples, and escutcheons shall be chrome-plated brass unless other materials or finish is specified. Basket and similar strainer assemblies for sinks shall be stainless steel.

B. Drain and waste assemblies below lavatories and sinks shall be minimum 17-gauge chrome plated brass and traps shall include cleanout plugs.

C. Stops and supplies:

1. All stops and supplies shall be NSF 61 compliant and contain less than 0.25% lead (Pb) by weight.

2. Chrome plated brass/copper supplies shall be provided on all water supplies to fixtures. All hot/cold faucet handles for lavatories, sinks and bath/shower supply fittings shall include red and blue color code indications.

3. Stops shall be chrome-plated brass, angle all bronze compression quarter turn ball type as McQuire LFBV series. Locate stops centrally above or below fixture in accessible locations.

2.2 ESCUTCHEONS

A. Provide chrome-plated escutcheons on all water and drain piping in wall, floor and ceiling penetrations.

B. Heavy-duty type escutcheons, with setscrews shall be utilized in exposed applications under wall mounted lavatories and sinks and on exposed piping applications on tank type water closet stops and on exposed piping to flush valves, etc.

C. Light duty slip-on type may be utilized in concealed installations within cabinets.

2.3 CARRIERS

A. Provide appropriate carriers for all wall mounted urinals, lavatories, electric drinking fountains, and sinks, and as indicated elsewhere in these specifications or on the drawings, or as required. All carriers shall be concealed, floor mounted type unless otherwise approved by the PROFESSIONAL.

B. Where wall hung urinals, lavatories, electric drinking fountains, or sinks are installed back to back and carriers are specified, provide one carrier to serve both fixtures in lieu of individual carriers.

2.4 HANDICAPPED SERVICES

A. Provide where required and/or indicated plumbing fixtures and installations that comply with the latest version of "American with Disabilities Act" (ADA).

B. Provide neat pre-packaged molded insulation protection on an exposed drain and water piping below sinks and lavatories equal to TRUEBO Models #102 and #105.

2.5 PLUMBING FIXTURES AND TRIM

Furnish and install all plumbing fixtures specified herein and shown on plans. Kohler fixtures are specified, however, Eljer, or American Standard may be used if they are equal in all respects to those specified. CONTRACTOR shall submit data on trim as well as fixtures. All water closets, urinals and other fixtures associated with flush valves shall be water conservation type unless specified otherwise. All lavatory and shower supply fittings shall be of the flow restrictor type, unless specified otherwise. Flush valves shall be Zurn type “AV” or Sloan Royal with clog resistant design.

A. Water Closets: All water closet seats shall have stainless steel mounting post and fasteners with “Sta-Tite” technology as Bemis or Church.

1. WC-1 – ADA Compliant floor mounted vitreous china siphon jet with elongated bowl and 1-1/2” top spud, 2” passage and 1.6-gallon flush. (Coordinate with grab bar and ARCHITECT’s details per ADA requirements. Install with handle opposite nearest corner installation).
   a. Fixture: Kohler Model K 96057 (Highcliff Ultra).
   b. Flush valve: Zurn Model ZER-6000PL-WS1-CCP-MOB battery operated sensor flush valve with manual override button.
   c. Seat: Bemis Model 10SSCT.

2. WC-2 Floor mounted vitreous china siphon jet with elongated bowl and 1-1/2” top spud, 2” passage and 1.6-gallon flush.
   a. Fixture: Kohler Model K 96057 (Highcliff Ultra).
   b. Flush valve: Zurn Model ZER-6000PL-WS1-CCP-MOB battery operated sensor flush valve with manual override button.
   c. Seat: Bemis Model 10SSCT.

B. Urinals:

1. U-1 – ADA Compliant wall mounted vitreous china washout design with 3/4” top spud, 2” outlet and high efficiency 1.0-gallon flush.
   a. Fixture: Kohler Model K 4904-ET-0 (Bardon).
   b. Flush valve: Zurn Model ZER-6003PL-WS1-CCP-MOB battery operated sensor flush valve with manual override button.
   c. Carrier: Zurn adjustable floor mounted wall carrier(s) as required.

2. U-2 – Wall mounted vitreous china washout design with 3/4” top spud, 2” outlet and high efficiency 1.0-gallon flush.
   a. Fixture: Kohler Model K 4904-ET-0 (Bardon).
   b. Flush valve: Zurn Model ZER-6003PL-WS1-CCP-MOB battery operated sensor flush valve with manual override button.
   c. Carrier: Zurn adjustable floor mounted wall carrier(s) as required.

C. Lavatories:

1. L-1 – ADA Compliant wall mounted vitreous china with 8” faucet centers and 5” backsplash.
   a. Fixture: Kohler Model K 2006 (Kingston).
   b. Faucet: T&S Brass Model B-2867-04-VF05, rigid gooseneck faucet, 10-1/2” high, 5” clearance, 5-1/2” reach, 4” wrist blade handles, 0.5 gpm vandal resistant aerator.
   c. Carrier: Zurn adjustable floor mounted wall carrier(s) as required.

2. L-2 – ADA Compliant wall mounted vitreous china with single hole drilling and 5” backsplash.
   a. Fixture: Kohler Model K 2007 (Kingston).
   b. Faucet: T&S Brass Model B-0712-VF05, metering single hole faucet with adjustable metering cycle, 4-1/2” high, 7/8” clearance, 4” reach, 0.5 gpm vandal resistant aerator.
   c. Carrier: Wade adjustable floor mounted wall carrier(s) as required.

3. L-3 – Wall mounted (size 17”x15”) 20 ga., 304 stainless steel (NSF listed), 4” faucet centers with basket drain and wall mounting bracket
   a. Fixture: Advance Tabco Model 7-PS-66 with splash mounted gooseneck faucet with wrist blade handles and side splashes.

D. Service Sinks:

1. SS-1 – Terrazzo, drop front, floor mounted, corner mop sink (size 24”x24”x12”).
   a. Fixture: Acorn Model TNC-24.
   b. Faucet: T&S Brass Model B-0665-BSTR mop sink faucet with vacuum breaker, wall brace and pail hook.
   c. Accessories and Trim:
      i. 20 ga. stainless steel cap on drop front
      ii. 12” high stainless-steel back panels on all walls.
      iii. Acorn Model KMH mop hanger (mounted above sink).

E. Sinks: Sink sizes herein are listed as overall dimensions. Unless noted otherwise the order of dimensions is listed as front-to-back x left-to-right x bowl depth. Coordinate number of holes required with faucet and other accessories specified.

1. S-1 – Single compartment, 18 ga. self-rimming (size 22”x25”x10-1/2”).
   a. Fixture: Just Model SLX-2225-A-GR.
   b. T&S Brass Model B-2867-04-VRS, rigid gooseneck faucet, 10-1/2” high, 5” clearance, 5-1/2” reach, 4” wrist blade handles, 1.5 gpm vandal resistant aerator.
   c. Trim: Just Model J-35 stainless steel basket strainer.

2. S-2 – Double compartment, 18 ga. self-rimming (size 22”x33”x8”).
   a. Fixture: Just Model DL-2233-A-GR.
   b. Faucet: T&S Brass Model B-2347-05, swivel gooseneck faucet, 13-1/2” high, 6” clearance, 8-3/4” reach, 4” wrist blade handles, 1.5 gpm vandal resistant aerator, hose and spray.
   c. Trim: Just Model J-35 stainless steel basket strainer (2 each).

3. S-3 – Double compartment, 16 ga. floor mounted (size 36”x80”x42”).
   a. Fixture: Aero Model MF2-3020-36L
   b. Faucet: T&S Brass Model B-0330-04-116X, splash mounted 24” total reach double joint swing spout with 4” wrist blade lever handles and 1.5 gpm vandal resistant aerator.
   c. Trim: Rotary level operated drain outlet (2 each), continuous waste drain connection.

F. Showers: Note: provide for each shower head, a separate high-temperature shut-off device equal to Powers HydroGuard Model HT115.

1. SH-1 – ADA Compliant shower enclosure, fittings and drain.

   a. Shower Enclosure: Comfort Designs Model SSS 3682 BF. Open top gelcoat shower unit, full wood backing, pre-leveled easy base, barrier free threshold, integral stainless-steel grab bars on 2 sides, integral vertical stainless-steel grab bar, no caulk brass drain, stainless steel curtain rod/cups.
   b. Shower Valve: Zurn Model Z-7101-SS-LH-DVP2-HW-MT, pressure balancing valve with single metal handle, metal cover, escutcheon and stem handle, diverter valve.
   c. Spray Head: Zurn Model Z7000-S1, shower head with 2.5 gpm water flow control.
   d. Accessories and Trim:
      i. 2.5 gpm hand/wall shower head
      ii. 60” flexible metal hose
      iii. 36” wall mounted slide bar

G. Bottle Fillers: All capacities (G. P. H.) are based on 50-degree F., drinking water, 80-degree F., inlet water and 90-degree F. ambient. All shall be NSF 61 compliant and contain less than 0.25% lead (Pb) by weight.

1. EBF-1 – ADA Compliant, Barrier-free, stainless steel with integral drain and stainless-steel cabinet with bottom louvered stainless-steel panel.

   a. Fixture: Murdock Model A0000000-BF48, 8.0 gallons per hour cooling capacity.
   b. Accessories and Trim:
      i. BAT – Battery operated sensor.
      ii. WF1 – Water Filter, NSF 42 and 53, 1500-gallon capacity, 1 micron.

H. Hose Bibbs:

1. HB-1 - Hose Bibb: Non-freeze wall hydrant (designed to fit one standard modular masonry course), stainless steel box with hinged locking cover stamped “WATER”, bronze hydrant, hose connection with integral vacuum breaker, and "T" handle key, Wade Model 8701-BB, Hydrant shall be 3/4 inch.

2. HB-2 - Hose Bibb: Mild climate box wall hydrant, Hydrant in hinged covered box, stainless steel box and hinged cover and, "T" handle key, Wade Model 8708, hydrant shall be 3/4 inch.

3. HB-3 - Hose Bibb: Roof mounted post-type hydrant equal to Murdock Model 3907 with integral check valve for backflow prevention. See Detail on

Drawings for clarity.

4. HB-4 - Hose Bibb: Quarter-turn ball hose end valve equal to American Valve Model M74QT. Provide with American Valve Model MVB vacuum breaker.

I. Trap Primers:

1. TP-1 Trap Primer: Trap primer shall be connected to water closet flush valve. Exposed piping shall be chrome plated, provide chrome-plated escutcheon at mount to wall. Zurn Model Z-6000 TPO.

J. Trap Guard

1. TG-1 - Trap Guard: Flexible elastomeric tube treated to roll up when water is not passing through to resist emission of sewer gases, as ProSet®, MiFab, Smith, or Green Drain. Trap guard to be designed to meet dimensional and installation requirements of specified floor drain.

K. Water Hammer Arrestors (WHA):

1. Water hammer arrestors shall be piston type.

2. Water hammer arresters shall be type approved for installation with no access panel required.

3. All water hammer arresters shall be NSF 61 compliant and contain less than 0.25% lead (Pb) by weight.

4. The following schedule for Sioux Chief Hyrda-Rester arrestors shall apply:

P.D.I SYMBOL	FIXTURE UNIT RATINGS
A	4-11
B	12-32
C	33-60
D	61-113
E	114-154
F	155-330

L. IMB – Ice Maker Box: White powder coated steel recessed metal box with quarter-turn ball valve and integral water hammer arrester. Box equal to Guy Gray Model MIB1HAAB where installed in non-fire rated construction or Guy Gray Model FRIB12ABSHA where installed in fire rated construction. Provide with NSF 61 compliant (lead free) 10-foot-long stainless-steel icemaker connector equal. Make final connection to equipment.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Fixture Setting: Opening between fixture and floor and wall finish shall be sealed with silicone based caulking. Grout other excessive gaps as required.

B. Supports and Fastenings: Secure all fixtures, equipment and trimmings to partitions, walls, etc., with brass through bolts, toggle bolts, expansion bolts, or power set fasteners, as required. Exposed heads of bolts and nuts in finished rooms to be hexagonal, polished chromium plated brass with rounded tops.

C. Support wall hung lavatories and urinals by appropriate carriers.

D. Tightly cover and protect fixtures and equipment against dirt, water and chemical or mechanical injury.

E. Where water closet waste pipe rough-in is misaligned with fixture location, modify piping to eliminate relocation of water closet.

F. Attach floor mounted water closets to closet flange.

G. All exposed metal trim and piping shall be chrome plated brass and polished.

H. Trim which can be removed or disassembled without tools is not permitted.

I. Furnish and install plumbing fixtures and pertaining appurtenances of the manufacturer and model number as indicated in these specifications and/or noted on the plans.

J. Replace any fixtures or equipment broken, cracked, discolored, pitted, or otherwise imperfect.

K. Setting height or location of fixtures shall be as dimensioned or as directed by ARCHITECT.

L. Provide plumbing fixtures with accessible stops in supplies or with integral stops in faucets. Provide lavatory faucets, sink faucets, and supply stops with renewable seats.

M. Provide closets with white bolt caps with retainer clips. Use all mineral gasket with plastic discharge sleeve having ethane core reinforcement.

N. Install all wall, roof and ground hydrants in strict accordance with manufacturer's recommendations and applicable details on Drawings. Hydrants shall be installed such that box/hydrant is square and plumb with adjacent building construction. Where wall hydrants are specified to match standard brick dimensions, adjust location in field to avoid cutting bricks and install with long dimension horizontal and hinge on bottom of box.

O. Install all fixtures in strict accordance with manufacturer's recommendations.

P. Water Hammer Arrestors:

1. All water supply piping fittings and fixtures shall be protected against water hammer, shock or surge pressure by installation water hammer arrestors.

2. Water hammer arresters shall be installed per the manufacturer's recommendations. This shall include spacing, sizing, etc.

3. Fixture piping shall be adequately anchored to prevent vibration.

4. CONTRACTOR must guarantee against water hammer at end of project.

3.2 CLEANING:

At completion of all work, fixtures, exposed materials and equipment shall be thoroughly cleaned.

3.3 OPERATIONAL TESTS

Pour at least five (5) gallons of water into every floor drain to test for pipe stoppage. Remedy all stoppage.

END OF SECTION

Domestic Water Heaters and Accessories

PART 1 – GENERAL

1.1 SCOPE

Provide all labor, equipment, material, etc., required to complete water heater installations specified herein and/or shown or scheduled on Contract Drawings.

1.2 APPLICABLE STANDARDS

A. A.S.M.E. Code Sections where referenced or applicable.

B. The water heater shall include all standard equipment as shown on manufacturer's specification sheet, shall fit properly into the space provided for it and shall conform to the Drawing requirements. The complete installation shall be in accordance with all applicable state and local codes and installation drawings/details.

PART 2 – PRODUCTS

2.1 DOMESTIC HOT WATER EQUIPMENT

A. Large Commercial Natural Gas Water Heaters:

1. Heater shall be of ASME glass lined design, UL listed with a working pressure of 160 psi, and ASME rating at 125 psi with appropriate stamp. Minimum storage capacity shall be as scheduled on Drawings.
2. Heater and insulation shall meet minimum requirements of ASHRAE 90A.
3. Heater shall be equipped with stainless steel water connections, and boiler type hand hole cleanout.
4. Heater shall be equipped with an integrated control system consisting of a 180º F., adjustable thermostat with upper and lower sensing bulbs.
5. Heaters shall be equipped with a manual reset gas shut off device, a gas pressure regulator set for fuel provided, coated steel burners, draft diverter and anodes for cathodic protection.
6. The outer jacket shall have a baked enamel finish.
7. Required approvals A.G.A. certification and NSF certification for 180-degree F service.
8. Units to be furnished with properly sized ASME temperature and pressure relief valve.
9. Unit shall be of energy efficient design, with flue damper and minimum A.F.U.E. of 90%.
10. Provide separated combustion and venting/intake ducting per manufacturer's recommendations.

2.2 ACCESSORIES

A. Relief Valve for Gas and Electric Water Heaters: Brass or bronze, fully automatic, self-closing combination pressure and temperature ASME relief valve. Pressure relief valve shall be spring operated with testing lever, set for 100 pounds pressure. Temperature relief valves shall contain a non-corrosive metal thermostat with bulb. Pipe discharge to floor or as directed on Drawings or by PROFESSIONAL.

B. Potable Water Expansion Tank (EXPT)

Provide potable water expansion tanks with factory finished metal outer jacket with FDA approved rubberized bladder with pre-charged tank and charging valve. Acceptance volume shall be within five percent (5%) of minimum specified (see detail(s) on schedule on Drawings). Support units as recommended by unit manufacturer and Industry Standards. Expansion tanks shall be rated for 125 psi. ASME construction shall be provided where water heater is ASME constructed. See Schedule/Drawings for more information.

C. Circulating Pump:

In line pumps shall be circulators with all bronze or stainless-steel waterway design. Pumps shaft shall have mechanical seal and shall be connected to motor shaft. Pump motor shall be sized for continuous duty operation, with sleeve or ball bearings and lubrication fittings, or system lubricated type. Pump shall be B & G, Grundfos, Taco or equal.

PART 3 – EXECUTION

3.1 LEAKAGE TEST:

Before connections are made, test heaters and tanks with hydrostatic pressure of 150 psig and prove tight.

3.2 PERFORMANCE TEST:

A. Prove system is balanced and 105 degrees F. is available at farthest outlet from heaters.

B. Install heater as per manufacturer's instructions. Refer to Section *Basic Mechanical Materials and Methods* for instruction of ferrous to non-ferrous piping connections. Refer to Drawings for detail of water heater installation, if applicable.

C. Provide all pipe, fittings, and accessories as indicated or required for complete installation.

D. See Section *Testing, Adjusting and Balancing* for setting water heaters, and testing/setting fixtures and valves, etc.

END OF SECTION

Packaged Air Conditioners

PART 1 – GENERAL

1.1 SCOPE

A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Contract Drawings.

B. Work Included: Self-contained units, rooftop units, window units, through-wall units, computer room units, and split systems.

C. Warm air furnace/evaporator coil and condensing units.

D. Definitions:

1. Energy Efficiency Ratio (EER): A ratio calculated by dividing the cooling capacity in Btuh by the power input in watts at any given set of rating conditions, expressed in Btuh per watt (Btuh/watt).

2. Unitary (ARI): Consists of one or more factory-made assemblies, which normally include an evaporator or cooling coil, a compressor and condenser combination, and may include a heating function.

1.2 APPLICABLE STANDARDS

A. Refer to Section *Basic Mechanical Materials and Methods*.

B. Safety Standards:

1. Design, manufacture and installation of mechanical refrigeration equipment: ANSI B9.1.

2. Machinery Guards: Provide guards as shown in AMCA 410 for belts, chains, couplings, pulleys, sheaves, shafts, gears and other moving parts regardless of height above the floor. Drive guards may be excluded where motors and drives are inside factory fabricated unit casings.

C. Corrosion Prevention: Unless specified otherwise, equipment fabricated from ferrous metals that do not have a zinc-coating conforming to ASTM A386 or a duplex coating of zinc and paint shall be treated for prevention of rust with a factory coating or paint system that will withstand 125 hours in a salt-spray fog test, except that equipment located outdoors shall be tested for 500 hours. The salt-spray fog test shall be in accordance with ASTM B117 using a 20 percent sodium chloride solution. Immediately after completion of the test, the coating shall show no signs of blistering, wrinkling or cracking, no loss of adhesion, and the specimen shall show no signs of rust creepage beyond 1/8 inch on either side of the scratch mark. The film thickness of the factory coating or paint system applied on the equipment, shall be not less than film thickness used on the test specimen.

D. ARI Standards:

1. Capacity 135,000 BTU/HR and Greater: ARI 360.

2. Capacity Below 135,000 BTU/HR: ARI 210. Units shall be listed in the ARI Directory of Certified Unitary Air Conditioners.

PART 2 – PRODUCTS

2.1 UNITARY AIR CONDITIONERS

Self-Contained Combination Packaged Unit (Up to 30 Tons): Air-conditioner shall be a

factory packaged cooling combination heating and cooling single zone unit as indicated and shall be suitable for mounting on either the roof of building or a concrete pad on ground as indicated on Drawings. The package shall consist of one or more refrigerant compressors with electric motors, cooling coils, condensers, fans, air filters, heating section, control wiring and piping, all factory assembled in a weatherproof enclosure mounted on a structural steel base ready for field connection to utilities and ducts. The package unit shall be sufficiently rigid and arranged to permit handling by a crane boom or by helicopter.

A. Unit Enclosure: Construct with removable insulated access panels completely weatherized for outside installation, and properly reinforced and braced. Provide panels and access door for inspection and access to all internal parts. Provide insulated enclosure with adequate reinforced points of supports for setting of the unit. Joints shall be air and watertight. Base shall consist of a one piece welded assembly with 14 gauge members.

B. Access to compressors, evaporator fan, controls and air filter sections shall include hinged access doors with weatherproof gasketed seal and quarter turn latches.

C. See Detail on Drawings for curb construction requirements.

D. Provide manufacturer approved heavy duty louvered or expanded metal grille hail guard spaced minimum 2” from face of condensing coil. See detail on Contract Drawings.

E. Cabinet Insulation: One inch (1") thick and 3/4 pound density to prevent condensate from forming on the unit casing from air entrance at coils to air outlet of unit. Insulation shall meet the requirements of NFPA Standard 90A and be protected against deterioration and delamination from air currents. Insulate condensate drain pan with water impervious insulation of sufficient thickness to prevent condensate formation on the exterior at ambient conditions encountered.

F. Evaporator Fan: Forward curved type (or backward inclined) DWDI Class I centrifugal type specifically designed and suitable for the operating pressure conforming to AMCA 210. Provide adjustable pitch pulley. Units shall have greaseable lubricated ball bearings. Statically balance fan assemblies in the fan housing and final assembly. Fan motors to be isolated with spring isolators. Fan motors shall conform to NEMA MG-1. Motor starters shall conform to NEMA ICS. Motors shall have thermal overload protection. Three phase motors shall have protection from phase loss, reversal, and high/low voltage.

G. Compressors: Provide scroll type conforming to ARI 520, provided with all minimum standard equipment and accessories listed therein.

1. Compressor shall be of the scroll type and shall include high and low pressure cutouts, overloads, and inherent thermostat.

2. Compressors shall be suction gas cooled and include integral centrifugal oil pump to provide positive lubrication of all moving parts.

3. Compressors shall include anti-slugging device, timed automatic restart delay and crankcase heaters.

4. Individual compressor isolation valves shall be provided where compressors are installed in tandem arrangement on the same refrigerant circuit.

5. Three phase compressors shall have protection from phase loss, reversal, and high/low voltage.

H. Coils:

1. Condenser, and evaporator coils shall be copper type with aluminum fins and conform to ARI 410 or as approved.

2. Condensing Coils for Multi-Compressors: Provide a separate air cooled condenser circuit for each multi-compressor separate circuited installation(s). If compressors are paralleled, provide not less than two independent circuits, and no less separate circuits or distinct levels of control than scheduled. A common-housing may be used, but each coil must be provided with separate controls to operate individual condenser fans for each coil. All coils shall sub-cooler. The air-cooled condenser coil shall be extended-surface fin-and-tube with seamless copper tubes with aluminum fins. The coils shall be tested for 425 psi. In the event one compressor fails, the other compressor(s) shall continue to operate on the other independent circuit.

3. Evaporator coils for multi-circuited systems shall be split face design.

I. Filter Boxes: Provide filter boxes with insulated hinged access doors with snug fitting air filter frame allowing a maximum 1% of scheduled air flow bypass.

Filters shall be of the high velocity to serve the airflow capacity indicated on Contract Drawings. See Section *Air Cleaning/Treatment* for air filter specifications, including type, efficiency and number.

J. Heating Section (All units shall have heat in reheat position):

1. Primary heating/reheat capability (dehumidification mode).

Hot refrigerant gas condenser coil (when refrigerant compressor(s) are running) with two-position hot gas reheat valve.

2. Secondary/Supplemental Heating (in Reheat Position)

Gas Fired Furnace: Heat exchanger tubes and cylindrical drum shall be constructed of aluminized steel with a stainless steel power burner section. Stainless steel power burner shall have prepurge, electric spark ignition, 100% safety shutoff controls, electronic flame sensing controls, series gas valves and limit controls. Staging control shall be with separate gas valves. All controls shall be listed for operation at low outdoor air temperatures. Burner shall be equipped with inspection window and air shutter for combustion air adjustment. Complete service access shall be provided for controls and wiring. Shall be A.G.A. design certified for outdoor installation. Units with cooling capacity exceeding 5 tons shall have 2-stage heating capability heat in the re-heat position. Provide multistage controls of capacity and characteristics as scheduled on Drawings.

K. Power Safety and Auxiliary Electric Controls and Accessories:

1. Three-phase units shall be provided with phase loss/reversal and brownout protection to shut down all motors in the unit if the phases are more than 10% out of balance on voltage, or the voltage is more than 10% under or over design voltage. These electrical controls shall include automatic restart capability.

2. Unit shall be provided with a factory installed 115 volt, 15 amp ground fault service receptacle. Receptacle to be factory powered requiring separate

electrical connection.

3. Rooftop mounted equipment shall be provided with thru-base electrical connections.

L. Controls:

1. Unit shall be factory provided with a BACNET MSTP interface “card” to allow Owner’s building EMS to read, reset, and control unit operation from remote workstation, etc.

2. Combination automatic heating/cooling changeover and auto-on fan switch shall be remotely zone mounted where indicated. Mount all other controls including motor starters and safety controls inside the enclosure. All wiring inside enclosure shall be accomplished at the factory. Unit mounted control panel shall include magnetic contactors for compressor, evaporator and condenser fan motors, three leg compressor overloads high and low pressure cutouts, oil pressure cutouts, non-recycling pump down and reset relay.

3. Provide unit manufacturer’s programmable thermostat with battery or error backup capability and humidistat for field remote mounting. Thermostat shall provide number of stages and configuration for fan speed change selection and to match scheduled stages and specified sequence.

4. Condenser Controls: Provide head pressure control with variable speed condenser fans to insure condensing temperature for proper system operation at all ambient temperatures down to 0ºF. Condenser fans to be heavy duty permanently lubricated ball bearing type with built-in thermal overload protection. Provide units with low ambient controls where scheduled with multiple cooling circuits or required to provide stable operation to suit application.

5. Condenser Start Up Control: Provide condenser with a start-up control package which permits start-up of compressor at ambient temperature of 0ºF. Package shall temporarily by-pass system low pressure-start to permit start-up whenever minimum ambient temperature is below design evaporator coil suction temperature. Provide low ambient start-up capability where required to suit application.

6. Economizer:

a. Systems scheduled on Drawings shall have an outdoor air option with moisture eliminators and full economizer cycle and shall include motorized automatic exhaust fan or fans, and motorized automatic modulating return and outside air dampers. Economizer cycle shall be controlled on a differential enthalpy basis.

7. Provide low limit temperature sensors on face of evaporator on systems with multiple refrigeration circuits for each stage of refrigeration, with adjustable time delay and automatic restart controls.

M. Warranty: See Section *Mechanical Systems and Equipment Warranties* for more information.

2.2 SPLIT DIRECT EXPANSION SYSTEMS

A. Ductless Mini-Split Systems:

1. Unit shall consist of reverse-cycle heating section and cooling coil in preassembled package. Unit shall consist of a supply fan, evaporator/heat pump coil and air filter section assembled in common cabinet.
2. Compressor shall be inverter driven variable speed type. Provide with refrigerant isolation valves on unit.
3. Unit shall include automatic restart capability following power outage.
4. Capacity and characteristics shall be as indicated on Contract Drawings. Provide data on air pressure drop of evaporator.

2.3 REFRIGERANT SPECIALTIES

A. Refrigerant specialties shall be provided and include thermostatic type expansion valves, refrigerant strainers, liquid sight-flow fittings, moisture indicator, and other devices indicated by the drawings and diagrams. Thermostatic expansion valves shall have externally mounted thermostatic elements connected to valve through capillary tubing of suitable length with external equalizer and with super heat adjustment.

B. Solenoid valves shall be suitable for a minimum of 250 lbs. working pressure fitted solder type or threaded connections and with seal-cap type manual lifting stem. Valves shall be suitable for operation with available current and provided with suitable solenoid coil protector. Specialties shall be Alco or Sporlan.

C. Provide ahead of each expansion valve a sight glass. Provide ahead of each expansion valve and/or solenoid valve a filter-dryer and moisture indicator.

PART 3 – EXECUTION

3.1 INSTALLATION

Handle and install units and accessories in accordance with ARI 260 and the manufacturer's printed instructions. Unit shall be started up and checked out by a factory service representative. CONTRACTOR shall furnish PROFESSIONAL completed start-up report covering unit operation and start-up. A copy of same shall be included in Close-out Documents. See Section MECHANICAL CLOSE-OUT REQUIREMENTS.

3.2 TESTS

Perform tests and make reports in accordance with Sections *Basic Mechanical Materials and Methods* and *Testing, Adjusting, and Balancing*.

3.3 UNIT CAPACITY

Characteristics and capacity of systems shall be as indicated on Contract Drawings.

3.4 CONTROLS

All systems will be provided with automatic heating/cooling changeover controls; one or two stage heating and/or cooling as required. Provide auxiliary time clocks and thermostats and/or humidistats as indicated in Section *Controls and Instrumentation*.

3.5 AIR FILTRATION

See Section *Air Cleaning/Treatment* for specific requirements.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE

A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Contract Drawings.

B. Work included: Fans for heating, ventilating and air conditioning.

C. Product Definitions: AMCA Publication 99, Standard 1-66.

1.2 APPLICABLE STANDARDS

A. Fans and power ventilators shall be listed in the current edition of AMCA 261, and shall bear the AMCA performance seal.

B. Operating Limits for Centrifugal Fans: AMCA 99 (Class 1, 11, and 111).

C. Fans and power ventilators shall comply with the following standards:

1. Testing and Rating: AMCA 210.

2. Sound Rating: AMCA 300.

D. Performance Criteria:

1. The fan schedule shows CFM and design static pressure. Scheduled fan motors, ½ horsepower and larger, are to be sized for design CFM at 110 percent design static pressure, but not to exceed ¾-inch additional pressure.

2. Provide fans and motors capable of stable operation at design conditions and at 110 percent pressure as stated above.

3. Lower than design pressure drop of approved individual components may allow use of a smaller fan motor and still provide the safety factor. When submitted as a deviation, a smaller motor may be approved in the interest of energy conservation.

4. Select fan operating point as follows:

a. Forward curved and axial fans: Right hand side of peak pressure point.

b. Airfoil, backward inclined or tubular: Near the peak of static efficiency.

E. Safety Criteria: Provide manufacturer's standard screen on fan inlet and discharge exposed to operating and maintenance personnel.

PART 2 – PRODUCTS

2.1 CENTRIFUGAL FANS

A. General:

1. Standards and Performance Criteria: Refer to Paragraph, QUALITY ASSURANCE.

2. Construction: Wheel diameters and outlet areas shall be in accordance with AMCA standards.

a. Housing: Low carbon steel, arc welded throughout, braced and supported by structural channel or angle iron to prevent vibration or

pulsation, flanged outlet, inlet fully streamlined. Provide lifting clips, and casing drain. Provide manufacturer's standard access door. Provide screens for fan inlets without duct connections.

b. Wheel: Steel plate with die formed blades welded or riveted in place, factory balanced statically and dynamically.

c. Shaft: Designed to operate at no more than 70 percent of the first critical speed at the top of the speed range of the fans class.

d. Bearings: Heavy-duty ball or roller type sized to produce a B10 life of not less than 40,000 hours, and an average fatigue life of 200,000 hours. Extend lubrication tubes for interior bearings or ducted units to outside of housing.

e. Painting: AMCA Standard preparation for coating 2601-66-1E33, followed by manufacturer's standard rust resistant baked enamel colored coating inside and out.

3. See Section *Electrical Requirements* for motor and starter requirements.

4. See Detail on Drawings for roof curb construction requirements.

B. Exhaust Air Fans

1. Direct Drive Above Ceiling Type:

a. Fan shall be mounted above ceiling and vent routed as indicated. Fan shall have forward curved wheel constructed of aluminum. Fan motor shall be of the shaded pole type. Housing shall be of the steel construction with baked enamel finish. Grille mounted in ceiling shall be of extruded aluminum.

b. Capacity and characteristics shall be as indicated on Contract Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fan, motor and drive in accordance with manufacturer's instructions.

B. Align fan and motor sheaves to allow belts to run true and straight.

C. Bolt equipment to curbs with galvanized lag bolts, number and location per manufacturer’s instructions.

3.2 PRE OPERATION MAINTENANCE

A. Grease bearings and install maintenance notation chart per Section *Basic Mechanical Materials and Methods*.

B. Rotate impeller by hand and check for shifting during shipment and check all bolts, collars, and other parts for tightness.

3.3 START UP AND INSTRUCTIONS

Check vibration and correct as necessary for air balance work.

3.4 ACCESSORIES

Provide all accessories including roof curbs, solid state speed controllers, wall mounting

collars, insect and/or bird screen, OSHA approved motor and inlet/outlet protecting guards, back draft damper (motorized or manual as indicated), thermostats, vibration isolators and starters with pilots, etc., as indicated or required.

END OF SECTION

Air Cleaning/Treatment

PART 1 – GENERAL

1.1 SCOPE

A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Contract Drawings.

B. Descriptions:

1. Air filters for Heating, Ventilating and Air Conditioning.

2. Definitions: Refer to newest edition of ASHRAE 52.2 for definitions of face velocity, net effective filtering area, media velocity, resistance (pressure drop), minimum efficiency reporting value (MERV), etc.

1.2 APPLICABLE STANDARDS

Air Filter Performance Report for Extended Surface Filters:

A. Submit a test report for each type of filter being offered. The report shall be less than two years old and have been prepared by an independent testing laboratory using test equipment, method and duct section as specified by ASHRAE Standard 52.2-1999 for type filter under test and acceptable to ENGINEER, indicating that filters comply with the requirements of this specification. Test for 500 fpm will be accepted for lower velocity filters provided the test report of an independent testing laboratory complies with all the requirements of this specification.

1. Selection procedures for manufacturer's standard products: All filters tested shall have been procured by the independent testing laboratory from the open market independent of manufacturer of these filters and a statement to this effect must accompany test report.

2. Selection procedures for new products not available on open market: Testing laboratory will certify that filters are not available in areas remote from manufacturer’s facilities. For each required test the independent Testing Laboratory shall select from the manufacturer's stock or production the number of samples required. The samples selected shall be representative of standard production considering media utilized and manufacturing locations. These test reports shall be less than six months old.

B. Filter Supplier Warranty for Extended Surface Filters: Guarantee the filters against leaks, blow-outs, and other deficiencies during their normal useful life. Defective filters shall be replaced at no cost to the Owner.

C. Identification: Each filter shall bear markings indicating manufacturer's name, filter size, and MERV & MERV-A ratings per ASHRAE Standard 52.2.

D. Definitions and Abbreviations

1. Spares: Filter(s) in sets to be turned over to the OWNER at the end of the project for the OWNER’S use after the project or any portion thereof, is complete.

2. Construction Period: This term generally includes the time period beginning with the OWNER’S notice-to-proceed and ending with the OWNER’S final acceptance of a project, or any phase of a project.

3. Temporary: A term generally depicting the use of air filters for use during

the construction period.

4. Filter Grille: An inlet device connected to an HVAC system where an air filter is to be installed and maintained during construction and permanently after project is completed.

5. Pleated Filters: An extended surface filter with folds of air filtration media.

6. Filter or Filter Set: Air filter(s) in sizes as recommended by equipment or supplier manufacturer to prevent air bypass and to provide the maximum face size and minimum velocity to promote longer filter life expectancy.

7. F/G: fiberglass

1.3 RESPONSIBILITY

A. The CONTRACTOR is responsible for providing, monitoring and maintaining all air filtration specified provisions during the construction period.

B. The CONTRACTOR is also responsible for providing spare sets of air filter(s) to the OWNER, labeled and in boxes for storage, for the OWNER'S use after the project is complete and at which time the OWNER assumes control of operation and maintenance functions for the systems. One of the filter spare sets shall be installed on the day of the final inspection by the PROFESSIONAL.

1.4 AIR FILTRATION PROTECTION REQUIRED

The following systems and installations shall be provided with proper air filtration prior to startup or use of the facilities new HVAC systems and existing or renovated HVAC systems in the area(s) affected by this project.

A. All new air handling systems, including split systems and rooftop packaged systems.

B. Filter grilles or registers.

C. Ducted return air systems: Provide temporary air filtration over all return air grilles, registers and filter grilles (in addition to filters in frame of filter grille).

1.5 TYPE OF AIR FILTRATION REQUIRED

The following is a listing of generic equipment and installation air filtration requirements. The CONTRACTOR may submit alternate filter thickness(es) to match specific applications but shall not be less than that listed, for PROFESSIONAL'S approval. The CONTRACTOR shall verify size, including thickness matched to CONTRACTOR supplied equipment and air distribution device accessory.

AIR FILTRATION REQUIREMENTS					
GENERAL INFORMATION			**CONSTRUCTION PERIOD FILTRATION**	**SPARES (PROJECT COMPLETION FILTRATION)**	
FILTER FUNCTION/ LOCATION	**FILTER TYPE**	**NOMINAL FILTER DEPTH/ THICKNESS**	**MINIMUM MERV & MERV-A RATINGS**	**MINIMUM MERV & MERV-A RATINGS**	**NUMBER OF SETS REQUIRED**
RETURN AIR GRILLES/ REGISTERS	PLEATED	1”	11	N/A	N/A
DUCTLESS SPLIT SYSTEMS, (DSS)	WASHABLE	-	4	4	1
PACKAGED UNITS, (RTU’S)	PLEATED	2”	11	13	3

PART 2 – PRODUCTS

2.1 EXTENDED SURFACE AIR FILTERS

A. Filter shall be pleated, disposable type. Filter shall consist of non-woven cotton and synthetic fabric media, media support grid and enclosing frame.

B. The filter shall be listed by Underwriters Laboratories as Class 2.

C. The media support shall be a welded wire grid with an effective open area of not less than 96%. The welded wire grid shall be bonded to the filter media to eliminate the possibility of media oscillation and media pull away.

D. The enclosing frame shall be constructed of a rigid, heavy-duty beverage board with diagonal support members bonded to each side of the filter to insure pleat stability. The inside periphery of the enclosing frame shall be bonded to the filter pack to eliminate possibility of air bypass.

E. Filter Characteristics

MINIMUM EFFICIENCY REPORTING VALUE (MERV & MERV-A)	**FILTER DEPTH/ THICKNESS**	**PRESSURE DROP (IN. W.G. @ 350 F.P.M.)**		**PRESSURE DROP (IN. W.G. @ 500 F.P.M.)**	
		INITIAL	**FINAL**	**INITIAL**	**FINAL**
8	1”	0.23	0.5	-	-
8	2”	-	-	0.29	0.75
11	1”	0.30	0.50	-	-
11	2”	-	-	0.35	0.75
13	2”	-	-	0.35	0.75

2.2 WASHABLE AIR FILTERS (DSS) - SEE SECTION *PACKAGED AIR CONDITIONERS.*

PART 3 – EXECUTION

3.1 INSTALLATION AND COORDINATION

A. Install supports, filters and gages in accordance with manufacturer's instructions.

B. At end of project, provide list of all HVAC air handling equipment and filter grilles, with size and quantity of air filters and MERV rating for each, and submit for Owner’s

future use and maintenance record. Furthermore, submit a letter signed by the OWNER acknowledging receipt of all spare sets of air filters outlined above. All boxes of air filters shall be labeled to match the individual HVAC system or return air filter grille location for which the filters are to be utilized.

3.2 START-UP AND TEMPORARY USE

A. Clean and vacuum air handling units and plenums to the satisfaction of the ENGINEER prior to starting air-handling systems.

B. Change out replaceable air filters, as filters are 60% loaded during construction use period and just prior to OWNER'S acceptance of project. Filters for use during construction period are in addition to OWNER'S spare sets, as specified herein.

C. Thoroughly wash wall unit filters as filters are 40% loaded during construction period, and just prior to OWNER'S acceptance of project.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE

A. Provide all material, equipment and labor, etc., required including all supply, return, outside air, exhaust, and other ductwork and as required for the A/C system, including mains, branches, plenums, mixing boxes, fittings, accessories, and other related sheet metal work for a complete installation as specified herein and/or shown on Drawings.

B. Work under this Section includes but is not necessarily limited to the following items: Ductwork for heating, ventilating and air conditioning systems.

C. Construct ductwork to meet all functional criteria defined in the SMACNA "HVAC Duct Construction Standards - Metal and Flexible" Latest Edition. This shall be subsequently referred to as the SMACNA Manual.

1.2 APPLICABLE STANDARDS

APPLICABLE PUBLICATIONS: The publications listed below form a part of this Specification to the extent referenced. The publications are referenced in the text by the basic designation only.

A. National Fire Protection Association (NFPA):

1. 90A.....Air Conditioning and Ventilating Systems – Latest Edition
2. 90B…….. Warm Air Heating and Air-Conditioning Systems – Latest Edition
3. 96.....Vapor Removal from Cooking Equipment – Latest Edition

B. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):

1. Low Pressure Duct Construction Standards – Latest Edition
2. Guidelines for Welding Sheet Metal – Latest Edition
3. Duct Liner Application Standard – Latest Edition

1.3 DEFINITIONS

A. Seal or Sealing: Use of liquid or mastic sealant, with or without compatible tape overlay, or gasketing of flanged joints, to keep air leakage at duct joints, seams and connections to an acceptable minimum.

B. Exposed Duct: Exposed to view in a finished room or outdoors.

1.4 QUALITY ASSURANCE

A. The CONTRACTOR must comply with the enclosed specification in its entirety.

B. At the discretion of the PROFESSIONAL, sheet metal gauges, reinforcing and sealant may be checked at various times during the construction period to verify all duct construction is in compliance.

C. If during site observations the PROFESSIONAL finds changes have been made without prior approval, the CONTRACTOR will correct deficiencies identified to comply with this specification solely at the CONTRACTOR's expense.

D. Duct penetrations and/or doors, etc., necessary for the PROFESSIONAL to observe the duct installations, shall be made/installed and repaired, etc. by this

CONTRACTOR, in ductwork as selected by PROFESSIONAL, at no additional cost to the OWNER or PROFESSIONAL.

E. All ductwork shall be installed un-insulated (except duct liner), subsequently sealed and observed/approved by PROFESSIONAL prior to insulating.

PART 2 – PRODUCTS

2.1 DUCTWORK PRESSURE CLASS CONSTRUCTION REQUIREMENTS

A. Ductwork shall be constructed to meet or exceed the SMACNA Standards based upon the following table of ductwork type and function.

DUCTWORK FUNCTION	DUCTWORK TYPE	DUCTWORK PRESSURE CLASS (IN. W.G.)
Low Pressure Supply Air	Rectangular	2 (pos.)
Low Pressure Supply Air	Round or Oval	2 (pos.)
Low Pressure Return Air	Rectangular	2 (neg.)
Low Pressure Return Air	Round or Oval	2 (neg.)
Low Pressure Exhaust Air	Rectangular	2 (neg.)
Low Pressure Exhaust Air	Round or Oval	2 (neg.)

B. Ductwork with the type not specifically indicated on Drawings shall be constructed to 2 in. w.g. unless upstream of terminal units (variable air volume boxes) which shall be constructed to 4 in. w.g.

2.2 RECTANGULAR DUCTWORK

A. General Requirements

1. Construct all rectangular ductwork with approved new prime G-90 or better galvanized steel sheet ASTM S27 (LFQ) with chemical treatment or as specified, with careful, neat, and accurate workmanship and with all joints and seams air tight. Longitudinal seams, transverse joints and bracing, sheet metal gauges and other construction details shall be as recommended in the latest edition of the ASHRAE Guide and SMACNA "HVAC Duct Construction Standards – Metal and Flexible", and as specified below.

2. **The rectangular duct sizes as indicated on the Drawings are inside dimensions, or net free area.** All necessary allowances should be made in the sizes shown on the Drawings to accommodate internal insulation or acoustic lining.

3. All ductwork shall be provided with any re-enforcements factory installed to meet the SMACNA pressure classifications listed in paragraph 2.01.

4. Transitions shall have a ratio of at least 4 to 1 except where prevented by job conditions. In such case the transition shall be made as gradual as possible.

5. All duct transitions from square to round shall be smooth square-to-round transitions. Spin-in fittings at the end of capped ducts are not acceptable.

6. Flanged (TDC or TDF) ductwork with reinforced gasketed joints shall be installed in the following applications:

a. Indoor ductwork with any dimension greater than 30 inches.

b. All indoor ductwork exposed to view regardless of size.

c. All outdoor ductwork regardless of size.

7. Rectangular ductwork exposed to weather shall be crowned to shed water.

B. Low Pressure Ductwork

1. Elbows shall be either mitered or radius type for 90 degree turns and radius only for all turns less than 90 degrees as indicated on the Drawings.

2. Mitered elbows shall be constructed using turning vanes in each mitered 90 degree turn. Turning vanes shall be galvanized steel of double-wall air foil design. Where ductwork is greater than or equal to 12” in the plane of the turn, install turning vanes with 4" minimum radius of curvature on a maximum of 4" centers. Where ductwork less than 12” in the plane of the turn, install turning vanes with 2" minimum radius of curvature on a maximum of 2" centers.

3. Curved elbows shall have a centerline radius of 1-1/2 times the cross-sectional dimension of the duct in the plane of the turn.

4. All rectangular branch connections to rectangular ducts shall be a lateral or radius type and include an externally adjustable factory fabricated air turning vane assembly. Where lateral types are installed, the length of the lateral shall be equal to one quarter of the duct width but in no case less than 4”. Where radius types are installed, the centerline radius shall be 1-1/2 times the branch duct dimension in the plane of the turn.

2.3 INTERNAL INSULATION (DUCT LINER) FOR RECTANGULAR DUCTWORK

A. Duct liner shall meet all of the following requirements and include independent testing lab verification of conformance with all of the following product characteristics.

1. Duct liner shall be made of spun or flame attenuated fiberglass with a factory-applied edge coating and of thickness and density based upon the application listed below.

a. Indoor applications – 1” thick, 1-1/2 pcf density.

b. Outdoor applications – 1-1/2” thick, 1-1/2 pcf density.

2. The thermal conductivity shall be equal to or less than 0.25 at 75 degree F. mean temperature.

3. The liner shall meet the Life Safety Standards as established by NFPA 90A and 90B and shall not support microbial growth as tested in accordance with ASTM G21 and G22.

4. The duct liner shall conform to the requirements of ASTM C 1071, with an NRC not less than 0.70 as tested per ASTM C 423 using a Type "A" mounting.

B. Comparable Products

1. Knauf “Ductliner EM”

2. CertainTeed “Toughgard”

3. Johns Manville “Linacoustic RC”.

2.4 LONGITUDINAL SEAM ROUND LOW PRESSURE DUCTWORK

A. Concealed round ductwork shall be constructed with SMACNA minimum pressure classification of 2" w.g.

B. Snap lock pipe is acceptable as long as all longitudinal and circumferential seams are sealed and screws as indicated in Part 3 - Execution.

C. All elbows and fittings shall be factory fabricated items by the same manufacturer as ductwork. Wye and laterals at diffusers take-offs shall be factory fabricated.

2.5 FLEXIBLE AIR DUCTWORK

A. Insulated Flexible Air Duct: Factory made including mineral fiber insulation with maximum C factor of 0.16 (R=6) at 75 degrees F. mean temperature, encased with a low permeability moisture barrier metalized outer jacket, having a puncture resistance of not less than 50 Beach Units. Acoustic insertion loss shall be not less than 3db per foot of straight duct, at 500 Hz, based on 6-inch duct, air velocity at 2500 fpm.

B. Flexible ducts shall be listed by Underwriters Laboratories, Inc., complying with UL 181. Ducts larger than 8-inches diameter shall be Class 1. Ducts 8-inches in diameter and smaller may be Class 1 or Class 2.

C. Minimum working pressure for low and medium pressure systems: 6 inches w.g. positive, 2 inches w.g. negative.

D. Duct Clamps

1. Stainless steel strap with cadmium plated worm gear tightening device.

2. Nylon tie wrap minimum ¼” wide.

2.6 FLEXIBLE DUCTWORK ELBOW SUPPORTS

Elbow supports shall be constructed of durable composite material and be fully adjustable to support flexible duct diameters 6" – 16". Elbow supports shall be UL listed for use in return air plenum spaces. Flexible ductwork elbow supports equal to Thermaflex FlexFlow Elbow.

2.7 JOINT SEALING

A. Sealant: Elastomeric compound, gun or brush grade, maximum 25 flame spread and 50 smoke developed (dry state) compounded specifically for sealing ductwork. Use products as recommended by the manufacturer for low, medium or high-pressure metal duct systems.

B. Tape/Gaskets in flanged joints such as TDC or TDF: Soft butyl rubber/elastomeric composition equal to Sticky Tape manufactured by Ductmate.

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Comply with provisions of Section, *BASIC MECHANICAL MATERIALS AND METHODS*, particularly regarding coordination with other trades.

B. Fabricate and install ductwork and accessories in accordance with referenced SMACNA Standards and manufacturer’s printed instructions.

C. Fabricate ductwork based on field measurements of space available. Sizes on plans may be altered by the CONTRACTOR, when approved by the ENGINEER, to

other dimensions without increasing air pressure friction losses where necessary to avoid interferences and clearance difficulties.

D. All ductwork located outdoors shall be sealed water tight on all seams and connections.

E. Provide duct transitions, offsets and connections to dampers, coils, and other equipment.

F. Weld sheet metal in accordance with SMACNA, Guidelines for Welding Sheet Metal. Repair damaged galvanized areas with galvanizing repair compound.

G. Each collar for outlet and intake devices on exposed ducts shall be flanged inward at the device mounting end, and the outside dimensions of the collar shall not be less than the overall flange dimensions of the devices attached thereto.

H. At each location where exposed ductwork passes through finished walls, floors, or ceiling, install a neat sheet metal collar completely covering the rough opening in the building construction secured to ductwork with sheet metal screws.

I. Provide UL approved flexible connectors per Section *Mechanical Sound and Vibration Control*.

J. Construct casings, eliminators, and pipe penetrations in accordance with applicable SMACNA Standards. Design casing access doors to swing against air pressure so the pressure helps to maintain a tight seal.

K. Install fire, smoke and combination fire/smoke dampers in accordance with the manufacturer's instructions to conform to the installation used for the rating test.

L. Where diffusers, registers and grilles cannot be installed to avoid seeing inside the duct, or items and other installations above the ceiling through plenum grilles, paint the inside of the duct or above ceiling installations, with flat black paint to reduce visibility.

M. Protection and Cleaning

1. Adequately protect ductwork and equipment against physical damage and entry of foreign matter to the inside at all times both prior to and after installation into project.

2. Cap open ends of ducts and equipment when not in operation.

3. Clean ductwork and equipment prior to painting. See PAINTING section for specific requirements pertaining to surface preparation.

4. Both the inside and outside of all ductwork and equipment shall be clean and free of dust, debris, foreign material, etc. prior to final acceptance of the project.

5. Place equipment in first class operating condition, or return to source of supply for repair or replacement, as determined by PROFESSIONAL.

3.2 INTERNAL INSULATION (DUCT LINER) FOR RECTANGULAR DUCTWORK

A. The following rectangular ductwork shall be interior acoustically lined:

1. Ductwork within ten (10) feet of any supply or return fan for HVAC applications, except built-up R/A plenums.

2. Ductwork within ten (10) feet of exhaust fans.

3. Ductwork exposed to view indoors.
4. Supply and Return ductwork located outdoors.
5. Transfer air ductwork and plenums.
6. Supply air plenums adjacent to air moving equipment, etc.
7. Where specifically indicated on Drawings.

B. The duct liner shall be applied to the flat sheet with 100% coverage of adhesive with the black matte surface facing the air stream.

C. Ducts with the sides or bottom dimension exceeding 20" shall have the liner additionally secured with welded pins and speed clips or "Gripnails" on a maximum of 12" centers and within 3" of edges. Pins shall be cut close to the speed clips.

D. Provide sheet metal nosing on all liner, where liner terminates and ductwork continues.

E. All seams, exposed edges and leading edges of all longitudinal and cross-joints of the liner shall be coated with an approved white sealant "butter".

F. Wet butter shall also be applied to duct to duct seams and connections simultaneously with the jobsite installation.

3.3 LONGITUDINAL SEAM ROUND LOW PRESSURE DUCTWORK

A. Screws shall be installed every 18" O.C. along longitudinal seams and minimum 6" from end connections

B. Screws shall be installed every 4" on center, but not less than 4 equally spaced, on circumferential ductwork and fitting joints.

C. All elbows and fittings shall be factory fabricated items by the same manufacturer as ductwork. Wye and laterals at diffusers take-offs shall be factory fabricated.

D. No dovetail field joints or fittings are allowed.

3.4 FLEXIBLE AIR DUCTWORK

A. Flexible ducts shall be installed with stainless steel strap or nylon tie wraps with sealant and as approved for UL 181, Class 1 installation. A "tightening gun" shall be utilized when installing nylon tie wraps.

B. Flexible ducts shall not penetrate any wall, floor, partition or ceiling.

C. Flexible duct shall be installed in continuous single pieces not over five (5') feet long, as straight and short as feasible, adequately supported.

D. Centerline radius of bends shall be not less than two duct diameters.

E. Flexible ductwork shall be suspended on 36" centers with a minimum 1-1/4-inch wide flat banding material.

3.5 JOINT SEALING

A. **All ductwork joints and longitudinal seams shall be sealed airtight.** Sealant shall be visibly sealed on the exterior of duct, including all factory fittings, all connections, both longitudinal and circumferential.

B. Duct tape (gray or foil type) shall NOT be utilized as a ductwork sealer.

C. Elastomeric or hard cast duct sealer shall NOT be utilized on fire damper sleeve to duct connections.

D. Utilize flanged style ductwork joining system in conjunction with tape/gasket for sealing breakaway joints and connections to fire, smoke and/or combination fire/smoke dampers.

3.6 DUCT LEAKAGE TESTS AND REPAIR

A. ALL ductwork shall be sealed airtight, as specified herein. Designated ductwork, as hereafter identified, shall be field pressure tested and proven tight. Other ductwork, not specified to be field tested may be randomly inspected by PROFESSIONAL; any or all ductwork not found to be comprehensively sealed (by visual inspection) may be thereafter required to be field pressure tested, solely at PROFESSIONAL'S discretion, to prove air tightness to specified tolerances.

B. The following ductwork shall be tested by the CONTRACTOR and witnessed and logged by a representative of the TAB Agency performing the work identified in Section *Testing, Adjusting and Balancing*. This includes all supply, return, exhaust, outside air, etc. trunk and all branch ducts, and plenums excluding flexible duct run-outs to individual air distribution devices, shall be tested and proven tight within specified tolerances.

1. All Low Pressure Ductwork.

a. Test pressure shall be at pressure class construction requirements identified in Part 2 of this specification.

C. Measured air quantity leakage test

1. The CONTRACTOR shall use recently calibrated orifice run, manometers and portable blower as recommended by AABC.

2. Instruments used for testing and balancing of system shall have been calibrated within six months preceding tests and checked for accuracy prior to start of work.

3. Instruments shall be of a type normally recognized as adequate and accurate for the test contemplated. List type of instrument, manufacturer, serial number and latest calibration date as a part of the submitted test data.

4. Allowable Leakage

a. Low Pressure Ductwork shall have a maximum leakage of five (5) percent of design flow rate (cfm) for complete system or portions thereof. Summation of leakage for all sections shall not exceed the total allowable for a single system.

5. Verification: By TAB Agency. See attached Duct Test Log.

DUCT TEST LOG						
DATE	**SYSTEM**	**LOCATION OF TEST**	**TEST PRESSURE**	**ACTUAL LEAKAGE (CFM)**	**RESULTS % OF LEAKAGE**	**TAB WITNESSED (INITIALS)**
Remarks: (Include Narrative of Procedure, List of Instrumentation, Last Calibration Date, etc.)						
Note: Turn in all forms filled out with project closeout documentation. Copy this form if more sheets are needed. These forms and/or log shall be kept at jobsite and upon request made available to ARCHITECT and/or PROFESSIONAL.						

I certify that the data listed above is accurate and was witnessed by myself or qualified employees of the TAB Agency.

_____ _____

TAB Agent Date

END OF SECTION

Ductwork Accessories

PART 1 – GENERAL

1.1 SCOPE

Ductwork accessories for HVAC including supply air, return air, outside air, transfer air and general exhaust systems.

1.2 APPLICABLE STANDARDS

A. Refer to Paragraph, QUALITY ASSURANCE, in Section *BASIC METHODS AND REQUIREMENTS* (MECHANICAL).

B. Fire Safety Code: Comply with NFPA 90A

C. Duct System Construction: Referenced SMACNA Standards are the minimum acceptable quality.

D. Duct accessories exposed to the air stream, such as dampers turning vanes, extractors, etc. and access openings, shall be of the same material as the duct or provide at least the same level of corrosion resistance.

1.3 DEFINITIONS

A. Seal or Sealing: Use of liquid or mastic sealant, with or without compatible tape overlay, or gasketing of flanged joints, to keep air leakage at duct joints, seams and connections to an acceptable minimum.

B. SMACNA duct pressure classification for Low Pressure: Static pressure rating up to 2 inches wg (water gauge), positive or negative, for rectangular ducts, and 1 inch wg for round ductwork.

PART 2 – PRODUCTS

2.1 TAKE-OFF FITTINGS

A. Round ductwork take-offs shall be conical/bellmouth type or 45 deg lateral (shoe-tap) type. Provide take-offs with volume damper including continuous shaft, locking quadrant handle, nylon bushings and stand-off bracket. Located where indicated and accessible.

B. Conical take-off fittings shall be equal to Flexmaster model CBD SOG with B03 option.

C. 45 deg lateral (shoe-tap) take-off fittings shall be equal to Flexmaster model STOD with B03 option.

2.2 DAMPERS

A. Rectangular Volume Dampers: Opposed blade, multi-louver type. Provide end bearing for all dampers. Quadrant or other operator for externally insulated duct shall have stand-off mount so operation is clear of the insulation.

B. Control/Motorized Dampers: See Section *Controls and Instrumentation*.

2.3 DUCT ACCESS DOORS, PANELS AND SECTIONS

A. Provide access doors, sized and located for maintenance work, upstream where possible, in the following locations:

1. Each fire damper (for link service), fire/smoke damper, smoke damper and automatic control damper.

2. Each duct mounted smoke detector.

B. Openings shall be as large as feasible in small ducts, 8” diameter minimum, with round spin-in access door and sash lock(s). Access sections in insulated ducts shall be double wall, insulated.

1. For low and medium pressure rectangular ducts, provide Flexmaster Model SDSM with R6 insulation option, flange with stick on gasket and cable door retention accessories.

2. For round and flat oval ducts provide Ruskin Model ADR.

2.4 WALL INTAKE/EXHAUST LOUVERS

A. See Schedule on Drawings for more information.

2.5 AIR DISTRIBUTION DEVICES

A. Including supply, return, transfer and exhaust ceiling, floor and sidewall installation, aluminum gasketed construction as indicated. Provide steel construction and matching UL Listed ceiling radiation damper on applications in fire rated ceiling assemblies.

B. All inside ceiling units shall have factory finish, off-white color unless otherwise noted.

C. All soffit outdoor units shall have factory finish, color to match soffit. Submit color chart to ARCHITECT for custom color selection.

D. See Schedule on Drawings for more information.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Comply with provisions of Section *BASIC MECHANICAL MATERIALS AND METHODS*, particularly regarding coordination with other trades.

B. Construct casings, eliminators, and pipe penetrations in accordance with LPDS, Chapter 3. Design casing access doors to swing against air pressure so the pressure helps to maintain a tight seal.

C. Install duct hangers and supports in accordance with SMACNA, LPDS, Chapter 5, and HPDS, Chapter 6, in concealed applications.

D. Provide primary and secondary balance dampers on all supply distribution devices. Provide a supply air duct damper and air extractor off main ductwork to branch ductwork of the types as listed below:

1. Round Ductwork: Provide conical or lateral type taps with integral butterfly damper. Submit information for approval.

2. Rectangular Ductwork: Provide radius or lateral elbow tap, as indicated with air extractor assembly and opposed blade multi-blade damper.

3. Provide exterior duct damper and extractor controller arm assemblies that extend past proposed ductwork installation for accessible operation.

E. When splitter dampers occur above other than lay-in ceiling, provide damper assembly complete with supports, bearings, chromium plated ceiling escutcheons and adjustable regulator, as Young Models No. 1 and No. 890-A.

END OF SECTION

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide complete HVAC controls and instrumentation for the following items:

1. Air Handling Systems Including:

a. Exhaust Fans

b. Direct Expansion Systems

B. Definitions:

1. Deviations: The difference between the controller set point and the value of the controlled variable (such as room temperature) at any instant.

2. Dead band: A temperature range over which no heating or cooling energy is supplied, such as 72-78 degrees F, i.e., as opposed to single point changeover or overlap.

3. Control Wiring: Includes conduit, wire and wiring devices to install complete HVAC control systems including motor control circuits, interlocks, thermostats, switches and like devices.

1.2 QUALITY ASSURANCE

A. Criteria:

1. The maximum deviation of occupied room conditions from the controller set point shall not exceed plus or minus one degree F for temperature, and plus or minus three percent for relative humidity unless the system is operating in the dead band range.

B. Performance tests:

1. Demonstrate to the Owner that all controls are installed, adjusted, and can perform all functions required by the contract drawings and specifications.

1.3 SUBMITTALS

A. Manufacturer's Literature and Data for all components, including the following:

1. Controllers.

2. Relays and switches.

3. Control dampers, control valves and operators.

4. Instrumentation products.

B. Certificates:

1. Compliance with paragraph, QUALITY ASSURANCE.

2. Name and address of a permanent service organization maintained or trained by the manufacturer that will render satisfactory service within eight hours after notification that service is required.

C. Control Drawings: Integrate with flow diagrams; show outlines of HVAC equipment with control devices, schematic one line control piping and wiring, and written sequence of operation and operation instructions. Equipment numbers shall correspond to those shown on the Contract Drawings. Provide three (3) complete

sets of blue-line as-built drawings.

D. Operation and Maintenance Manuals:

1. Submit in accordance with Section *Mechanical Close-Out Requirements*.

2. Include the following documentation:

a. General description and specification for all components.

b. Detailed illustrations and complete calibration procedures.

c. Complete trouble shooting procedures and guidelines.

d. Complete operating instructions for all systems.

e. Piping schematic/flow diagrams.

1.4 INSTRUCTIONS

A. Instructions to OWNER Operations Personnel: Perform in accordance with Section *Mechanical Close-Out Requirements*.

B. Training by independent or franchised dealers who are not direct employees of the temperature control company will not be acceptable.

1.5 GUARANTY

Any defects in workmanship or material during the guaranty period shall be corrected by the CONTRACTOR at no cost to the OWNER. Correction of defects shall be accomplished during regular working hours.

PART 2 – PRODUCTS

2.1 SENSORS AND CONTROLLERS

A. Combination heating/cooling thermostat: This remote wall sensor/controller is to be utilized to control split and/or packaged HVAC equipment with heating and cooling capabilities. Thermostats shall be of the low voltage or electronic adjustable type and shall conform to requirements of UL 873. Thermostats for air conditioners shall be provided and shall be combination heating-cooling type with contacts hermetically sealed against moisture, corrosion, lint, dust and foreign materials. Thermostats shall be designed to operate on not more than 1.5 degrees Fahrenheit differential from setpoint to actual temperature, or as noted, and of suitable range calibrated in degrees Fahrenheit. Thermostats shall have adjustable heat anticipation and fixed cooling anticipation. Air conditioning heating/cooling thermostats shall contain two independent temperature sending elements electrically connected to control the heating and cooling operation(s), respectively. The electrical characteristics shall be 24V AC or less. The maximum differential between heating and cooling setpoints shall be 3 degrees Fahrenheit. Automatic switching for system changeover from heating to cooling or cooling to heating shall be accomplished through the use of a thermostat sub base. Provide all thermostats with visible temperature space read out in degrees Fahrenheit, and adjustable separate setpoint control for heating and cooling functions.

Provide the number of stages of control, with a nominal 3 to 5 degrees Fahrenheit between stages, for heating and cooling functions to match the number of stages scheduled and/or specified. Provide a type thermostat with emergency/auxiliary heat control capability matched to heat pump applications.

B. Heating only thermostat: Thermostats for unit heaters, duct heating units, wall and/or ceiling heaters, and for low limit zone temperature control, shall be heating only low voltage (24 VAC or less) type, with number of stages matched to equipment scheduled or specified capability. Provide thermostat with fan “auto-on” sub base and control capability for heating equipment when an integral fan is included. Heating capability, with fan where applicable, shall be energized on a drop in temperature below controller setpoint.

C. Humidistat: Low voltage or electronic type sensor/controller capable of minimum 2% relative humidity accuracy, and no more than 1% drift per year temperature compensating, non-condensing, early field calibratable, sensor/controller shall energize humidity control equipment/capability on a rise in space above setpoint. Provide multistage or multiple setpoint humidity sensor/controllers to match equipment scheduled and/or specified capability and/or control.

D. Provide specialty sensor/controllers to match specified sequence of operation as delineated hereafter,

E. Duct Mounted Smoke Detectors: Photoelectric type smoke sensors including duct housings, sampling tubes, etc. and shall be provided and properly installed in air handling duct systems as specified herein and/or indicated on Drawings. Provide and install remote audible horn panel and visual alarm panel with push-button reset of detector, and silencing capability of audible alarm. Verify location of alarm horn panel and reset panel with ARCHITECT/PROFESSIONAL prior to installation.

2.2 RELAYS:

A. Provide as required for system functions.

B. Electrical Pilot Duty or Contactor Types: Provide inductive rated contacts for circuits with coils, motors or other inductive devices, minimum 120V, 15A. rating.

2.3 MOTORIZED CONTROL DAMPERS

A. Dampers shall be of the airfoil, ultra low leakage, opposed blade design. Dampers shall be constructed of minimum 16 gauge galvanized steel. Side mounted linkage shall be out of airstream. Blades shall include rubber edge seals for tight seal.

B. Modulating damper actuators shall be a minimum of 40:1 turndown ratio.

C. Damper actuators shall be two-position normally closed low-voltage type.

D. Design and install control dampers to "fail safe" in either the normally open or normally closed position as required for freeze, moisture, smoke or fire protection.

2.4 FINAL CONTROL ELEMENTS AND OPERATORS

A. Fail Safe Operation: Design and install control valves and dampers to "fail safe" in either the normally open or normally closed position as required for freeze, moisture, smoke or fire protection.

B. Spring Ranges: As required for system sequencing and to provide tight close off.

2.5 WIRING MATERIALS

A. Comply with applicable sections of *Division 26 and 28*. Provide wiring for control devices furnished under this Section, HVAC motor control conduits and interlocks. Color code and number all wires, whether individual or in cables, for identification.

B. A complete wiring system shall be provided for all direct digital control (DDC) and electric controlled apparatus. All wiring shall be installed in a neat, workmanlike manner, of sufficient size and tested to be continuous and without unnecessary "short".

Wiring shall be as follows:

1. Exposed Areas and Mechanical Equipment Rooms: Wiring shall be routed in metallic conduit per *Division 26 and 28* requirements. Provide flexible conduit connections to rotating equipment.

2. Concealed, Accessible Areas: Wiring may be routed outside in above ceiling accessible spaces conduit, however wiring outside conduit shall be sheathed with plenum rated jacket with maximum rating of 50/25 smoke developed/fire rated per NFPA 90A.

   a. All wiring will be routed in the bar joists and/or roof structure space and supported with tie-straps at maximum 6'-0" on center.

   b. All drops and risers to HVAC equipment, fans, sensors, etc., will have a tie-strap installed directly above each device to insure a vertical support to the device.

   c. Any open wiring that enters a conduit in the walls or drop/rise to connect equipment will have a minimum of 12" of wire looped outside the conduit above the ceiling and will be attached utilizing a tie-strap within 12" of the conduit end or connection.

3. Inaccessible Areas: Same as #1 above - includes wiring in walls, above hard ceilings, in chases, etc.

4. Inside Panels or Unit Enclosures: Wiring may be run outside conduit and neatly tied in bundles for neatness and function.

5. Wiring in exterior and moist environments shall be routed in weatherproof liquid tite conduit with matching fittings and connections.

6. Minimum gauge for low voltage (24VAC or less) control wiring shall be 18 AWG copper solid conductor(s).

2.6 IDENTIFICATION/SIGNAGE

A. Provide permanent phenolic labels for all operators, controllers, and sensors. Coordinate with ENGINEER on designations required. Submit Shop Drawing of installation indicating switch location(s) and identification. See Section *Mechanical Identification*.

2.7 CONTROL SEQUENCES

Control sequences shall be:

A. PACKAGED GAS HEATING/ELECTRIC COOLING SYSTEMS (WITH INTEGRAL HOT GAS REFRIGERANT COIL FOR HUMIDITY CONTROL)

1. UNIT CONTROLS SHALL BE ENERGIZED FROM THERMOSTAT CONTROLLER LOCATED AS INDICATED ON DRAWINGS.

2. EACH THERMOSTAT SHALL ALSO HAVE AN 0-3 HOUR ELECTRONIC TIMER THRU THE FACE OF THE PROGRAMMABLE THERMOSTAT FOR MANUAL AFTER HOURS OVERRIDE OF OCCUPANCY CONTROLS.

3. WHEN OCCUPIED, THE EVAPORATOR FAN SHALL RUN CONTINUOUSLY AND ZONE HEATING AND COOLING THERMOSTAT SHALL CONTROL THE HEATING FUNCTION AND CYCLE CONDENSING UNITS TO MAINTAIN ZONE ENVIRONMENT CONDITIONS.

4. UNITS WITH CAPACITIES 2000 CFM OR GREATER WILL INCLUDE AND BE DE ENERGIZED BY SMOKE DETECTOR(S) LOCATED IN THE RETURN DUCT/PLENUM AND SUPPLY AIR TRUNK DUCT IF PRODUCTS OF COMBUSTION ARE DETECTED.

5. A ZONE LOCATED HIGH LIMIT HUMIDITY SENSOR/CONTROLLER SET INITIALLY ON 60% RH AND LOW AND HIGH LIMIT THERMOSTAT SETTINGS OF 62 AND 85 DEGREES F. RESPECTIVELY, SHALL AUTOMATICALLY OVERRIDE PROGRAMMABLE THERMOSTAT TIME BASED "NORMAL OCCUPANCY" CONTROL OF ALL ZONE COOLING/HEATING CAPABILITY FOR UNOCCUPIED PERIOD UPPER LIMIT HUMIDITY, MANAGEMENT OF UTILITY USAGE AND/OR FREEZE PREVENTION.

6. DURING UNOCCUPIED PERIODS, SUPPLY FAN SHALL BE CYCLED IN CONJUNCTION WITH A CALL FOR HEATING/COOLING OR DEHUMIDIFICATION.

7. DURING ALL PERIODS, ZONE HUMIDISTAT SHALL ENERGIZE REFRIGERATION CAPACITY AND THERMOSTATIC CONTROLS SHALL CYCLE REFRIGERANT HOT GAS REHEAT TO MAINTAIN ZONE THERMOSTATIC AND HUMIDITY SETPOINT PER MANUFACTURER'S CONTROLS STRATEGY.

8. PROVIDE INDIVIDUAL EVAPORATOR COIL CIRCUIT FREEZESTAT COMPRESSOR SHUTDOWN AND AUTOMATIC TIME DELAY RESTART CONTROLS ON SYSTEMS SCHEDULED WITH LOW AMBIENT CONTROLS AND ALL UNITS WITH DUAL CIRCUIT EVAPORATORS.

9. WHERE INDICATED ON DRAWINGS, OUTSIDE AIR DAMPER POSITION SHALL BE OVERRIDDEN BY DIFFERENTIAL ENTHALPY ECONOMIZER CONTROLS WHEN OUTSIDE AIR AND RETURN AIR CONDITIONS INDICATE LESS ENERGY IS REQUIRED TO CONDITION OUTSIDE AIR THAN RETURN AIR. OUTSIDE AIR DAMPERS SHALL BE COMPLETELY OPENED PRIOR TO BEGINNING TO MODULATE RETURN AIR DAMPER CLOSED. WHEN CONDITIONS ARE NO LONGER CONDUCIVE TO ECONOMIZER OPERATION, NORMAL SEQUENCE OF OPERATION SHALL RESUME.

B. FANS:

1. SEE CONTROL SEQUENCE AT SCHEDULE(S) ON DRAWINGS.

C. DUCTLESS SPLIT SYSTEMS

1. CONTINUOUS OPERATION. CONTROLLED BY MANUFACTURER'S AUTOMATIC HEATING/COOLING CHANGEOVER THERMOSTATS.

PART 3 – EXECUTION

3.1 INSTALLATION AND ADJUSTMENT

A. Install and adjust required control components and systems in accordance with instructions of the manufacturer. Work shall be performed by employees of the manufacturer or an authorized representative.

B. All control wiring shall be routed in accordance with paragraph 2.05 herein. Install control wiring and connections in accordance with applicable Sections of *DIVISION 26 and 28*.

C. Except for short apparatus connections run conduit parallel to or at right angles to the building structure. Conceal conduit in finished spaces.

D. Do not run conduit concealed under insulation or inside ducts. Mount control devices and conduit located on ducts or apparatus with external insulation or stand-off support to avoid interference with insulation.

E. Run wire connecting devices on or in control cabinets parallel with the sides of the cabinet neatly racked to permit tracing. Rack connections bridging a cabinet door along the hinge side and protect from damage. Provide grommets, sleeves or vinyl tape to protect plastic tubing or wires from sharp edges of panels, conduit, and other items.

F. Provide all necessary factory and/or field labor for complete calibration and adjustment of the air flow control components, and be responsible for setting all control set points, operating sequences, and alarm systems contained within the control center to produce the system performance specified.

G. Provide water heater controls, operating instructions, controls and piping schematic in neat laminated displays for mounting in water heater room.

H. CONTRACTOR shall provide all power wiring and connect relays, time clocks, control panels, MCP, etc. which are furnished by CONTRACTOR.

I. Provide permanent identification of panel MCP, time clock, and all controllers, by zone, etc. as per Section *Mechanical Identification* and PROFESSIONAL'S instruction. Submit details of proposed identification along with control schematics and device specifications for PROFESSIONAL'S approval. Submit Drawings, schematics, operating instructions, etc. to be posted, framed, laminated, etc. to PROFESSIONAL for approval.

END OF SECTION

Testing, Adjusting and Balancing

PART 1 – GENERAL

1.1 SCOPE

A. The process of Testing, Adjusting and Balancing (TAB) for mechanical HVAC and Plumbing systems is a requirement for this project.

B. Definitions and Abbreviations:

1. TAB: Testing, Adjusting and Balancing. The process of checking and adjusting HVAC and plumbing systems to meet design objectives and performance intent.

2. AABC: Associated Air Balance Council.

3. NEBB: National Environmental Balancing Bureau.

4. Plumbing Systems: Domestic hot water and re-circulating systems.

5. Air Systems: Included all supply air, return air, exhaust air, transfer air and outside air systems.

C. The CONTRACTOR shall provide the services of a qualified independent TAB Agency for testing, adjusting, and balancing as described herein and include same in his bid. CONTRACTOR shall submit TAB AGENCY experience, agenda and associated credentials to PROFESSIONAL for TAB AGENCY and agenda approval.

1.2 APPLICABLE STANDARDS

A. TAB Agency Qualifications: Current membership in AABC or NEBB.

B. Performance Criteria: Work shall be performed in accordance with the approved TAB agenda requirements.

C. Test Equipment Criteria: The basic instrumentation requirements and accuracy/calibration required by AABC (Section Two) or Section II of the NEBB Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.

D. A factory air test hood, recently calibrated, shall be utilized for ceiling air device CFM measurement.

1.3 APPLICABLE PUBLICATIONS:

The following publications form a part of this Specification to the extent indicated by the reference thereto. In text the publications are referred by to by the initials of the organization.

A. Associated Air Balance Council (AABC):

1. National Standards for Total System Balance, 2002 Edition

B. National Environmental Balancing Bureau (NEBB):

1. Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems, 8th Edition, 2015

2. Procedural Standards for Measuring Sound and Vibration, 2nd Edition, September 2006

1.4 CORRESPONDENCE

A. Representative of TESTING, ADJUSTING and BALANCING Agency shall report to the CONTRACTOR, during all phases of the test and balance process, any deficiencies that will impair the proper balance and operation of the systems involved. This shall include, but not limited to, reporting balancing valves/dampers, controls, and safety sensors, etc. not installed as called for on the Plans or in the Specifications.

B. The TAB Agency shall submit preliminary reports a minimum seven (7) days prior to scheduled substantial completion for this project or any phase thereof, and including a comprehensive narrative of problems, obstacles, recommendations, and remedial actions for PROFESSIONAL'S review and approval.

C. TAB Agency shall not release any reports to other parties until such has been approved by the PROFESSIONAL.

PART 2 PRODUCTS NOT APPLICABLE

PART 3 – EXECUTION

3.1 GENERAL

A. Coordinate TAB procedures with any phased construction requirements for the project so that usable increments of finished work may be accepted for beneficial occupancy. Systems serving partially occupied phases of the project may require balancing for each phase prior to final balancing and shall required separate TAB effort and reports for each phase and submittal prior to advancing to next phase of project.

B. Allow sufficient time in construction schedule for TAB prior to substantial completion inspection for the project.

C. Conduct final TAB after system has been completed and is in full working order. Put all HVAC systems into full operation and continue operation of the systems during each working day of TAB. Accomplish TAB in accordance with the CONTRACTOR provided Agenda approved by PROFESSIONAL.

D. Substantial Completion: Substantial Completion of mechanical systems shall not be given without TAB Agency's written certification that the mechanical systems and controls have been thoroughly tested and are safely performing as intended. See certification required herein. No other certification will be acceptable.

E. Preparation of Equipment and Systems for Testing and Balancing:

1. The CONTRACTOR shall, upon completion of items or work required by this contract, thoroughly clean all dirt and debris from equipment, ducts, piping systems, strainers, accessories, etc. All bearings, gear boxes, wearing surfaces, or other equipment components requiring lubrication shall be properly serviced as recommended by the equipment manufacturer and shall be tagged with the date of service and type of lubricant used. All specified cleaning and protective devices shall then be installed in equipment, piping, plenums, ductwork, etc., and systems shall be placed in continuous operation. All fans shall have been in operation for at least twenty-four (24) hours prior to the start of testing and balancing so that initial stretch of drive belts will have taken place, and all other mechanical equipment including all temperature and operating control devices will have

been adjusted and calibrated for complete and functional operating service.

F. System balancing and performance testing:

1. The CONTRACTOR shall secure copies of all report forms, data sheets, and instrumentation to be used by the agency in the performance of their services and submit the same for approval. This submittal data shall include a tabulation of instruments and devices to be utilized in the performance of testing and balancing operations and shall include the name of the manufacturer of the instrument of devices, model number, range, degree of accuracy, date of last calibration, or the other pertinent information that may be required to determine the utility of the instrument of device. As a minimum requirement, the following instrumentation shall be employed in the performance of balancing and testing of mechanical system: swinging vane or hot wire type anemometer, low ran (0-0.25 in. water column) inclined tube manometer, high range (0-20 in. water column) U-tube manometer, pilot tube, ammeter, volt-meter, self-timing tachometer (maximum scale Division 2 rpm) pyrometer, powered psychrometer, vibration meter, other instruments, tools, and devices as required to accurately balance and test mechanical systems and components.

G. It is the responsibility of this section to make certain that all the submitted and/or existing equipment has proper motor size, sheave size, belt size, etc.

3.2 AIR BALANCE

A. Place all interactive systems in operation with all filters installed and automatic control systems completed and operating. Artificially load air filters by partial blanking or other means to provide air pressure drop midway between the clean and dirty condition. Set/reset room thermostats and humidistat, and/or equipment controls as necessary to check heating and cooling functions, and air flow rates for air distribution devices and adjust units if not within specified tolerances.

B. Balance systems to design ratings. Adjust fan speeds to provide design flows, including system diversities, at actual system pressures. Belt drives, including sheaves, belts, etc. shall be adjusted and/or replaced as required to safely obtain specified performance.

C. Make pitot tube traverses of all trunk lines and major branches when required to determine proper proportioning of air flows. Airflow measuring devices, where installed, may be utilized for this purpose. Seal duct access holes with snap in plugs.

D. Record pressure drop readings across all major system components and significant drops within duct systems such as air filters, coils, heaters, etc.

E. Make flow and pressure measurements at each terminal device, and each supply, return, or exhaust diffuser. Adjust each air outlet unit within plus or minus 10 percent of design requirements, but total air for each system shall be not less than shown unless otherwise approved by PROFESSIONAL. Adjust grilles and diffusers to minimize drafts in all areas. Mark permanently all damper quadrants at final set points. Total differentials between ventilation and exhaust for the purpose of proper pressurization, shall be maintained.

F. Adjust exhaust systems to indicated CFM requirements (+/- 10%).

3.3 VIBRATION TESTING

Check for excessive vibration of rotating equipment.

3.4 SOUND TESTING

Check for excessive noise from equipment, air distribution devices, etc. and notify PROFESSIONAL of any objectionable noise levels. Perform noise/sound measurement and provide noise level calculations/results in rooms and areas requested by PROFESSIONAL.

3.5 DUCT LEAKAGE TESTS

See Section *Ductwork* for duct testing requirements.

3.6 BUILDING/ZONE PRESSURIZATION:

The Tab Agency shall test the building pressurization and report same to PROFESSIONAL. These tests shall include various simulations between maximum and minimum ventilation capacities, to assure proper relief capability and pressurization per current ASHRAE recommendations.

3.7 MINIMUM TAB DATA REQUIRED

Approved TAB Agency shall furnish all labor and materials to balance the following new and/or modified equipment and systems: The following minimum information shall be provided:

A. Packaged Units: on systems scheduled to have multiple stages of heating and/or cooling capacity, or CFM requirements, provide the information for temperatures and/or airflow to indicate same for each operating condition. All information/data shall be gathered within a 90 minute period.

1. Total S/A CFM –
2. R/A CFM –
3. O/A CFM (Min/Max) –
4. R/A E.A.T. - Db/Wb (Cooling) –
5. O/A E.A.T. - Db/Wb (Cooling) –
6. S/A L.A.T. - Db/Wb - (first stage cooling only)
7. S/A L.A.T. - Db/Wb - (first & second stages cooling together)
8. R/A E.A.T. - (Heating) –
9. O/A E.A.T. (Heating) –
10. S/A L.A.T. - (first stage heating only) –
11. S/A L.A.T. - (first and second stages heating together) –
12. External Static Pressure
13. Fan RPM
14. Fan Motor F.L.A. rated vs. actual
15. Fan Motor Horsepower and Service Factor (belt drive units)
16. Size, Type, Efficiency and Relative Condition of all Air Filters

B. Condensing Units:

1. E.A.T. –
2. L.A.T. –
3. Voltage –
4. F.L.A. –
5. Outdoor ambient (ºF) –

C. Fans:

1. CFM –
2. Voltage –
3. F.L.A. –
4. External Static Pressure –
5. Size, Type, Efficiency and Relative Condition of all Air Filters –

D. TAB Agency shall test and report the domestic hot water temperature. CONTRACTOR shall make any adjustments required of domestic water heaters, mixing valves, etc., in order to achieve scheduled domestic hot water temperature shown on Plumbing Fixture Rough-in Schedule on Contract Drawings (+/- 5º F).

E. Balance all S.A., E.A. and O.A. air distribution devices to within 10% of specified C.F.M., yet main area pressurization and differentials.

F. Mark all flow C.F.M., balance valve set points, etc. on an 11”x17” reduced scale set of working drawings and submit to PROFESSIONAL with TAB report prior to completion of work.

G. Submit list of equipment with excessive vibration.

H. Submit the Test and Balance report as indicated above, along with the working drawing to PROFESSIONAL for approval prior to completion and substantial completion inspection to job.

I. Verify that all mechanical system controls, safety and shutdown interlock and sequence of operation is as specified. TAB Agency shall provide written certification that he has verified same and/or note any and all discrepancies. See paragraph 3.11 for specific certification.

3.8 TAB SITE VISIT COORDINATION

A. The TAB Agency shall inform the PROFESSIONAL, in writing seven (7) calendar days prior to his site visit for final TAB of systems such that PROFESSIONAL may be present to witness same, at PROFESSIONAL’S sole discretion. Changes to schedule shall be coordinated with and approved by PROFESSIONAL, with sufficient advance notice. TAB Agency shall be required to coordinate with PROFESSIONAL’S office representative, date of final inspection, and provide random tests and verification of TAB report information, at PROFESSIONAL’S selection.

B. It shall also be the responsibility of the TAB agency to include the cost of any opposite season check-out of all system components which might be required and modify air distribution delivery and/or temperature to any room, area, or zone which

may require adjustment during the first year of system operation.

3.9 SYSTEM CHANGES

A. Final balancing changes shall be approved by the CONTRACTOR'S who installed the equipment. Changes may encompass, but not be restricted to, changing the pulleys, belts, dampers or adding dampers, balancing valves, etc.

B. The TAB Agency shall coordinate with the CONTRACTOR any changes required including belts, sheaves, etc. to balance systems within specified tolerances. All cost of any modifications is the responsibility of the CONTRACTOR.

3.10 VERIFICATION / INSPECTION

A. After the final TAB report is submitted and reviewed by the PROFESSIONAL, he will soon afterward schedule a verification inspection with the TAB Agency. At this inspection, the TAB Agency will test airflow flows, water flows, sound levels, control operation and sequence, for random air distribution grilles, fans, AHU's, equipment, piping, etc., as selected by PROFESSIONAL.

B. This inspection will last no longer than four (4) hours for each completed phase of the project. Should this verification information exceed the specified tolerance, the TAB Agency may be required to retest and balance the entire system(s) to these tolerances, solely at the PROFESSIONAL's discretion. A follow-up verification inspection shall then be required, and the procedure will begin again. The cost of these inspections, re-inspections, TAB and reports shall be borne by the CONTRACTOR.

3.11 CERTIFICATION

The TAB Agency shall provide the following written TAB certification within the final TAB report (see also Section *Mechanical Submittals and Shop Drawings*):

> "The Testing, Adjusting and Balancing (TAB) Agency certifies that the HVAC air and plumbing water systems and controls have had a full range of tests and checks carried out by the TAB Agency, to determine if all components, sub-systems, systems and interfaces between systems operate in accordance with the Contract Documents. This includes all modes and sequences of control operation, interlocks and conditional and specified control responses to abnormal, safety and emergency conditions. The (TAB) Agency had provided to the OWNER the specified training and documentation on the operation of these systems such that these systems can be safely and efficiently operated in line with design requirements."

3.12 OWNER EDUCATION REQUIREMENTS AND INVOLVEMENT

See Section *Mechanical Close-out Requirements* for Owner Education requirements.

END OF SECTION

SECTION 26.0511

ELECTRICAL GENERAL AND WORK IN EXISTING FACILITIES

PART 1 – GENERAL

1.1 GENERAL

A. All work shall conform to the latest editions of the National Electrical Code (NEC) [National Fire Protection Association (NFPA) 70], the Standard for Electrical Safety in the Workplace (NFPA 70E), the Life-Safety Code (NFPA 101), the International Building Code, the Americans with Disabilities Act, and all other applicable federal, state, and local codes and regulations.

B. All work shall be performed in strict compliance with NFPA 70E. Submission of bid shall stand as an agreement by the Contractor to indemnify and hold harmless the Engineer and Owner from all liability related to damage and/or injury to personnel and equipment during the installation of the project.

C. The contract documents are schematic in nature and are intended to convey the intent of the electrical work to be performed on this project. Provide all material, labor, equipment, etc., necessary to provide complete and operable electrical systems.

D. The General Conditions, Supplementary Conditions, General Requirements, Information to Bidders, and all other parts of this set of Contract Documents are hereby adopted and are applicable to the Division 26, 27, and 28 Contractor.

1.2 SCOPE OF WORK

A. Visit site prior to bid. Devise a plan for installation of complete and operable electrical systems meeting the requirements and intent of the Contract Documents. Submission of Bid stands as evidence that the Contractor accepts the Contract Documents as sufficient and complete for the work to be performed. Notify the engineer at least two weeks prior to bid of any discrepancies between the Contract Documents and actual field conditions. No change orders will be granted due to existing conditions that could have been observed during a site visit.

B. Provide temporary power and lighting during construction. Coordinate with the General Contractor for the exact requirements.

C. Electrical switchgear and panelboard layouts are based on sizes of Square D equipment. Equipment manufactured by General Electric, Siemens, and Cutler Hammer are equally acceptable. However, the Electrical Contractor is responsible for selecting and furnishing gear that will fit in the spaces provided and shall be responsible for arranging the gear to meet the required code clearances. Regardless of the manufacturer, the Electrical Contractor shall provide a drawn-to-scale electrical layout with the equipment brochures for all rooms in which panelboards, motor control centers, switchboards, or switchgear are placed. The drawings shall include the work of all other trades including mechanical system piping, ductwork, sprinkler piping, etc. No conduits shall be installed until layouts have been approved.

D. Locate junction boxes, pull boxes, disconnects, and other equipment requiring access in such a manner that they are accessible at the end of construction. Notify the Architect where it is impossible to plan conduit routing or equipment placement in such a manner, and provide the necessary access panels in the ceiling or wall as required. The access panel type and style shall be subject to the Architect's approval. Employ a painter to provide the appropriate coatings as directed by the Architect.

E. Relocate, or recircuit, all electrical equipment, conduit, and circuitry conflicting with or obstructing work on this project. Where the electrical systems are owned by other entities, pay them to relocate, or recircuit, their facilities.

F. Arrange for connection of service to all electrical systems by the appropriate utility company. Coordinate completely with all utility company requirements even if they are different than the contract documents. If utility company requirements are different from the contract documents, notify the engineer at least ten days prior to bid. **See allowance section in the front end specifications for utility company allowance amount.**

G. Provide all necessary equipment, raceway, circuitry, fittings, lugs, terminations, labor, etc. and connect to all equipment and appliances requiring electrical connections furnished herein, by the Owner, or by other Contractors. Prior to ordering electrical equipment and roughing in for equipment furnished by the Owner or other Contractors, verify all connection types, connection locations, connection heights, voltages, number of phases, conductor sizes, disconnecting means, breaker sizes, etc. Furnish the proper electrical equipment for the equipment actually being supplied.

1.3 WORK IN EXISTING FACILITIES

A. All work shall be scheduled and coordinated through the General Contractor with the Owner. Provide necessary costs for all work during both normal and premium work hours in bid.

B. Provide continuous uninterrupted power to all existing facilities to remain during the entire construction process. Any required power outages must be scheduled and approved by the Owner in writing at least three days prior to the outage.

1.4 SCOPE OF WORK IN EXISTING FACILITIES

A. Prior to beginning work, survey existing electrical systems. Document, in writing, signed by the Owner any portions of existing systems that are not operating properly before construction begins. Any electrical systems found inoperable at the end of the construction process that has not been so documented shall be repaired at the end of construction.

B. Remove electrical equipment in areas being demolished and electrical equipment feeding other equipment being demolished. Remove raceways and circuitry back to the panel of origination. Where raceways are installed in inaccessible areas, remove conductors back to the panel of origination. Where circuits are not being completely demolished, remove conductors back to a junction box or other connection point outside of the renovated area and recircuit existing electrical equipment that is to remain as required. Where necessary, completely refeed existing electrical equipment that is to remain. It is the intent of this specification that all existing equipment to remain be left completely operable at the end of the construction process.

C. Survey existing panel board circuitry and provide new typewritten directories giving complete as-built circuitry information for all panelboards affected by the construction on this project.

D. Where new circuit breakers are installed in existing equipment, the new circuit breakers shall be manufactured for installation in that equipment. The Amperes Interrupting Current (AIC) Rating shall equal the AIC rating of the existing equipment. A breaker with a lower AIC rating may be used if the contractor provides calculations showing that the breaker rating is sufficient to handle the available fault current. Submit these calculations for approval prior to ordering the breaker. An AIC rating on an existing breaker in the panelboard or switchboard does not demonstrate sufficient proof that the available fault current is less than that breaker's AIC rating.

1.5 SUBMITTALS AND SHOP DRAWINGS

A. Within 30 days after award of Contract and prior to beginning work, provide six bound copies of manufacturers' cut sheets containing information concerning each article of electrical equipment to be furnished on this project. These cut sheets shall contain sufficient information to prove compliance with the contract documents. Information addressing the requirements of the contract documents shall be highlighted. Each bound set shall bear the stamp of the Electrical Contractor as well as the General Contractor.

B. Within 30 days after award of Contract and prior to beginning work, provide six sets of full size shop drawings showing exact equipment locations with all equipment drawn to scale. Show all raceways with their junction boxes and pull boxes. Show all connection types, locations, and heights to equipment. Provide mounting and support details for all raceways and equipment. Coordinate with all other trades to ensure that there are no conflicts between systems. Each set of shop drawings shall bear the stamp of the Electrical Contractor, the General Contractor, and all Project Sub-Contractors. Failure to submit these Shop Drawings will render the Electrical Contractor responsible for resolving all conflicts between trades at his own expense.

C. Submittals and Shop Drawings are reviewed to determine quality of materials. Approval of submittals and shop drawings does not relieve the Contractor of meeting the requirements and intent of the Contract Documents.

D. Outlet, light fixture, and device locations are shown in their approximate locations on the drawings. Coordinate with Architectural drawings to get final locations. Mount all electrical outlets shown at counters such that the bottom of the box is two inches above the backsplash or six inches above a counter with no backsplash. The Owner reserves the right to relocate outlets, light fixtures, and devices a distance not to exceed twenty feet prior to the installation of outlet boxes.

PART 2 - PRODUCTS

2.1 All electrical equipment and materials shall be new. All equipment and materials shall be stored on the job site in weatherproof enclosures. Electronic equipment shall be stored in facilities where the temperature and humidity are controlled. In addition, comply completely with all manufacturers' requirements for storage and handling.

2.2 All equipment shall be UL listed for the application in which it is used and shall be labeled as evidence of its UL listing.

2.3 Each circuit breaker supplying a multiwire branch circuit shall be installed with a manufacturer supplied handle tie to simultaneously disconnect all ungrounded conductors. Each multi-wire branch circuit shall comply with NEC article 210.4.

2.4 Products shall be selected to maintain or improve the aesthetics of the facility. Gain approval of the Architect or Engineer prior to ordering or installing any electrical equipment or raceway.

PART 3 – EXECUTION

3.1 WORKMANSHIP

All work shall be performed with an emphasis on neatness. The Engineer, Architect, and Owner retain the right to reject work that is, in their judgment, unsatisfactory.

3.2 EXPERIENCE

The Contractor shall have completed at least two jobs of similar size and scope within the past five years. The Engineer reserves the right to reject Contractors based on their inability to submit evidence of their experience, or based on experience with the Contractor on previous projects.

3.3 PERMITS

Obtain and pay for all permits required for work.

3.4 FIREPROOFING

A. Fireproof all penetrations through firewalls with a fireproofing compound listed to maintain the rating of the wall through which the raceway passes.

B. The fire-stopping caulk shall be a one-part, intumescent, latex elastomer. The caulk shall be capable of expanding a minimum of 3 times at 1000°F. The material shall be thixotropic and be applicable to overhead, vertical and horizontal fire-stops. The caulk shall be listed by independent test agencies such as UL or FM and be tested to, and pass the criteria of, ASTM E 814 Fire Test, tested under positive pressure. It shall comply with the requirements of the NEC (NFPA-70), BOCA, ICBO, SBCCI and NFPA Code 101. Fire-stopping caulk shall be paintable, but shall be non-hardening. Fire-stopping caulk shall be 3M Fire barrier CP or approved equal.

C. The fireproofing materials shall be installed by individuals certified to perform such work. Submit evidence of personnel certifications with electrical equipment brochures.

D. Where cable trays are shown crossing firewalls, terminate the cable tray on each side of the wall and run the conductors through conduits installed in the wall. Fireproof around the conductors after installation.

E. Provide mineral wool packing and all other materials recommended by the manufacturer for a complete installation.

3.5 FLASHING

Provide all necessary equipment and flash all roof penetrations in such a manner to ensure that all penetrations are completely sealed and all roof warranties remain in effect. Where there are no roof warranties, the Electrical Contractor shall guarantee the electrical penetrations against leaking for a period of one year from project completion. Employ a professional roofing contractor to perform all flashing.

3.6 PROTECTION

A. Keep energized equipment covered during all phases of construction. Use enclosures, doors, covers, etc., to ensure that neither personnel nor machinery contact live electrical equipment.

B. Replace electrical equipment that is damaged during construction.

3.7 DAMAGED FACILITIES

A. Locate all existing site equipment and utilities prior to beginning construction. Repair all equipment and utilities damaged during construction, or pay for the repair of the equipment and utilities where required by the Owner of the damaged facilities.

B. Coordinate the routing of all circuits and the locations of all devices with the Architect or Engineer and the Owner. Shop drawings shall describe completely the locations and elevations of all raceways, boxes, fittings, and equipment.

3.8 EXCAVATION AND BACKFILL

A. Excavate in such a manner as to minimize erosion of the soil. Backfill trenches around conduits with fine sand that is free of rocks, clods, and debris. Fill sand a minimum of 4" over conduits. Backfill the rest of the trench in six inch increments, wetted, and tamped. Final compaction shall be a minimum of 95% of that of the adjacent earth. Resurface the grade with the same material as that excavated from the grade whether it be paving, concrete, sod, etc. Repair work shall be comparable to the quality of the original site prior to excavation.

B. Provide a 3" wide plastic labeled marker tape 12" below grade over all electrical conduits buried underground. Tapes for power circuits shall have a warning such as "Caution: Buried Electrical Line Below." Labels on tapes for telephone, data, cable television, and other facilities shall adequately describe the line over which they are buried.

C. Provide a #12 AWG wire in each buried conduit run labeled accordingly on each end.

3.9 IDENTIFICATION

A. Label all switchboards, panel boards, motor starters, disconnects, and motor control centers furnished under Division 26, 27, and 28 and other divisions of this contract with engraved rigid plastic nameplates having letters at least ¼ inch high. Nameplates shall be bolted to the enclosure. All labels shall indicate the voltage, number of phases, the AIC rating, and the panelboard and circuit number from which the device is fed.

B. All circuit breakers in Switchboards, Motor Control Centers, Square D, I-Line, and similar panelboards shall be labeled with plastic nameplates (as described in Part A) providing the name of the load served and the ampacity and number of poles of the breaker.

C. All Square D NQOD, NF and similar panel boards shall have typewritten circuit directories.

D. Label all conductors at all junction boxes, pull boxes, and terminations with typewritten adhesive markers indicating the panel board or switchboard name and circuit number of the conductor. Labels shall be Brady Datatab or approved equal.

E. Label all junction boxes and pull boxes with stenciled painted letters containing the name of the panel board and circuit numbers of the circuits contained within. Use black paint for normal circuits, red paint for emergency circuits, and orange paint for fire alarm circuits. The Contractor may select other colors for junction boxes and pull boxes for auxiliary systems.

F. Label all conduits in the most likely direction of access and view every 50' and on both ends of each bend with stenciled painted letters containing the name of the panel board and circuit numbers of the circuits contained within. Use black paint for normal circuits, red paint for emergency circuits, and orange paint for fire alarm circuits. The Contractor may select other colors for conduits for auxiliary systems.

3.10 AS-BUILT DRAWINGS

Maintain one set of drawings during construction for as-built markings. Mark these drawings in red to indicate field changes. Provide these drawings to the Engineer at the end of the construction process. Where required under the General Conditions, Special Conditions, or other portions of this contract, provide revised computer drawn as-built drawings to the Engineer at the end of construction.

3.11 TESTING

A. Test all systems, or pay testing agencies as required, for compliance with the requirements of all regulatory agencies.

B. Test the electrical power service ground using a Biddle Three-Terminal Ground Resistance Tester, or approved equal. Grounds shall meet the requirements of the NEC, or of Specification 260526, whichever is more stringent. Test grounds only when the earth is dry. Provide additional ground rods as necessary to achieve the required results.

C. Prior to making final equipment connections, test all service, feeder, and branch circuit conductors for continuity, phase-to-phase faults, and phase-to-ground faults using a Megger BM100 or approved equal test instrument generating 500 Vdc. Insulation resistance shall be a minimum of 500,000 Ohms between any conductor and ground and 1,000,000 Ohms between any two conductors.

D. Test other systems as required in their respective specifications.

E. Provide three bound copies of all test results to the Engineer at the end of the construction process. No Recommendation of Substantial Completion will be granted until all testing reports have been submitted.

3.12 WARRANTY

Provide the Owner a written guarantee to repair, or replace, all faulty equipment and systems for a period of one year from date of Substantial Completion. During this one-year period, a representative of the Contractor shall be on the site actively working on the repairs within 24 hours of the Owner's telephone call. During this period of time, the Owner shall not be charged for any repair work or expenses related with the repair work unless the Contractor can prove that the Owner has damaged the equipment or system.

END OF SECTION

SECTION 26.0519

LOW-VOLTAGE POWER CONDUCTORS AND CABLES

PART 1 – GENERAL

Provide all circuitry, terminations, splices, connectors, lugs, and other equipment necessary for connection of all equipment requiring electrical connections.

PART 2 – PRODUCTS

2.1 All electrical conductors shall be soft-drawn annealed copper having 98% conductivity and an insulation rating of 600V.

2.2 Conductors shall be UL listed for installation in the raceway in which they are to be installed.

2.3 Conductors shall be rated 90 degrees C for use in residential, commercial, industrial, and institutional facilities, and shall be listed as 105 degrees C appliance wire. Conductors shall be listed under UL 83, UL 1063, and UL 758. If XLP or EPR insulation is used, conductors shall be listed under UL 44 and NEMA WC7.

2.4 Conductors used for branch circuits, feeders, auxiliary systems, and controls run in dry locations shall have PVC insulation and a Nylon outer jacket. They shall be THHN/THWN or XHHW-2.

2.5 Conductors used for branch circuits, feeders, auxiliary systems, and controls run in wet locations shall have XLP or EPR insulation and be type XHHW-2.

2.6 Conductors used for operating room isolation panels and associated branch circuits shall be copper stranded conductor having a cross-linked polyethylene insulation or equivalent with a dielectric constant of 3.5 or less. Wire-pulling compounds that increase the dielectric constant shall not be used on the secondary conductors of isolation panels. The isolated circuit conductors shall be identified as follows:

Isolated Circuit #1 – Orange
Isolated Circuit #2 – Brown

For 125 volt, 15 & 20 ampere receptacles: The orange conductor shall be connected to the terminal on the receptacle that is identified in accordance with NEC 200.10(B) for connection to the grounded circuit conductor.

2.7 Conductors used for services shall be type SE for aerial services or type USE-2 for underground services.

2.8 Sizes #10 and #12 shall be solid conductors except where used for controls. All controls conductors shall be stranded.

2.9 Use minimum #14 AWG conductors for controls and auxiliary circuits. Use larger conductors as required to compensate for voltage drops exceeding 3% of the system voltage.

2.10 Conductors shall be furnished in the colors described below unless local ordinances require different colors. Conductors #8 and smaller shall be furnished with colored insulation; conductors larger than #8 shall be taped with the appropriately colored tape for a length of at least 2” at each panelboard, junction box, pull box, load, or other exposed location. Ground conductors shall be taped green for their entire exposed length.

SystemVoltage	208Y/120V, 3-Phase, 4-Wire	120/240V, 3-Phase, 4-Wire	480Y/277V, 3-Phase, 4-Wire
Phase A	Black	Black	Brown
Phase B	Red	Orange	Orange
Phase C	Blue	Blue	Yellow
Neutral	White	White	Gray
Ground	Green	Green	Green

2.11 Conductor sizing chart:

Voltage Drop Chart for 20amp single pole circuits		
Voltage	Circuit Length	Conductor size (awg)
120	< 90'	#12
120	> 90'	#10
120	> 145'	#8
120	> 230'	#6
277	< 200'	#12
277	> 200'	#10
277	> 325'	#8
277	> 525'	#6

A. Circuit sizes indicated on the drawings are minimum NEC requirements. Refer to this chart for upsizing conductors based on circuit length.
B. Do not connect conductors larger than #10 directly to a receptacle or a switch. Provide a junction box to downsize the conductor to #12 at the device.
C. For circuits longer than those listed above, consult with the Engineer for conductor sizes.

PART 3 – EXECUTION

3.1 Install conductors carefully using a minimum of two tradesmen – one feeding the conductors into the conduit, and the other pulling the conductors into the conduit.

3.2 Each branch circuit and multiwire branch circuit shall be run with its own neutral conductor complying with NEC article 200.4.

3.3 Join stranded conductors with appropriate mechanical or compression lugs. Wire nuts may be used for solid conductors only.

3.4 Splices shall only be made in approved enclosures. Splices shall not be pulled inside conduits.

3.5 Provide cable supports and strain relief connectors as required by the NEC.

3.6 Furnish junction boxes, pull boxes, handholes, manholes, etc. as required to ensure that the maximum number of bends allowed by the NEC are not exceeded and to ensure that the cables are not damaged during installation.

END OF SECTION

SECTION 26.0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 GENERAL

Ground all equipment, systems, structures, etc., per the latest edition of the National Electrical Code (NEC).

PART 2 – PRODUCTS

2.1 Use mechanical bolted connections in dry locations that are accessible.

2.2 Use exothermic welds in wet locations and locations that will be inaccessible at the end of construction.

2.3 Ground rods shall be UL listed 3/4" x 10' copper-clad steel ground rods with a minimum copper cladding thickness of 10 mils.

PART 3 – EXECUTION

3.1 Ground rods shall be installed with their tops no less than 6" below grade.

3.2 Bond ground connections to metal raceways at each end of the conduit run. Provide grounding bushings where required by the NEC. Where cable trays are used, bond the ground conductor to each section and fitting of the tray.

3.3 Provide all circuits with an equipment grounding conductor sized per the NEC, or as shown on the drawings. Circuitry shown on drawings does not include the required equipment grounding conductor. Where multiple circuits are run with a common neutral, only one equipment grounding conductor is needed. The equipment grounding conductor shall be furnished with green insulation for conductors #8 AWG and smaller; where larger than #8, the equipment grounding conductor shall be taped green for its entire exposed length.

3.4 The grounding electrode conductor(s) shall be bare or shall be colored green for its entire exposed length.

3.5 Individual ground conductors shall be installed in PVC conduit sized per the NEC.

3.6 Provide receptacles, luminaires, and other devices with a green conductor that bonds the receptacle grounding screw or pigtail, the outlet box grounding screw, and the equipment grounding conductor together.

3.7 In health care facilities, where two or more different panel boards serve the same patient-care area, an 8 AWG insulated continuous copper conductor shall bond these different panelboards together.

3.8 Telephone, cable television, and other auxiliary systems shall be bonded to the electrical building service ground using a conductor no smaller than #6 AWG.

END OF SECTION

SECTION 26.0533

RACEWAYS, OUTLET BOXES AND JUNCTION BOXES FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 GENERAL

A. All electrical systems circuitry shall be contained in raceways unless expressly listed in the specification for that system.

B. Outlet Boxes and Junction Boxes

1. Furnish and install all outlet boxes and junction boxes in accordance with this specification and the requirements of the NEC.

2. Provide outlet boxes for all switches, receptacles, luminaires, telephone jacks, cable jacks, and other devices furnished in this Contract. Provide all necessary hardware including, but not limited to, additional structural support, support brackets, screws, bolts, fixture studs, etc.

3. Outlet boxes and junction boxes in dry locations shall be galvanized stamped steel boxes sized per the latest edition of the National Electrical Code (NEC), but no less than 4" x 4" x 2 1/8" deep. The thickness of the steel shall be in compliance with the requirements of the NEC. Provide stamped steel covers for all junction boxes manufactured to fit the particular box on which it is used.

4. Outlet boxes used in concrete and masonry walls and ceilings shall be of the concrete type manufactured for such applications.

5. Outlet boxes and junction boxes in wet locations shall be of cast metal construction with gasketed waterproof covers. All conduit connections to the boxes shall be made watertight.

6. Wall outlet boxes shall be 4" x 4" x 2 1/8", or larger as required, with plaster rings provided for final flush installation. Plaster rings shall have single-gang openings unless the equipment mounted inside requires two-gang installation.

7. Floor boxes in slabs on grade shall be deep rectangular, cast iron, fully adjustable boxes with brass rings unless noted differently on the drawings. Covers shall be made of brass and shall provide flip top access to the power or data jacks inside. Screw-on covers are not acceptable unless a flip-top cover is unavailable for the device installed in the floor box. Provide the box sized as required for the number of devices shown installed. Boxes shall be as follows, or equal:

   a. Single-Gang Cover Plates: Steel City #P64 ¾ 2 for data and P64DS for power.
   b. Double-Gang Boxes: Steel City #642
   c. Triple-Gang Boxes: Steel City #643

9. Receptacles installed in floor boxes shall be as described in Specification 26 09 23, Switches and Receptacles. Data, Telephone, or Combination Data and Telephone Outlets shall consist of Category 5 rated RJ45 jacks mounted in flip top cover plate.

11. Size all boxes per the requirements of the latest NEC.

1.2 SCOPE OF WORK

A. Raceways

1. Provide all raceways, fittings, couplings, anchors, supports, hangers, etc. for complete raceway systems.

2. Use Schedule 40 polyvinyl chloride (PVC) conduit for primary and secondary service entrance conduit encased in concrete, service entrance for telephone, exterior feeders encased in concrete, exterior underground branch circuits. Do not use PVC conduit for feeders or branch circuits inside the building. Provide PVC-coated galvanized rigid steel elbows and PVC-coated galvanized rigid steel conduit for all vertical runs extending to a point at least 6" above grade. Galvanized Rigid steel conduit coated with two complete coats of asphaltum or bituminous paint may be used in lieu of PVC-coated galvanized rigid steel conduit.

3. Use Galvanized Rigid Steel (GRS) conduit for interior and exterior primary and secondary service conduit and for branch circuits exposed to weather.

4. Use Intermediate Metal Conduit (IMC) for all panelboard feeders, feeders installed in concrete slabs at ground floor, branch circuits below 6' above finished floor, wet locations, hazardous locations, and pendant drops.

5. Use Electrical Metallic Tubing (EMT) for all branch circuits and installed overhead more than 6' above finished floor and in dry locations and in slabs above grade level.

6. Conduits shall not be smaller than ¾" nominal trade size.

PART 2 – PRODUCTS

2.1 Products for Raceways

A. PVC conduits, fittings, couplings, adapters, and accessories shall be UL listed and approved for use with 90 degree Celsius conductors. The UL label shall be affixed to each ten foot length of conduit and each fitting. Conduits shall comply with NEMA Specification TC-2 and UL 651. Fittings shall comply with NEMA TC-3 and UL 514b.

B. PVC-coated conduits, fittings, couplings, adapters, and accessories shall be UL listed with PVC as the primary corrosion protection. They shall be hot dipped galvanized rigid steel conduit with threads electro-galvanized after cutting. The conduit shall meet UL 6. The fittings shall meet UL 514B. The PVC coating shall be uniformly applied to the interior and exterior of all conduit and fittings. The coating shall be nominally 2 mils thick. The PVC coating shall extend one pipe diameter or two inches, whichever is less, at every male fitting except unions to fit over the joining female connection. Couplings shall contain a series of longitudinal ribs, 40 mils in thickness, to protect the coating from damage by tools during installation. PVC-coated conduits shall be ETL Verified PVC-001. Fittings shall be manufactured to the same standard. PVC-coated conduit shall be Robroy Plastibond or equal.

C. GRS conduits, fittings, couplings, adapters, and accessories shall be UL listed. They shall be hot-dipped galvanized steel. They shall meet the safety standards of UL 6, and shall be manufactured to ANSI C80.1. Threads shall be hot galvanized after cutting.

D. IMC conduits, fittings, couplings, adapters, and accessories shall be UL listed. They shall be hot-galvanized steel. Fittings, couplings, adapters, and accessories shall be the same as those for GRS conduit described above. IMC shall meet UL 1242 and ANSI C80.6. Threads shall be hot galvanized after cutting. The inside of the conduit shall be finished with a corrosion-resistant coating.

E. EMT conduits, fittings, couplings, adapters, and accessories shall be UL listed. They shall be hot galvanized steel and shall be produced in accordance with UL 797 and ANSI C80.3. The inside shall be finished with a corrosion-resistant lubricating coating.

F. Conduit fittings used with EMT conduits may be set screw indenter type or compression type. All metallic fittings for IMC and Rigid conduit shall be compression type fittings.

G. Flexible metallic conduit shall be constructed of galvanized steel and shall be UL listed as compliant with UL 1 and UL 1479.

H. Liquidtight flexible conduit shall be constructed of galvanized steel and shall be coated with a PVC jacket to resist liquids, dirt, grease, and oils. All fittings shall be designed, constructed, and installed to maintain the integrity of the liquidtight connections. Liquidtight flexible conduit shall comply with UL 360.

2.2 ACCEPTABLE MANUFACTURERS FOR OUTLET BOXES AND JUNCTION BOXES.

A. Outlet boxes and junction boxes shall be manufactured by Raco, Steel City, or Appleton.

PART 3 – EXECUTION

3.1 CONDUIT EXECUTION

A. Conduits run underground shall be buried no less than 24” deep. Services and primary conduits feeding transformers shall be buried no less than 48” deep.

B. All EMT conduits shall be ¾”minimum, except for stub ups from a light switch.

C. **Do not install conduits in or below ground floor slabs, except for service conduits, site lighting, and where specifically indicated on the drawings.**

D. Do not install conduits within 6” of the deck where a screw down type roof system is utilized.

E. PVC-coated conduits may be field-bent provided that manufacturer-approved tools are used. Individuals installing PVC-coated conduits shall be trained for installation by factory-certified trainers. Provide evidence of training with equipment brochures.

F. Support and install all conduits per the latest edition of the National Electrical Code. Support groups of conduits with electrical strut supported by threaded rods anchored to the building structure. Supports shall be designed to hold no less than twice the weight of the conduit and conductors to be supported plus an additional 250 pounds at midspan.

G. All conduits shall be grouped and run parallel to each other and to building walls.

H. All conduits shall be assembled according to the manufacturer’s instructions.

I. Conduits run underground shall be assembled to be watertight.

J. Cap all conduits during installation. Pull a mandrel sized for that conduit and a cleaning brush through each conduit before installation of any conductors.

K. Conduits that are obviously damaged and field bends that are obviously out of round shall be replaced.

L. Provide final connections to equipment with flexible metallic conduit. In wet or damp locations, use liquidtight flexible conduit. Flexible conduit shall not exceed 72".

M. Terminate conduits entering boxes with a locknut inside the box and a locknut outside the box. Provide protective bushings on all conduit threads. Use watertight hubs where conduit terminations are exposed to moisture.

N. Use grounding bushings on all feeder conduits, all underground conduits, and where required by the National Electrical Code.

O. Conduits shall be run no closer than 12" to hot water pipes.

P. Where conduits are run through the ceiling and are required to make connections to equipment within the room that is not located near a wall, support the conduit from the structural ceiling and provide a flange bolted to the floor. Install a tee conduit fitting in the vertical run of conduit, and make the connection to the equipment with a piece of flexible conduit extending from the tee conduit fitting to the equipment.

Q. Provide expansion fittings where conduits cross building expansion joints. Provide grounding jumpers between the conduits.

R. Provide EMT conduit sleeves where conduits pass through walls, floors, or footings sized a minimum of two nominal trade sizes larger than the conduit that must pass through the sleeve.

S. Equip all empty conduits with a pullwire or string capable of withstanding 200 pounds of pulling tension.

3.2 Execution for Outlet Boxes and Junction Boxes.

A. All devices shall be flush mounted unless specific written permission is obtained from the Engineer for a particular device in a particular location.

B. Install outlet boxes in walls, and provide plaster rings such that wall finish contractor's finish is flush against the edge of the plaster ring. Workmanship will not be accepted where the hole in the wall shows behind the cover plate, or the wall finish is uneven or unpainted at the edge of the cover plate.

C. Use round or square ceiling outlet boxes as required for the device being installed. The ceiling shall be finished flush against the box; the fixture shall completely cover the box and mount tight against the ceiling. Coordinate the requirements of the fixture prior to installing the box.

D. Provide junction boxes, pull boxes, and conduit fittings where required by the NEC to limit the number of bends in the raceway, and where required to prevent damage to conductors due to long runs.

E. Junction boxes and pull boxes installed in the ground outside shall be Quazite Composolite or equal. Mount the boxes over 24" of washed gravel fill. If splices are to be made inside the boxes, the boxes shall be of the type furnished with a bottom, and all conduit connections shall be watertight. In addition, all conductor splices shall be made watertight using an appropriate splice kit as manufactured by 3M, or an equal.

END OF SECTION

SECTION 26.0573
ELECTRICAL STUDIES

PART 1 – GENERAL

1.1 The Electrical Studies in this specification shall be performed by the electrical gear Manufacturer. The Electrical Studies shall be preliminarily performed at the electrical gear submittal time and then updated when all of the electrical gear is installed and the exact electrical parameters are known.

1.2 The purpose of the preliminary study (Protective Device Coordination and Fault Current Studies) is to verify that the submitted electrical gear is submitted with the correct circuit breakers and distribution equipment for the facilities' power system. The initial study shall be conducted using the electrical gear specified in the construction documents. The Single Line Diagram in the construction drawings shall be used for circuitry sizes of the major electrical gear. The Power, Mechanical, and Equipment Plans in the construction drawings shall be used for circuitry sizes of the remaining electrical gear. The Utility transformer shall be modeled using "worst case" parameters for impedance and infinite short circuit current available at the primary of the transformer. Dry type transformers shall be modeled using typical impedances for the size of transformer specified. Emergency generators shall be modeled using "worst case" parameters for sub-transient reactance and a typical decrement curve for the kW size of generator specified utilizing a permanent magnet alternator. The Electrical Contractor shall assist the electrical gear Manufacturer's Engineer with estimated circuitry lengths, fault currents, transformer sizes, generator sizes, and any other necessary information. The studies shall be run, evaluated, and then submitted along with the electrical gear submittals. The equipment AIC ratings on the Drawings and in the Specifications represent the minimum acceptable ratings. Higher rated equipment shall be provided as necessary, based on study results. The Protective Device Coordination Study shall show that the submitted electrical gear selectively coordinates and adequately protects all equipment, including transformer, motor, and generator damage curves. Electrical gear submittals will not be approved without the results of this study. An electronic copy of the power system model shall be saved by the electrical gear Manufacturer's Engineer for a period of seven years.

1.3 After all of the electrical gear is installed and the exact electrical parameters of the project are known, the Electrical Contractor shall give that information to the electrical gear Manufacturer's Engineer. The saved power system model shall be updated with the exact utility X/R ratios (three phase and phase-to-ground), utility primary voltage over-current protection devices, transformer impedances, circuitry sizes, circuitry lengths, generator sub-transient reactance, and generator overload curves. The purpose of updating the preliminary power system model is to provide accurate information for Arc Flash Labels, Available Fault Current Labels, and Protective Device Settings. A Fault Current Study, a Protective Device Coordination Study, and an Arc Flash Study shall be run, evaluated, and then submitted to the Electrical Engineer for approval. The approved study report shall be used for setting the Protective Devices, producing Arc Flash Labels, and producing Available Fault Current Labels.

1.4 It is the responsibility of the Electrical Contractor and the Gear Manufacturer's Engineer to gather all of the necessary information for the studies. The Power Source, PLLC will not investigate and/or provide the required information for the studies.

PART 2 – ELECTRICAL STUDIES PERFORMED

2.1 PROTECTIVE DEVICE COORDINATION AND ARC FLASH STUDIES

A. The Contractor shall employ the equipment Manufacturer's Engineers to perform the Protective Device Coordination and Arc Flash studies. The Engineer responsible for the study shall perform such work as his job responsibility, and shall have performed at least 100 such studies in his career. Submit the Engineer's credentials with the study results.

B. Analyses shall be prepared to demonstrate that the equipment and system to be provided meet the specified requirements for equipment ratings, coordination, and protection. They shall include a fault current analysis and protective device coordination study.

C. Scope of Analyses. The Fault Current Analysis, Protective Device Coordination, and Arc Flash Studies shall include all electrical equipment where the incident energy level is greater than 1.2 Cal/cm^2. The term electrical gear shall include the following: Transformers (Utility & Dry Type), Switchboards, Panelboards, Motor Control Centers, Disconnects, Loadcenters, Enclosed Circuit Breakers, Motor Starters, Contactors, etc.

D. Determination of Facts. The time-current characteristics, features, and nameplate data for each existing protective device shall be determined and documented. The Contractor shall coordinate with the commercial power company for three phase and single phase fault current availability and X/R ratios at the site.

E. Single-Line Diagram. Provide a single-line diagram to show the electrical system buses, devices, transformation points, and all sources of fault current (including generator and motor contributions). A fault-impedance diagram or a computer analysis diagram shall be provided. Each bus, device or transformation point shall have a unique identifier. If a fault-impedance diagram is provided, impedance data shall be shown. Locations of switches, breakers, and circuit interrupting devices shall be shown on the diagram, together with available fault data, and the device interrupting rating.

F. Arc Flash Hazard Analysis:

1. Method. The Arc Flash Hazard analysis shall be performed in accordance with the latest applicable NFPA 70E, OSHA 29-CFR, Part 1910 Sub part S, IEEE 1584, and NESC Standards. **The intent of this specification is to require that Arc Flash calculations be performed on all 208V and above electrical equipment, even if NFPA 70E doesn't require the calculations to be performed for that equipment.** The study must be performed using IEEE 1584 for equipment rated 50 to 15kV and NESC for equipment rated above 15kV. **The use of NFPA 70E Task Tables to determine Hazard Classification is not acceptable.**

2. Data. The analysis shall consider all operating scenarios during normal conditions, alternate operations, emergency power conditions, and any other operations, which could result in maximum Arc Flash Hazard. The label shall list the maximum incidental energy calculated and the scenario. Possible scenarios include, but are not limited to: Normal Utility Power, Emergency Generator Power, Bus Tie Breaker Open, Bus Tie Breaker Closed, UPS Power, etc..

G. Fault Current Analysis:

1. Method. The fault current analysis shall be performed in accordance with methods described in IEEE Std 242, and IEEE Std 399.

2. Data. Actual data shall be utilized in final fault calculations. Bus characteristics and transformer impedances shall be those proposed for the initial analysis. Data shall be documented in the report.

G. Fault Current Availability. Balanced three-phase fault, bolted line-to-line fault, and line-to-ground fault current values shall be provided at each voltage transformation point and at each power distribution bus. This data shall be shown in tabular form on the diagram or in the report.

H. Coordination Study. The study shall demonstrate that the maximum possible degree of selectivity has been obtained between all electrical equipment, consistent with protection of equipment and conductors from damage from overloads and fault conditions. The study shall include a description of the coordination of the protective devices in this project. Provide a written narrative that describes: which devices may operate in

the event of a fault at each bus; the logic used to arrive at device ratings and settings; any situations where system coordination is not achievable due to device limitations (an analysis of any device curves which overlap); coordination between upstream and downstream devices; and settings. Provide recommendations to improve or enhance system reliability and detail where such changes would involve additions or modifications to the Contract. Cost changes (addition or reduction) shall be provided. Composite coordination plots shall be provided on log-log graph paper.

I. Study Reports (Initial and Final)

1. The reports shall include a narrative: the analyses performed; the bases and methods used; and the desired method of coordinated protection of the power system.

2. The reports shall include descriptive and technical data for existing devices and new protective devices proposed. The data shall include Manufacturer's published data, nameplate data, and definition of the fixed or adjustable features of the existing or new protective devices.

3. The reports shall document utility company data including system voltages, fault MVA, system three phase X/R ratio and magnitude, system single line to ground X/R ratio and magnitude, time-current characteristic curves, current transformer ratios, relay device curves, and protective device ratings & settings.

4. The reports shall contain fully coordinated composite time-current characteristic curves for each bus in the system as required to ensure coordinated power system protection between protective devices or equipment. The report shall include recommended devices or equipment. The report shall include recommended ratings and settings of all protective devices in tabulated form.

5. The reports shall provide the calculations performed for the analyses including computer analysis programs utilized. The name of the software package, developer, and version number shall be provided.

PART 3 – LABELS

3.1 **The Electrical Gear Manufacturer shall print Arc Flash Labels for all electrical gear, Switchboards, Panelboards, Transformers (all except Utility), Motor Control Centers, Disconnects, Loadcenters, Enclosed Circuit Breakers, Motor Starters, Contactors, etc.** Arc Flash labels shall comply with the label detail in the construction drawings. The labels shall be of a type and quality to last in the environment in which they are installed. The labels shall be furnished to the Electrical Contractor for installation by the Electrical Contractor.

3.2 The Electrical Contractor shall make the Available Fault Current Labels complying with the label detail in the construction drawings for each piece of electrical gear. The Protective Device Coordination Study report shall be used for providing the Available Fault Current at each location. The labels shall comply with NEC Article 110.24 of the 2011 edition. Available Fault Current labels shall be of a type and quality to last in the environment in which they are installed. The labels shall be mounted according to the label detail in the construction drawings.

END OF SECTION

SECTION 26.0923

SWITCHES AND RECEPTACLES

PART 1 – GENERAL

Furnish and install all switches and receptacles in accordance with this specification and the requirements of the NEC.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

Switches and receptacles shall be manufactured by Hubbell, Cooper Wiring Devices, Leviton, or Pass & Seymour.

2.2 GENERAL

A. Switches and receptacles shall be specification grade. They shall have ampacity and voltage ratings suitable for the application in which they are used.

B. Consult architect or engineer for device colors prior to ordering devices.

C. Provide brushed stainless steel cover plates for all devices. A single cover plate shall cover all devices in one box.

D. Light switches shall be 20 Ampere, 120-277V back-wired and side-wired toggle switches. They shall be rated up to 2 HP at 240V. Each switch shall be equipped with a grounding screw. Switches shall be Hubbell CSB series or equal.

E. Duplex NEMA 5-20R receptacles shall be tamper resistant Hubbell CR20TR or equal.

F. Duplex GFI NEMA 5-20R receptacles shall be tamper resistant, 20amp, Hubbell or equal.

G. Weatherproof while-in-use cover plates shall be Teddico #34017-7 or equal. Cover plates shall be single gang, lockable, and constructed of heavy duty die cast metal.

H. All 125V, 15 and 20 ampere receptacles installed in dwelling units shall be of the tamper-resistant type.

I. All 15 and 20 ampere, 125 and 250V non-locking receptacles installed in wet or damp locations shall be listed as the weather-resistant type.

J. Devices furnished in this Contract, but not listed above, shall be of the same standard of quality as those items listed.

PART 3 – EXECUTION

3.1 Flush mount all devices unless specific written permission is obtained from the Engineer for a particular device in a particular location.

3.2 Install all devices vertically unless the drawings specifically state that the particular device should be mounted horizontally.

3.3 Install receptacles with the ground slot up.

END OF SECTION

SECTION 26.0926
VACANCY SENSORS

PART 1 - GENERAL

1.1 Furnish and install a complete system of Vacancy sensors as shown on the drawings and as specified herein to comply with the International Energy Conservation Code (IECC) 2012. The drawings are provided to show the general scope of the work, and show the absolute minimum components required. Actual system components, quantities, and locations shall be determined by the motion detector vendor and provided to the Contractor with the installation shop drawings.

1.2 The Contractor and Sales Representatives are advised to take notice of specified component characteristics when attempting to select and propose substitutions. It is highly unlikely that substitutions on a one-for-one component basis will produce results that provide acceptable system performance.

1.3 Provide all power packs, hardware, software, devices, circuitry, and other components, material, and labor required to install, configure, and test the entire system to the satisfaction of the Architect, Owner, and Engineer.

1.4 Submit six sets of manufacturer's cut sheets describing completely all equipment, and six sets of shop drawings showing all circuitry including terminal-to-terminal connections.

1.5 The wiring diagrams on these drawings are based on our best interpretation of the manufacturer's data that was available at the time of design; however, they shall not be used for system installation and configuration. The controls equipment vendor is expected to be thoroughly knowledgeable of the equipment that is being proposed, and shall provide detailed shop drawings tailored for each circuit and lighting zone on the project. General manufacturer's data sheets shall not be acceptable. The shop drawings shall be suitable for the installing electrician to use for complete installation of the circuitry without referring to data sheets or installation manuals for connection of lighting control equipment. These requirements shall be followed whether the specified equipment, or products of other manufacturers, is provided.

PART 2 - PRODUCTS

2.1 Hallway Vacancy sensors: Vacancy sensors used in the hallways shall be passive infrared, ceiling-mounted units with a coverage of 6' x 130'. They shall be Sensor Switch HW13 WV BR or approved equal.

2.2 Wall mounted LED lighting controls shall be 0-10V dimmer/vacancy sensor type equal to Lutron MS-Z101-V-XX

2.3 Wall mounted lighting controls shall be dual technology (ultrasonic/passive infrared) dual relay vacancy sensor type equal to Lutron MS-B202-V-XX

2.4 Areas up to 500 Square Feet: Ceiling mounted Vacancy sensors used in areas up to 500 square feet shall be dual technology infrared and passive infrared, ceiling-mounted units with a 360 degree, 500 square foot coverage.

2.5 Power Packs: Power packs shall be of the same manufacturer as the Vacancy sensors. Each shall be capable of controlling a 20 ampere circuit. They shall be rated for operation at the voltage of the system on which they will be used.

2.6 Circuitry: Provide control circuitry as required by the manufacturer for optimum system operation, but no less than the following: Control cables shall be 3-conductor #22 AWG copper with an overall jacket. Adjust conductor sizes as required to overcome unacceptable voltage drop.

PART 3 - EXECUTION

3.1 Vacancy sensors shall be provided so that their coverage areas overlap and there are no dead zones in the rooms where persons may stand and not be detected.

3.2 Vacancy Sensors shall be set for “manual on/automatic off” operation.

3.3 All work shall be done by qualified system technicians.

3.4 Wiring, including control wiring, shall be in Raceways meeting Specification 260533.

3.5 Guarantee workmanship and material for a period of one year after final acceptance. During the warranty period, repair or replace faulty equipment at no cost to the Owner for labor, material, or expenses.

3.6 Upon completion of job, test entire system. After testing submit a certificate to the Architect stating verification of the following:

PART 4 – CLOSE-OUT DOCUMENTS

4.1 Provide the following documents to the Architect for delivery to the Owner at the time of substantial completion:

A. Written Guarantee
B. Two sets of data prepared by the manufacturer for each item of electrical equipment completely describing each piece of equipment. The data shall include parts lists, a description of operation, shop drawings, wiring diagrams, maintenance procedures, and other literature required for operation and maintenance of equipment.

4.2 Instruct the Owner on system operational procedures. Notify the Owner and Architect at least one week in advance of the training session. Provide written step-by-step instructional material.

4.3 Notify the General Contractor that you are to present during the Pre-final Inspection. During that inspection, demonstrate all system functionality and capabilities; remove cover plates and panels covers as required to show the quality of the installation. The Owner, Architect, and Engineer reserve the right to reject unsuitable workmanship or performance.

END OF SECTION

SECTION 26.2400

PANELBOARDS

PART 1 – GENERAL

1.1 Furnish and install all panelboards, complete with their circuit breakers, phase buses, neutral buses, ground buses, structural supports, and other equipment necessary for complete systems.

1.2 The equipment vendor shall perform all calculations necessary and provide complete Arc Flash Labels as required by the National Electrical Cod (NEC) and the drawings. Note: The drawings typically require more detail than required by the NEC.

PART 2 – PRODUCTS

2.1 GENERAL

A. Panelboards shall be designed, manufactured, and tested to be in compliance with NEMA PB 1, UL 50, UL 67, UL 489, NFPA 70, and the ASTM.

B. Circuit breakers shall be designed, manufactured, and tested to be in compliance with NEMA AB 1, UL 489, and Federal Specification W-C-375B/GEN.

C. Panelboards shall be UL listed for service entrance where used for that purpose.

D. Panelboard ampere interrupting current (AIC) ratings shall equal the lowest rated device in the panelboard. Provide panelboards with the AIC ratings shown on the Contract Drawings. Buses shall be braced to withstand the AIC rating shown on the drawings. Series ratings shall only be used where shown on the panelboard schedules.

E. All panelboards shall be furnished with dead-front, door-in-door construction.

F. Lug locations shall be determined during the creation of shop drawings for proper arrangement with the raceway system.

G. Buses shall be constructed of 98% conductivity copper or equivalently rated aluminum.

H. Panelboard enclosures shall be NEMA 1 when they are to be mounted indoors, and NEMA 3R when they are to be mounted outdoors. Provide special enclosures where shown on the Contract Drawings.

2.2 ACCEPTABLE MANUFACTURERS

Panelboards shall be manufactured by Siemens, Square D, General Electric, or Cutler Hammer.

2.3 PANELBOARD CLASSES

A. Power distribution panelboards shall be available with mains and branch devices up to 1200 amperes. AIC ratings shall be available up to 200,000 Amperes. Power distribution panelboards shall be equipped with a nameplate containing the appropriate system voltage, number of wires, and number of phases for the system on which they are installed.

B. In 480Vac and less applications where a main breaker not exceeding 600 Amperes is required, the AIC rating does not exceed 65,000 Amperes, and no branch breakers exceed 125 Amperes, Square D NF and equivalent panelboards may be used.

C. In 480Vac and less applications where a main breaker not exceeding 225 Amperes is required, the AIC rating does not exceed 14,000 Amperes, and no branch breakers exceed 100Amperes, Square D NEHB and equivalent panelboards may be used.

D. In 240Vac and less applications where a main breaker not exceeding 400 Amperes or main lugs not exceeding 600 Amperes is required, the AIC rating does not exceed 22,000 Amperes, and no branch breakers exceed 125 Amperes, Square D NQOD and equivalent panelboards may be used.

2.4 CIRCUIT BREAKERS

A. Circuit breakers shall be thermal magnetic, molded-case with quick-make, quick-break contact action. They shall have thermal and magnetic tripping elements on each pole. Breakers with multiple poles shall have common tripping of all poles. Circuit breaker ampere ratings shall be stamped on the handle. Interrupting ratings of the circuit breakers shall be equivalent to the specified AIC rating of the panelboard. Breakers handles shall reside in a position between "ON" and "OFF" after a trip condition. Breakers shall be rated HACR when used for heating, air-conditioning, and refrigeration; HID when used with High Intensity Discharge fixtures; and shall be rated SWD when used for switching duty.

B. Circuit breaker sizes for motor loads are based on Square D recommendations for use of their breakers at the motor horsepowers listed on the mechanical drawings. If equipment is used other than Square D, adjust breaker sizes per the manufacturer's recommendations.

C. Each circuit breaker supplying a multiwire branch circuit shall be installed with a manufacturer supplied handle tie to simultaneously disconnect all ungrounded conductors. Each multiwire branch circuit shall comply with NEC article 210.4.

D. Circuit breakers with slash ratings, such as 120/240V or 480Y/277V, shall be used in solidly grounded systems where the nominal voltage of any conductor to ground does not exceed the lower of the two values of the breaker's voltage rating and the nominal voltage between any two conductors does not exceed the higher value of the circuit breaker's voltage rating.

E. Circuit breakers with straight voltage ratings, such as 240V or 480V, shall be used in systems other than solidly grounded systems (Corner-Grounded Delta, Ungrounded, Impedance Grounded, etc.) where the nominal voltage between any two conductors does not exceed the circuit breaker's voltage rating. A two-pole circuit breaker shall not be used to protect a three-phase, Corner-Grounded Delta system unless the circuit breaker is marked 1Φ-3Φ.

PART 3 – EXECUTION

3.1 Install panelboards in complete compliance with all manufacturers' installation instructions.

3.2 Install conductors neatly in panelboards. Group and tie-wrap circuits that share a common neutral.

3.3 Number circuits exactly as shown on the contract drawings.

END OF SECTION

SECTION 26.2800

DISCONNECTS AND SEPARATELY-MOUNTED CIRCUIT BREAKERS

PART 1 – GENERAL

Furnish and install all disconnects and separately mounted circuit breakers as shown on the drawings, specified herein, and required by the NEC.

PART 2 – PRODUCTS

2.1 GENERAL

A. Disconnects shall be of the heavy-duty type, and shall be UL listed for service entrance use. They shall meet or exceed the requirements of NEMA Standard KS1. Provide fuses sized to appropriately protect the load served. Equipment manufacturer's recommendations shall take precedence over the Contract Drawings.

B. Fuses shall be dual element, time-delay, Class J fuses. They shall be Bussman Low-Peak or approved equal.

C. Circuit breakers shall be thermal magnetic, molded-case with quick-make, quick-break contact action. They shall have thermal and magnetic tripping elements on each pole. Breakers with multiple poles shall have common tripping of all poles. Circuit breaker ampere ratings shall be stamped on the handle. Interrupting ratings of the circuit breakers shall be equivalent to the specified AIC rating of the panelboard. Breakers handles shall reside in a position between "ON" and "OFF" after a trip condition. Breakers shall be rated HACR when used for heating, air-conditioning, and refrigeration; HID when used with High Intensity Discharge fixtures; and shall be rated SWD when used for switching duty.

D. Circuit breaker sizes for motor loads are based on Square D recommendations for use of their breakers at the motor horsepowers listed on the mechanical drawings. If equipment is used other than Square D, adjust breaker sizes per the manufacturer's recommendations.

E. Circuit breakers with slash ratings, such as 120/240V or 480Y/277V, shall be used in solidly grounded systems where the nominal voltage of any conductor to ground does not exceed the lower of the two values of the breaker's voltage rating and the nominal voltage between any two conductors does not exceed the higher value of the circuit breaker's voltage rating.

F. Circuit breakers with straight voltage ratings, such as 240V or 480V, shall be used in systems other than solidly grounded systems (Corner-Grounded Delta, Ungrounded, Impedance Grounded, etc.) where the nominal voltage between any two conductors does not exceed the circuit breaker's voltage rating. A two-pole circuit breaker shall not be used to protect a three-phase, Corner-Grounded Delta system unless the circuit breaker is marked 1Φ-3Φ.

G. Disconnect and individually-mounted circuit breaker ampere interrupting current (AIC) ratings shall equal the rating of the panelboard from which they are fed unless otherwise noted.

H. Buses shall be constructed of 98% conductivity copper or equivalently rated aluminum.

I. Switches shall be horsepower rated where used to serve motors.

J. Enclosures shall be NEMA 1 when they are to be mounted indoors, NEMA 3R when they are to be mounted outdoors, and NEMA 4X where they are subject to washdown. Provide special enclosures where shown on the Contract Drawings.

2.2 ACCEPTABLE MANUFACTURERS

Disconnects and separately-mounted circuit breakers shall be manufactured by Siemens, Square D, General Electric, or Cutler Hammer.

PART 3 – EXECUTION

3.1 Install disconnects and individually-mounted circuit breakers in complete compliance with all manufacturers' installation instructions. Where necessary, provide structural supports and bracing for installation.

3.2 Disconnects are to be surface-mounted.

3.3 Individually-mounted circuit breakers are to be flush-mounted unless otherwise shown.

END OF SECTION

SECTION 26.5100
LIGHTING

PART 1 – GENERAL

Provide all lighting fixtures (luminaires), lamps, end caps, connectors, fittings, structural support members, supports, brackets, etc., for a complete and operable lighting system.

PART 2 – PRODUCTS

2.1 LUMINAIRES

A. Luminaires are shown in the Luminaire Schedule on the drawings to establish a standard of quality. Manufacturer's names and model numbers shall not be interpreted as a proprietary specification. Notify the engineer at least two weeks prior to bid if an equivalent for a fixture listed in the schedule is not readily available,

B. Prior to submitting electrical equipment brochures for review and approval, coordinate with the General Contractor and verify that the fixtures are appropriate for the ceiling types in which they are shown to be installed. Also verify that ballast voltage on the submittals is appropriate for the electrical system on which the fixtures are to be installed (regardless of voltage listed in the part number in the Fixture Schedule). Submit with equipment brochures a certificate stating that these items of coordination have been completed.

2.2 LED

A. LED fixtures shall be LM79 and LM80 tested. Color temperature shall be as specified on the drawings.

B. Lumen outputs listed on the drawings are minimum requirements.

C. Fixtures shall have a minimum 80CRI.

2.3 BATTERIES

A. Emergency Batteries: Emergency batteries in fixtures shall consist of an automatic power failure device, a test switch, and a pilot light that is visible from outside of the fixture. They shall contain a fully automatic solid state charger in a self-contained power pack. The fixture shall be factory wired in a manner that will allow the emergency lamps to be switched while still maintaining charging power to the battery. Wiring Diagrams shall be furnished with the fixture showing switching connections. The battery shall be of the sealed electrolyte type with the capacity to provide power to the lamps provided for a minimum of 90 minutes.

The battery shall be able to operate unattended with no maintenance for a period of no less than five years. Emergency batteries shall be fully compatible with solid state ballasts. Battery packs shall be mounted inside the fixture unless remotely mounted ballasts are shown on the drawings.

2.4 SUPPORTS

A. Provide all structural members necessary to support fixtures in locations shown on the contract drawings. Submit mounting and support details to the Architect or Engineer for approval with the project shop drawings. Notify the General Contractor prior to bid of any structural work that will be required to support the fixtures.

B. Provide hangers, cords, stems, etc., where required. Coordinate with the Architect or Engineer for proper stem lengths prior to ordering fixtures.

C. Support the ceiling grid at all four corners of recessed light fixtures.

D. Provide clips for fixtures installed in lay-in ceilings. Clips shall be equal to Erico Caddy clips # 515 or #515A.

PART 3 – EXECUTION

3.1 Raceways for lighting systems in accessible ceilings shall be run to junction boxes mounted in locations that do not interfere with the ceiling installation, the luminaire installation, or other building systems. Provide final connections to fixtures using conductors in flexible conduit. Flexible conduit whips shall not exceed six feet in length.

3.2 All recessed fixtures shall be mounted with their trims flush against the ceiling.

3.3 Comply completely with all manufacturers' installation instructions.

3.4 LED fixtures shall be warranted for 5 years after beneficial occupancy.

END OF SECTION

SECTION 27.3000

TELEPHONE AND DATA SYSTEMS

PART 1 – GENERAL

1.1 Provide complete telephone and data systems in accordance with this specification and the contract drawings. All systems shall be furnished and installed to meet or exceed EIA/TIA Category 6 Standards.

1.2 All new wiring on this project shall conform to the EIA TIA 568A T568A scheme.

1.3 Prior to ordering equipment, provide six sets of manufacturer's cut sheets to the Architect or Engineer for the equipment to be installed. Also submit shop drawings showing the floor plan with all wiring tag identification and conduit and cable routing. Do not order any equipment without receiving submittals and shop drawings that have been reviewed and approved by the Engineer.

1.4 Contractors furnishing and installing telephone and data system components shall be regularly involved in furnishing and installing systems of the type specified. They shall have installed five systems similar in size and scope within the past six months. The Telephone and Data System Contractor shall pull the cable as well as install all jacks and make all other system terminations.

PART 2 – PRODUCTS

2.1 Outlet Boxes: Provide outlet boxes in accordance with Specification 26 05 33.

2.2 Plaster Rings: Plaster rings shall be furnished to provide single-gang openings in outlet boxes unless otherwise noted.

2.3 Raceways: Provide raceways in accordance with Specification 26 05 33.

2.4 Jacks: Provide outlet boxes with a strap containing the number of Jacks indicated on the drawings. Outlet jacks shall be 8-position, 8-conductor, RJ-45 jacks that are multivendor supportive accepting most phone and data plugs. Jacks shall have gold-plated (50 microinches minimum) contacts with 110 connections on the back. The jacks shall snap in the straps. The straps shall be colored to match the switches and receptacle color selected by the Architect. The straps shall be covered by a stainless steel wallplate identical to those of the receptacles and switches. Wireless access point jacks shall be white; data jacks shall be blue.

2.5 Fiber Optic Cabling: Cable shall be a 12 strand OM3.

2.6 Cable: All cable shall be Category 6 rated and shall conform to or exceed the EIA/TIA 578 Commercial Building Wiring Standard, Horizontal Cable Section and the EIA/TIA Technical Systems Bulletin 36 for Unshielded Twisted Pair Cables. Other standards supported shall include IEEE 802.3, Ibase5, 10BASE-T; IEEE 802.5, 4 Mbps, 16 Mbps (328 ft/100m), 104 Workstations, proposed ANSI X3T9.5 TP-PMD requirements for UTP at 100 Mbps, and 155 MB ATM. Cabling shall be UL listed. Wireless access point cables shall be white; data cables shall be blue. All Cable shall be plenum rated.

2.7 Telephone and Data Backboard (TDBB): Wall mount a ¾" x 4' x 8' sheet of plywood, primed and painted with two coats of fire-retardant black paint. Provide a ¼" x 4" x 17.75" copper ground block (Erico Eritech TMGB-A18L23PT or approved equal) on the wall, bond a #6 AWG copper conductor to the ground block with a two hole compression lug and run the #6 AWG ground wire to the electrical power system ground. Bond the #6 AWG ground wire to the power system electrode using an exothermic weld.

2.8 Patch Panels: Data Cables shall terminate at the Telephone & Data Backboard in patch panels. Provide a patch panel (or panels) at each TDBB to accommodate all cabling plus 15% spare capacity. Provide crossconnecting cables as required to interconnect the patch panels providing the Owner a single connection point for a connection to a server.

2.9 Racks: Provide a 19" wall mounted/ lockable rack for mounting of the patch panels. The rack shall be mounted on the TDBB. Rack shall accommodate 13U of space.

PART 3 – EXECUTION

3.1 Provide a 1" conduit extending from each outlet box to a point above the nearest accessible ceiling. Terminate the conduit with a protective bushing.

3.2 Route conductors from the outlet box, above the lay-in ceilings, and to the telephone and data backboard. Group, tie-wrap, and support the conductors from the structural ceiling above the lay-in ceiling. Provide conduit for sleeves where cables pass through areas with hard ceilings.

3.3 Provide a minimum of two data cables to each data outlet and wireless access point location.

3.4 Mount plywood backboard securely to wall framing members. The bottom of the backboard shall be 6" above the finished floor.

3.5 Provide a #6 copper ground wire in 1" PVC conduit from the Telephone and Data Backboard to the Building Power System Ground.

3.6 Service Conduits: Provide two 2" PVC conduits with long radius elbows from the Telephone and Data Backboard to the existing MDF at the Performing Arts Center. Conduits bends shall contain radii that are no less than 10 times the conduit diameter. Stub conduits up 4" above the floor at the Telephone and Data Backboard and cover with plastic caps. Do not glue the caps on the conduits. Seal conduits below grade to prohibit the entrance, of dirt, water, and gases. Conduits shall be buried 24" to 36" below grade

3.7 Fiber Optic: Terminate all fiber optic strands in a wall mounted fiber optic termination box.

3.8 Equip all spare conduits with a pullwire or string capable of withstanding 200 pounds of pulling tension.

3.9 Uniquely identify and label all cables at each end using EIA/TIA Standards. Provide engraved or professionally stenciled label markings on the faceplate beside each jack.

3.10 Test each cable for opens, shorts, correct pairs, crossed wiring, and proper termination using a CT200 tester from Atcom Services, Inc. or approved equal. Replace any cable that is unable to pass the tests. Provide a written log of the test results of each cable to the Engineer at the prefinal inspection. Demonstrate testing of any cables selected by the Engineer.

END OF SECTION

SECTION 28.1614

SECURITY CONDUIT SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. Provide a complete and operable system of outlet boxes and raceways for the Owner's Security System including, but not limited to conduits, raceways, outlet boxes, and pullstrings.

PART 2 - PRODUCTS

2.1 Outlet boxes shall be furnished per Specification Section 26 0533.

2.2 Raceways shall be furnished per Specification Section 26 0533. Minimum conduit size shall be 3/4" nominal trade size. Provide pullstrings in all conduits.

2.3 Provide all outlets with blank, brushed stainless steel cover plates.

PART 3 - EXECUTION

3.1 Extend a 3/4" conduit from each key pad to a point above the accessible ceiling.

3.2 Extend a 3/4" conduit from the door contact location in the door frame to a point above the accessible ceiling.

3.3 Label each conduit as "SECURITY"

3.4 Provide pullstrings in all conduits.

END OF SECTION

SECTION 28.2302

CAMERA CONDUIT SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. Provide a complete and operable system of outlet boxes and raceways for the Owner's Camera System including, but not limited to conduits, raceways, outlet boxes, and pullstrings.

PART 2 - PRODUCTS

2.1 Outlet boxes shall be furnished per Specification Section 26 0533.

2.2 Raceways shall be furnished per Specification Section 26 0533. Minimum conduit size shall be 3/4" nominal trade size. Provide pullstrings in all conduits.

2.3 Provide all outlets with blank, brushed stainless steel cover plates.

PART 3 - EXECUTION

3.1 Extend a 3/4" conduit from each camera to the data rack.

3.2 Where cameras will be wall mounted or mounted to a non-LAT ceiling, provide a single gang j-box with a blank cover plate.

3.3 Label each conduit as "CAMERA"

3.4 Provide pullstrings in all conduits.

END OF SECTION

SECTION 28.3100

FIRE ALARM SYSTEM

PART 1 – GENERAL

1.1 GENERAL

A. Furnish and install a complete and operable voice evacuation fire alarm system in accordance with the Contract drawings and all federal, state, and local codes. Equipment on the drawings represents the absolute minimum required for the project. Include costs for all other required devices and equipment required for a complete and operable code compliant system. Notify the engineer in writing of any devices required by code, but not shown, at least ten days prior to bid.

B. Comply completely with the latest edition of all applicable federal, state, and local codes including, but not limited to the following:
   1) National Electrical Code (NFPA 70)
   2) Life Safety Code (NFPA 101)
   3) National Fire Alarm Code (NFPA 72)
   4) The International Building Code
   5) ANSI/ASME A17.1, Safety Code for Elevators and Escalators

1.2 SCOPE OF WORK

A. Provide all enclosures, hardware, software, devices, and all other components, material, and labor required to install, configure, and test the entire system to the satisfaction of the Engineer and all authorities.

B. All components of the system shall be manufactured by the same company. The system and its components shall be approved by UL and Factory Mutual.

C. All system components shall be installed by a franchised distributor of the fire alarm system having a repair and service department on call 24 hours a day, seven days a week. The repair and service department shall be located within 150 miles of the project.

D. Submit complete shop drawings showing all devices including mounting locations and heights and terminal-to-terminal connections. **Employ an independent third party testing agency that will be involved in certification of the system to review the shop drawings to ensure compliance with the contract documents and all applicable codes.**

PART 2 – PRODUCTS

2.1 Provide an intelligent, addressable fire alarm control panel complete with all equipment necessary to monitor and control the devices shown. The system shall sound a non-coded general alarm. Upon an alarm condition, the fire alarm control panel shall automatically report the alarm condition to a monitoring agency. Provide all telephone connections, circuitry, and conduit to perform this functionality back to the telephone backboard. The fire alarm system shall be capable of producing voice announcements through the system speakers.

2.2 The new fire alarm system shall be monitored via the existing EST system in the Performing Arts Center.

2.3 Provide a NiCad battery sized to operate the control panel without normal power for 24 hours, and then to alarm the panel continuously for at least five minutes. Submit battery sizing calculations with the manufacturer's cut sheets and shop drawings.

2.4 All devices shall be addressable and shall be electrically supervised.

2.5 Smoke detectors shall be of the photoelectric type.

2.6 Duct detectors shall be of the air sampling type. Furnish complete with sampling tubes and duct housings.

2.7 Smoke detectors mounted under raised computer floors shall be of the photoelectric type. They shall be UL listed for installation in plenums.

2.8 Pull stations shall be of metallic construction. They shall be furnished with lexan shields and warning horns.

2.9 Horns shall be rated a minimum of 85 dB at 10'.

2.10 Speakers shall be square. They shall be wall-mounted to a 4" square box. They shall produce a minimum sound level of 85dB at 10'. They shall have adjustable taps for volume level adjustment.

2.11 Strobes shall have a nominal rating of at least 75 Cd.

2.12 Combination horn-strobe units or speaker-strobe units shall meet the specified requirements of the individual horns, strobes, and speakers.

2.13 Monitor all sprinkler system flow switches at the facility. Provide an alarm upon flow indication.

2.14 Monitor all sprinkler system tamper and supervisory switches at the facility. Provide a trouble signal upon tamper indication.

2.15 Provide duct detectors in the return duct of all air units. If a fresh air intake duct is installed, all duct detectors shall be mounted upstream of the intake duct. For air units with flow ratings greater than 15,000 CFM, provide duct detectors in both the return and supply ducts.

2.16 Provide all necessary relays and circuitry, and shut down all air units upon an alarm condition of the fire alarm system.

2.17 Provide all necessary equipment and circuitry for control of the elevator in accordance with ANSI/ASME A17.1, Safety Code for Elevators and Escalators.

2.18 Provide all necessary equipment and circuitry to automatically release the magnetic door locks upon an alarm of the Fire Alarm System.

2.19 Conductors shall be #14 AWG copper rated THHN/THWN. Provide larger conductors where required to compensate for voltage drop.

PART 3 – EXECUTION

3.1 All components and circuitry shall be assembled and installed per the requirements of all applicable codes and the manufacturer's recommendations.

3.2 All devices shall be mounted with their boxes flush in the walls.

3.3 Smoke detectors shall be mounted at least 36" away from supply vents.

3.4 All outlet boxes, junction boxes, and cover plates shall be painted red.

3.5 All circuitry shall be in installed in power limited fire cable. Any circuitry that is on the exterior of the building shall be installed in conduit.

3.6 Provide all connections to allow the existing EST system at the Performing Arts Center to monitor the new fire alarm system in the Multipurpose building.

3.7 The Fire Alarm System Contractor shall employ an independent third party testing agency to test and certify all system components, including each smoke detector, duct detector, and pull station prior to the pre-final inspection. All systems shall be completely operable prior to the request for a pre-final site observation. The system shall be tested in the presence of the Owner, Architect, and Engineer at the prefinal site observation.

3.8 Provide a one-year warranty for the system and all components. The warranty shall begin at the date of final acceptance of the building. During the warranty period, the system shall be repaired or replaced as necessary at no cost to the Owner. During the warranty period, a technician shall be on the job site within twenty-four hours of a problem report from the Owner.

END OF SECTION

ARCHITECTURAL ABBREVIATIONS

∠	ANGLE
&	AND
@	AT
A/C	AIR CONDITIONING
ACM.	ASBESTOS CONTAINING MATERIALS
ACOUS.	ACOUSTICAL
ACT	ACOUSTICAL CEILING TILE
A/E	ARCHITECT/ENGINEER
A.F.F.	ABOVE FINISHED FLOOR
A.H.U.	AIR HANDLING UNIT
ALT.	ALTERNATE
ALUM.	ALUMINUM / ALUMINIUM
A.P.C.	ARCHITECTURAL PRECAST CONCRETE
A.P.	ACCESS PANEL
APPROX.	APPROXIMATE
ARCH.	ARCHITECTURAL
ASPH.	ASPHALT
ASY.	ASSEMBLY
ATTEN.	ATTENUATION
A.V.	AUDIO/VISUAL
BD.	BOARD
BIT.	BITUMINOUS
BLDG.	BUILDING
BLKG.	BLOCKING
BM.	BEAM
B.M.	BENCH MARK
BOT.	BOTTOM
BRG.	BEARING
BRZ.	BRONZE
BU	BUILT-UP
B.U.R.	BUILT-UP ROOF
[/ CH.	CHANNEL
CAB.	CABINET
C.B.	CATCH BASIN
CEM.	CEMENT
CER.	CERAMIC
CFS	COLD FORMED STEEL
C.G.	CORNER GUARD
C.I.	CONTINUOUS INSULATION
CJ	CONTROL JOINT
CLG.	CEILING
CLR.	CLEAR
CMU	CONCRETE MASONRY UNIT
C.O.	CASED OPENING
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONT.	CONTINUOUS
COORD.	COORDINATE
CPT.	CARPET
C.R. CH.	COLD-ROLLED CHANNEL
CT	CERAMIC TILE
CTSK.	COUNTERSUNK
DBL.	DOUBLE
DEMO.	DEMOLITION / DEMOLISHED
DEPT.	DEPARTMENT
DTL.	DETAIL
DIA.	DIAMETER
DIM.	DIMENSION
DISP.	DISPENSER
DN.	DOWN
DP.	DAMPPROOFING
DS.	DOWNSPOUT
DWGS.	DRAWINGS
E.	EAST
EA.	EACH
E.D.F.	ELECTRICAL DRINKING FOUNTAIN
E.F.	EXHAUST FAN
E.I.F.S.	EXTERIOR INSULATION & FINISH SYSTEM
E.J.	EXPANSION JOINT
ELEC.	ELECTRICAL
EL.	ELEVATION
ELEV.	ELEVATOR
EMER.	EMERGENCY
ENCL.	ENCLOSURE
E.P.	EPOXY PAINT
EQ.	EQUAL
EQUIP.	EQUIPMENT
EST.	ESTIMATED
E.W.	EACH WAY
EXH.	EXHAUST
EXP.	EXPANSION
EXPO.	EXPOSED
EXIST.	EXISTING
EXT.	EXTERIOR
F.A.P.	FIRE ALARM PANEL
FD	FLOOR DRAIN
FNDN.	FOUNDATION
F.E.	FIRE EXTINGUISHER
F.E.C.	FIRE EXTINGUISHER CABINET
F.F.	FINISH FLOOR
F.F.E.	FINISH FLOOR ELEVATION
F.H.	FIRE HYDRANT
F.H.C.	FIRE HOSE CABINET
FIN.	FINISH
FIXT.	FIXTURE
FLR.	FLOOR
F.O.M.	FACE OF MASONRY
F.O.S.	FACE OF STUD
FP.	FIRE PROTECTION / FIREPROOFING
F.S.	FULL SIZE
'	FOOT / FEET
FTG.	FOOTING
FURN.	FURNISHED
FURR.	FURRING
F.W.C.	FABRIC WALL COVERING
GA.	GAUGE
GALV.	GALVANIZED
G.B.	GRAB BAR
GRD.	GRADE
G.C.	GENERAL CONTRACTOR
GL.	GLASS / GLAZING
GYP.	GYPSUM
GYP. BD.	GYPSUM BOARD
H.B.	HOSE BIB
H.C.	HOLLOW CORE
H.C. / HCP.	HANDICAP
HCWD.	HOLLOW CORE WOOD
HDWE.	HARDWARE
HT.	HEIGHT
HISTORIC.	HISTORICAL
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
HR.	HOUR
H.R.	HANDRAIL
HVAC.	HEATING, VENTILATING, & AIR CONDITIONING
"	INCH
I.D.	INSIDE DIAMETER
INSUL.	INSULATION
INT.	INTERIOR
INV.	INVERT
I.P.	IRON PIPE
JAN.	JANITOR
J.B.	JOIST BRG.
JT.	JOINT
K.O.	KNOCK DOWN
L.A.T.	LAY-IN ACOUSTICAL TILE
LAM.	LAMINATE
LAV.	LAVATORY
LBP.	LEAD BASED PAINT
LBS.	POUNDS
LT.	LIGHT
LT. WT.	LIGHT WEIGHT
LVR.	LOUVER
MAS.	MASONRY
MAX.	MAXIMUM
MECH.	MECHANICAL
MEMB.	MEMBRANE
MFGR.	MANUFACTURER
MH.	MANHOLE
MIN.	MINIMUM
MISC.	MISCELLANEOUS
M.O.	MASONRY OPENING
M.R. GYP. BD.	MOISTURE RESISTANT GYPSUM BOARD
MTD.	MOUNTED
MTL.	METAL
MATL.	MATERIAL
MIR.	MIRROR
MULL.	MULLION
N.	NORTH
N/A	NOT APPLICABLE
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
#	NUMBER
NOM.	NOMINAL
O.A.	OUTSIDE AREA
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
OPH	OPPOSITE HAND
OH.	OVERHEAD
OPNG.	OPENING
OPP.	OPPOSITE
ORIG.	ORIGINAL
O.S.	OVERFLOW SCUPPER
OTLN.	OUTLINE
OV.D.	OVERFLOW DRAIN
#	POUND
PBD.	PARTICLE BOARD
PC. CONC.	PRECAST CONCRETE
PLAM.	PLASTIC LAMINATE
P.I.P.	POURED-IN-PLACE
P.L.	PROPERTY LINE
PL.	PLATE
PLAS.	PLASTER
POL.	POLISHED
PR.	PAIR
PRE-FAB.	PRE-FABRICATED
PRE-FIN.	PRE-FINISHED
PTD.	PAINTED
PARTN.	PARTITION
PVMT.	PAVEMENT
PLYWD	PLYWOOD
RAD.	RADIUS
R.A.G.	RETURN AIR GRILLE
RB	RUBBER BASE
RC.	RESILIENT CHANNEL
RCP	REFLECTED CEILING PLAN
R.D.	ROOF DRAIN
RD.	ROUND
REF.	REFERENCE / REFER
REINF.	REINFORCED / REINFORCEMENT
REQ'D	REQUIRED
RESIL.	RESILIENT
R.H.	ROBE HOOK
RM.	ROOM
R.O.	ROUGH OPENING
S.	SOUTH
SC	SOLID CORE
SCHED.	SCHEDULE
S.C.WD.	SOLID CORE WOOD
S.D.	SOAP DISPENSER
SEAL.	SEALANT
SECT.	SECTION
SER. SK.	SERVICE SINK
SHT.	SHEET
SHVS.	SHELVES
SHWR.	SHOWER
SIM. / SIM	SIMILAR
SP.	SPLASH BLOCK
SPEC.	SPECIFICATION / SPECIFIED
SQ.	SQUARE
SQ. FT.	SQUARE FEET
SS	SANITARY SEWER
S.S.	STAINLESS STEEL
S.T.C.	SOUND TRANSMISSION COEFFICIENT
STD.	STANDARD
ST. DR.	STORM DRAIN
STL.	STEEL
STRUCT.	STRUCTURAL
SUSP.	SUSPENDED
SYM.	SYMMETRICAL
SYS.	SYSTEM
SYN.	SYNTHETIC
T.B.	TOWEL BAR
T.C.	TOP OF CURB
TEL.	TELEPHONE
TEMP.	TEMPORARY
T&G	TONGUE & GROOVE
THRES.	THRESHOLD
THK.	THICK / THICKNESS
T.O.S.	TOP OF STEEL
TYP.	TYPICAL
U.H.	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
U.P.S.	UNINTERRUPTABLE POWER SUPPLY
U.S.	UTILITY SHELF
VCT	VINYL COMPOSITION TILE
VERT.	VERTICAL
V.I.F.	VERIFY IN FIELD
V.O.J.	VERIFY ON JOB
V.T.R	VENT-THRU-ROOF
V.W.C.	VINYL WALL COVERING
W.	WEST
W/	WITH
W.C.	WATER CLOSET
WD.	WOOD
WDW.	WINDOW
WH	WATER HEATER
W/O	WITHOUT
W.P.	WATERPROOF
WSCT.	WAINSCOT
WT.	WEIGHT
W.W.M.	WELDED WIRE MESH

MATERIALS LEGEND

BRICK

INSULATION (RIGID)

CONCRETE

METAL

CONCRETE MASONRY UNITS

SHEATHING

GRAVEL

WOOD (SOLID WOOD)

GROUT

WOOD (CONTINTUOUS BLOCKING)

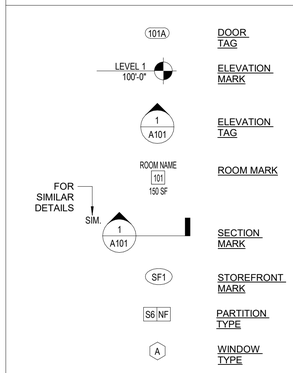
GYPSUM BOARD

WOOD (DISCONTINTUOUS BLOCKING)

INSULATION (BATT)

WATERPROOFING/DAMP PROOFING

SYMBOLS LEGEND



GENERAL NOTES

1. NOTES APPEAR ON VARIOUS DRAWINGS FOR VARIOUS DISCIPLINES FOR DIFFERENT SYSTEMS AND MATERIALS. REVIEW ALL SHEETS AND APPLY NOTES TO RELATED BUILDING COMPONENTS.

2. REFER TO COMPLETE SET OF ISSUED CONTRACT DOCUMENTS FOR OTHER APPLICABLE NOTES, ABBREVIATIONS, AND SYMBOLS.

3. WHERE MATERIALS ARE APPLIED TO, OR ARE IN DIRECT CONTACT WITH WORK INSTALLED BY ANOTHER SUBCONTRACTOR, COMMENCEMENT OF WORK IMPLIES ACCEPTANCE OF THE SUBSTRATE AS SUITABLE FOR THE APPLICATION INTENDED.

4. ISOLATE DISSIMILAR METALS TO PREVENT GALVANIC CORROSION.

5. PARTITION TYPES AND FIRE RESISTIVE RATINGS INDICATED ON A WALL ARE TO BE CONTINUOUS FOR THE LENGTH AND HEIGHT OF A PARTITION.

6. OPENINGS IN RATED WALL, FLOOR, CEILING AND ROOF ASSEMBLIES SHALL BE SEALED WITH PENETRATION SEALANT SYSTEMS MEETING OR EXCEEDING THE REQUIRED FIRE RESISTIVE RATINGS.

7. MAINTAIN THE FIRE RATING OF CONSTRUCTION AROUND CABINETS, PANELS, AND BOXES RECESSED IN FIRE RATED WALL, FLOOR, AND CEILING ASSEMBLIES.

8. PROVIDE CONTINUOUS PERIMETER FIRE SAFING BETWEEN FLOORS AND COORDINATE THE INSTALLATION WITH THE EXTERIOR WALL. FIRE RATING OF SAFING SHALL MATCH FIRE RATING OF FLOOR CONSTRUCTION.

9. DO NOT SCALE THE DRAWINGS.

10. FIELD MEASURE AND CONFIRM DIMENSIONS FOR OWNER PROVIDED EQUIPMENT AND FURNISHINGS.

11. PROVIDE STIFFENERS, BRACING, BACKING PLATES AND BLOCKING REQUIRED FOR SECURE INSTALLATION OF TOILET PARTITIONS, DOORS AND DOOR HARDWARE INCLUDING WALL-MOUNTED DOOR STOPS, HANDRAILS, WALL-MOUNTED SHELVES, OPERABLE PARTITIONS, MISCELLANEOUS EQUIPMENT, AND SUSPENDED MECHANICAL AND ELECTRICAL EQUIPMENT.

12. COORDINATE ALL BASE AND HOUSEKEEPING PADS WITH MECHANICAL, PLUMBING AND ELECTRICAL EQUIPMENT.

13. LOCATE ACCESS PANELS AS INDICATED ON DRAWINGS. FOR ACCESS PANELS NOT SHOWN BUT REQUIRED BY PROVISIONS OF THE CONTRACT DOCUMENTS, LOCATED IN ACCORDANCE WITH APPLICABLE CODES. SUBMIT PROPOSED LOCATIONS TO THE ARCHITECT FOR REVIEW AND ACCEPTANCE PRIOR TO INSTALLATION.

PROJECT TEAM

OWNER

PEARL PUBLIC SCHOOL DISTRICT
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MADISON MS 39110
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CHRIS GREEN
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PROJECT DESCRIPTION

A NEW ONE STORY INDOOR TRAINING FACILITY WITH ADJACENT COVERED PRACTICE FIELD.

DIMENSIONING CRITERIA

A. ALL DWGS. ARE INTENDED TO BE COMPLEMENTARY. DO NOT SCALE FOR DIM. NOTIFY THE ARCHITECT OF ANY DIM. DISCREPANCY PRIOR TO PROCEEDING.

B. DIM. AT CONC. & MAS. PARTITIONS ARE TO FACE OF PARTITION (NOM. DIM.).

C. DIM. AT FRAMED PARTITIONS ARE TO FACE OF FRAMING, U.N.O.

D. DIM. ARE AS IDENTIFIED ON THE DOCUMENTS OR AS ESTABLISHED BY ADDITIONAL CRITERIA AS FOLLOWS:

1. DIM. ARE NOT SHOWN FOR THE FOLLOWING CONDITIONS:

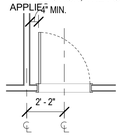
A. WHEN PARTITION IS CENTERED ON GRID LINE.

B. WHEN FACE OF PARTITION IS CENTERED ON GLAZING MULLION.

2. FOR OPENINGS IN PARTITIONS OR WALLS:

A. WHEN ONE OCCURS AT A GRIDLINE, NO DIM. WILL BE SHOWN & WIDTH WILL BE ESTABLISHED BY EITHER CRITERIA OR SCHEDULES.

B. WHEN ONE JAMB IS LOCATED BY A PARTITION INTERSECTION, THE FOLLOWING DIAGRAM APPLIES.



DRAWING INDEX

INDEX OF DRAWINGS

SHEET NUMBER	SHEET NAME	Discipline	SD 2021-04-01	DD	CD	AD1
01 - REFERENCE						
R000	COVER SHEET	01 - REFERENCE	X	X	X	
R100	PROJECT INFO	01 - REFERENCE	X	X	X	X
R200	LIFE SAFETY & ACCESSIBILITY COMPLIANCE	01 - REFERENCE			X	
R201	LIFE SAFETY & ACCESSIBILITY COMPLIANCE	01 - REFERENCE			X	
R300	RENDERINGS	01 - REFERENCE	X		X	
02 - CIVIL						
C001	CIVIL GENERAL NOTES	02 - CIVIL			X	
C101	EROSION CONTROL PLAN	02 - CIVIL			X	
C111	DEMOLITION PLAN	02 - CIVIL			X	
C112	OVEREXCAVATION PLAN	02 - CIVIL			X	
C121	SITE PLAN	02 - CIVIL			X	
C131	GRADING PLAN	02 - CIVIL			X	
C141	UTILITY PLAN	02 - CIVIL			X	
C201	CIVIL DETAILS	02 - CIVIL			X	
C202	CIVIL DETAILS	02 - CIVIL			X	
C203	CIVIL DETAILS	02 - CIVIL			X	
C204	CIVIL DETAILS	02 - CIVIL			X	
C205	CIVIL DETAILS	02 - CIVIL			X	
C206	CIVIL DETAILS	02 - CIVIL			X	
C207	CIVIL DETAILS	02 - CIVIL			X	
C208	CIVIL DETAILS	02 - CIVIL			X	
05 - ARCHITECTURE						
A001	ARCHITECTURAL SITE PLAN	05 - ARCHITECTURE	X	X	X	X
A101	OVERALL PLAN	05 - ARCHITECTURE	X	X	X	
A102	FIELD HOUSE PLAN	05 - ARCHITECTURE			X	
A103	REFLECTED CEILING PLAN	05 - ARCHITECTURE	X	X	X	X
A104	REFLECTED CEILING PLAN	05 - ARCHITECTURE			X	
A105	ROOF PLAN	05 - ARCHITECTURE	X	X	X	
A106	FINISH FLOOR PLAN, SCHEDULE, AND LEGEND	05 - ARCHITECTURE				X
A201	EXTERIOR ELEVATIONS	05 - ARCHITECTURE	X	X	X	X
A202	BUILDING SECTIONS	05 - ARCHITECTURE	X	X	X	

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SHEET NUMBER	SHEET NAME	Discipline	SD 2021-04-01	DD	CD	AD1
A210	ENLARGED SECTIONS	05 - ARCHITECTURE		X	X	X
A301	WALL SECTIONS	05 - ARCHITECTURE		X	X	X
A302	WALL SECTIONS	05 - ARCHITECTURE		X	X	
A303	WALL SECTIONS	05 - ARCHITECTURE		X	X	X
A401	EXTERIOR DETAILS	05 - ARCHITECTURE			X	X
A501	DOORS & WINDOWS	05 - ARCHITECTURE		X	X	X
A601	PARTITIONS & FINISHES	05 - ARCHITECTURE		X	X	
A701	ENLARGED PLANS & INTERIOR ELEVATIONS	05 - ARCHITECTURE		X	X	X
A702	ENLARGED PLANS & INTERIOR ELEVATIONS	05 - ARCHITECTURE			X	X
A703	ENLARGED PLANS & ELEVATIONS	05 - ARCHITECTURE		X	X	
A704	ENLARGED INTERIOR ELEVATIONS	05 - ARCHITECTURE			X	
A801	MILLWORK GENERAL NOTES	05 - ARCHITECTURE			X	
A901	STANDARD SIGNAGE	05 - ARCHITECTURE			X	
06 - STRUCTURAL						
S001	STRUCTURAL GENERAL NOTES / STRUCTURAL QUALITY ASSURANCE PLAN	06 - STRUCTURAL		X	X	
S101	OVERALL FOUNDATION PLAN	06 - STRUCTURAL		X	X	
S102	FIELD HOUSE FOUNDATION PLAN	06 - STRUCTURAL			X	
S201	FOUNDATION DETAILS	06 - STRUCTURAL		X	X	
S202	FOUNDATION DETAILS	06 - STRUCTURAL			X	
07 - MECHANICAL						
F101	OVERALL FIRE SPRINKLER PLANS	07 - MECHANICAL			X	
F201	FIRE SPRINKLER SCHEDULES & DETAILS	07 - MECHANICAL			X	
M101	OVERALL HVAC PLAN	07 - MECHANICAL		X	X	
M102	HVAC SCHEDULES	07 - MECHANICAL		X		

INDEX OF DRAWINGS

SHEET NUMBER	SHEET NAME	Discipline	SD 2021-04-01	DD	CD	AD1
M201	HVAC SCHEDULES	07 - MECHANICAL		X	X	
M202	HVAC SCHEDULES	07 - MECHANICAL		X	X	
M301	HVAC DETAILS	07 - MECHANICAL		X	X	
M302	HVAC DETAILS	07 - MECHANICAL				
09 - PLUMBING						
P101	OVERALL PLUMBING PLAN	09 - PLUMBING		X	X	
P102	PARTIAL PLUMBING PLAN NORTH	09 - PLUMBING		X	X	
P103	PARTIAL PLUMBING PLANS SOUTH	09 - PLUMBING			X	
P201	PLUMBING RISERS	09 - PLUMBING		X	X	
P301	PLUMBING SCHEDULES	09 - PLUMBING		X	X	
P401	PLUMBING DETAILS	09 - PLUMBING			X	
10 - ELECTRICAL						
E0.0	ELECTRICAL LEGEND	10 - ELECTRICAL			X	X
E0.1	ELECTRICAL DETAILS	10 - ELECTRICAL			X	
E0.2	ELECTRICAL DETAILS	10 - ELECTRICAL			X	
E0.3	ELECTRICAL SITE PLAN	10 - ELECTRICAL			X	
E1.0	OVERALL LIGHTING PLAN	10 - ELECTRICAL			X	
E1.1	PARTIAL LIGHTING PLAN - PART A	10 - ELECTRICAL			X	X
E1.2	PARTIAL LIGHTING PLAN - B	10 - ELECTRICAL			X	
E2.0	OVERALL POWER PLAN	10 - ELECTRICAL			X	
E2.1	PARTIAL POWER PLAN - PART A	10 - ELECTRICAL			X	
E2.2	PARTIAL POWER PLAN - PART B	10 - ELECTRICAL			X	
E3.0	OVERALL MECHANICAL/ AUXILLARY PLAN	10 - ELECTRICAL			X	
E3.1	PARTIAL MECH./ AUX. PLAN - PART A	10 - ELECTRICAL			X	
E3.2	PARTIAL MECH./ AUX. PLAN - PART B	10 - ELECTRICAL			X	

VICINITY MAP

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

REGISTERED ARCHITECT
JAMES RICHMOND WIER, Jr.
4446
STATE OF MISSISSIPPI

WED 25 SEP 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

REVISIONS

NO.	DESCRIPTION	DATE

R100
PROJECT INFO

INDOOR TRAINING FACILITY
FFE = 366.00

8. INSTALL, REPLACE, OR REPAIR SILT FENCE
14. INSTALL INLET PROTECTION AT NEW STORM STRUCTURES
1. INSTALL SILT FENCE
13. INSTALL RIP RAP PAD
2. PREPARE TEMPORARY PARKING AND STORAGE
17. PAVE SITE
19. INSTALL PERMANENT BMP: ASPHALT PAVING
16. PREPARE SITE FOR PAVING
15. STABILIZE SLOPES WITH SOD.
6. COMPLETE TOPSOIL STRIPPING OF BUILDING AREA AND ADJACENT AREAS
9. DELINEATE STOCKPILE OF UNDERCUT MATERIALS FOR BUILDING PAD
10. BEGIN CONSTRUCTION OF BUILDING PAD
18. INSTALL INLET PROTECTION AT PAVED AREAS
14. INSTALL INLET PROTECTION AT NEW STORM STRUCTURES
11. BEGIN CONSTRUCTION OF NEW GRASS SWALES
12. INSTALL STORM DRAINAGE
5. SEQUENCE GRADING OPERATIONS TO MINIMIZE EXPOSED AREAS
7. TEMPORARILY SEED, THROUGHOUT CONSTRUCTION, DENUDED AREAS THAT WILL BE INACTIVE FOR 14 DAYS OR MORE
19. PERMANENT STABILIZATION: GRASSED AREA
4. INSTALL HYDRAULIC CONTROL STRUCTURES
13. INSTALL RIP RAP PAD
EXTENDED CONSTRUCTION FENCE TO INCLUDE THE PARKING LOT
MATCHLINE A-A
MATCHLINE A-A
LIMITS OF DISTURBANCE, TYP
3. INSTALL INLET PROTECTION AT EXISTING STORM STRUCTURES
1. INSTALL CONSTRUCTION EXIT
1. INSTALL TEMPORARY CONSTRUCTION FENCE
EXISTING ASPHALT DRIVE
MATCHLINE B-B
MATCHLINE B-B
EXISTING TENNIS COURT

EROSION CONTROL LEGEND

- MINOR CONTOUR, EXISTING
- MAJOR CONTOUR, EXISTING
- TEMPORARY CONSTRUCTION FENCE
- PERMANENT SITE FENCE
- LIMITS OF DISTURBANCE
- SILT FENCE
- STRAW WATTLE INLET PROTECTION
- CONSTRUCTION ENTRANCE
- AREAS TO RECEIVE SOD (TIFWAY 419 BERMUDA)

MATCHLINE A-A

MATCHLINE B-B

DEVELOPER/OWNER

DEVELOPER/GENERAL CONTRACTOR:

SUPERINTENDENT:

WBA ARCHITECTURE

ACREAGE SUMMARY	
TOTAL PROPERTY AREA	UNKNOWN
ON-SITE DISTURBED AREA	4.44 ACRES
OFF-SITE DISTURBED AREA	0.00 ACRES
TOTAL DISTURBED AREA	4.44 ACRES

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

SPECIFICATIONS REQUIREMENT:
THE REQUIREMENTS SHOWN ON THIS PLAN ARE SUPPLEMENTED BY THE SWPPP CONTAINED WITHIN THE PROJECT SPECIFICATIONS. IN CASE OF CONFLICTS BETWEEN THE PLANS, SWPPP SPECIFICATIONS AND THE ACTUAL GENERAL PERMIT, THE MOST STRINGENT REQUIREMENTS SHALL APPLY.

-CAUTION NOTICE TO CONTRACTOR-
IF PROPERLY IMPLEMENTED, THIS PLAN WILL PROVIDE AN EFFECTIVE MEANS FOR CONTROLLING EROSION. HOWEVER, IT IS ACKNOWLEDGED THAT NO ONE PLAN CAN BE PREPARED THAT WILL DEPICT ALL POSSIBLE MEASURES NECESSARY FOR VARIOUS STAGES OF CONSTRUCTION. THE CONTRACTOR SHALL INCLUDE IN THE BASE BID ADEQUATE FUNDS TO PROVIDE ALL EROSION CONTROL MEASURES NECESSARY TO COMPLY WITH CODES FOR THE DURATION OF THE CONSTRUCTION PROJECT.

LIMITS OF DISTURBANCE
CONTRACTOR TO LIMIT DISTURBANCE OF SITE IN STRICT ACCORDANCE WITH THE EROSION CONTROL SEQUENCING SHOWN ON THIS PLAN. NO UNNECESSARY OR IMPROPERLY SEQUENCED CLEARING AND/OR GRADING SHALL BE PERMITTED.

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

PHASE I EROSION CONTROL SEQUENCING
1. INSTALL STABILIZED CONSTRUCTION EXIT(S), TEMPORARY CONSTRUCTION FENCE, AND INSTALL SILT FENCE(S) ON THE SITE (CLEAR ONLY THOSE AREAS NECESSARY TO INSTALL SILT FENCE).
2. PREPARE TEMPORARY PARKING AND STORAGE AREA.
3. INSTALL INLET PROTECTION AT EXISTING STORM STRUCTURES.
4. INSTALL AND STABILIZE HYDRAULIC CONTROL STRUCTURES (SWALES, CHECK DAMS, ETC.).
5. SEQUENCE GRADING OPERATIONS TO MINIMIZE EXPOSED AREAS.
6. COMPLETE TOPSOIL STRIPPING OF BUILDING AREA AND ADJACENT AREAS. STOCKPILE OR HAUL OFF TOPSOIL. STABILIZE TOPSOIL STOCKPILE WITH SILT FENCES AROUND THE TOE OF SLOPES AND SEED TOPSOIL STOCKPILE.

PHASE II EROSION CONTROL SEQUENCING
7. TEMPORARILY SEED, THROUGHOUT CONSTRUCTION, DENUDED AREAS THAT WILL BE INACTIVE FOR 14 DAYS OR MORE.
8. INSTALL, REPLACE, REPAIR, OR MAINTAIN PERIMETER SILT FENCE, CHECK DAMS, INLET PROTECTION, AND CONSTRUCTION EXIT AS NEEDED.
9. DELINEATE STOCKPILE OF UNDERCUT MATERIALS FOR BUILDING FOUNDATIONS AND ATHLETIC FIELD AND CONSTRUCT SILT FENCE AROUND STOCKPILE.
10. BEGIN CONSTRUCTION OF BUILDING PAD.
11. BEGIN CONSTRUCTION OF NEW GRASSED SWALES.
12. INSTALL UTILITIES AND STORM SEWERS.
13. INSTALL RIP RAP AROUND OUTLET STRUCTURES AS EACH OUTLET STRUCTURE IS INSTALLED.
14. INSTALL INLET PROTECTION AT ALL STORM SEWER STRUCTURES AS EACH INLET STRUCTURE IS INSTALLED.
15. AS SOON AS STRUCTURAL LIFTS ARE COMPLETE, SPREAD TOPSOIL ON FACE OF SLOPES AND ON AREAS TO RECEIVE GRASS. PERMANENTLY STABILIZE AREAS TO BE VEGETATED AS THEY ARE BROUGHT TO FINAL GRADE.
16. PREPARE SITE FOR PAVING.
17. PAVE SITE.
18. INSTALL APPROPRIATE INLET PROTECTION DEVICES FOR PAVED AREAS AS WORK PROGRESSES.
19. COMPLETE GRADING AND INSTALLATION OF PERMANENT STABILIZATION OVER ALL AREAS.

100 YEAR FLOODPLAINS, FLOODWAY FRINGES, AND FLOODWAYS
- THE PROJECT IS LOCATED IN ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN)

RECEIVING WATERS
- THE MAJORITY OF THE SITE DRAINS TO THE EAST VIA OVER LAND AND OPEN CHANNEL FLOW TO AN UNNAMED TRIBUTARY OF NEELY CREEK WHICH IS THE ULTIMATE RECEIVING WATER OF THE SITE. NEELY CREEK IS LOCATED APPROXIMATELY 1.50 MILES TO THE NORTH OF THE SITE. NEELY CREEK IS NOT LISTED ON THE 2020 STATE OF MISSISSIPPI 303D LIST OF IMPAIRED WATERWAYS.

SOIL TYPE
- THERE ARE TWO SOIL TYPES FOR THE PROJECT LISTED ON THE USDA NRCS SOIL SURVEY. THESE SOILS ARE AS FOLLOWS:

38	PITS-UDORTHENTS COMPLEX	WELL DRAINED
65D	SMITHDALE-PROVIDENCE COMPLEX	WELL DRAINED

WILLIAM ANDERS DENOMMEE — REGISTERED PROFESSIONAL — ENGINEER — 25145 — STATE OF MISSISSIPPI

WED 25 AUG 2021

CONSTRUCTION DOCUMENTS

WBA # 5820

REVISIONS

NO.	DESCRIPTION	DATE
1		FRI 03 SEP 2021

Mississippi 811 — protecting Mississippi's vital flow...one call at a time

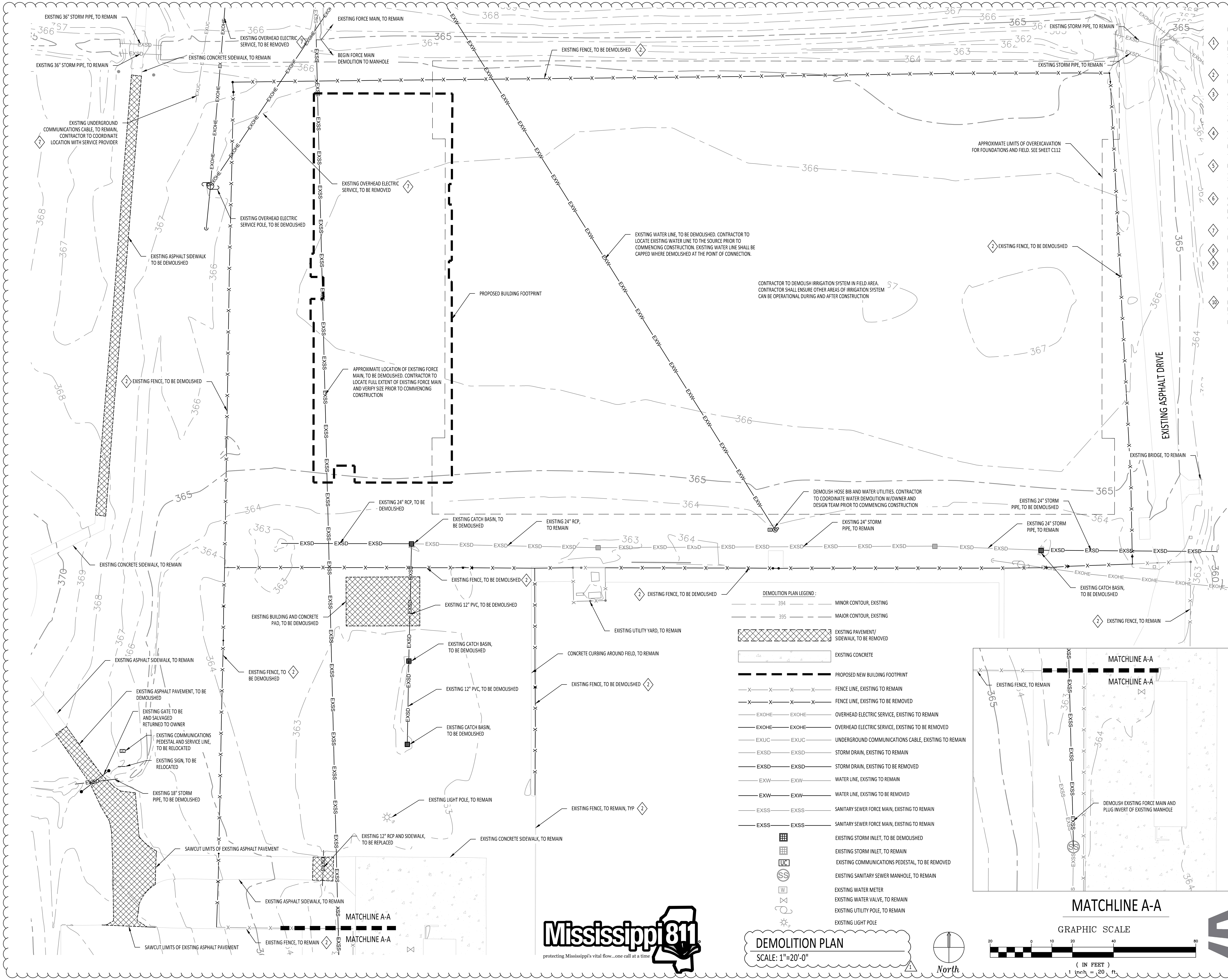
EROSION CONTROL PLAN
SCALE: 1"=20'-0"

North

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

SMITHERS ENGINEERS + CONSULTANTS

C101
EROSION CONTROL PLAN


EXISTING 36" STORM PIPE, TO REMAIN
EXISTING OVERHEAD ELECTRIC SERVICE, TO BE REMOVED
EXISTING FORCE MAIN, TO REMAIN
BEGIN FORCE MAIN DEMOLITION TO MANHOLE
EXISTING CONCRETE SIDEWALK, TO REMAIN
EXISTING FENCE, TO BE DEMOLISHED
EXISTING STORM PIPE, TO REMAIN
EXISTING UNDERGROUND COMMUNICATIONS CABLE, TO REMAIN, CONTRACTOR TO COORDINATE LOCATION WITH SERVICE PROVIDER
EXISTING OVERHEAD ELECTRIC SERVICE POLE, TO BE REMOVED
EXISTING ASPHALT SIDEWALK TO BE DEMOLISHED
EXISTING WATER LINE, TO BE DEMOLISHED. CONTRACTOR TO LOCATE EXISTING WATER LINE TO THE SOURCE PRIOR TO COMMENCING CONSTRUCTION. EXISTING WATER LINE SHALL BE CAPPED WHERE DEMOLISHED AT THE POINT OF CONNECTION.
APPROXIMATE LIMITS OF OVEREXCAVATION FOR FOUNDATIONS AND FIELD. SEE SHEET C112
CONTRACTOR TO DEMOLISH IRRIGATION SYSTEM IN FIELD AREA. CONTRACTOR SHALL ENSURE OTHER AREAS OF IRRIGATION SYSTEM CAN BE OPERATIONAL DURING AND AFTER CONSTRUCTION
PROPOSED BUILDING FOOTPRINT
APPROXIMATE LOCATION OF EXISTING FORCE MAIN, TO BE DEMOLISHED. CONTRACTOR TO LOCATE FULL EXTENT OF EXISTING FORCE MAIN AND VERIFY SIZE PRIOR TO COMMENCING CONSTRUCTION
EXISTING ASPHALT DRIVE
EXISTING BRIDGE, TO REMAIN
DEMOLISH HOSE BIB AND WATER UTILITIES. CONTRACTOR TO COORDINATE WATER DEMOLITION W/OWNER AND DESIGN TEAM PRIOR TO COMMENCING CONSTRUCTION
EXISTING 24" RCP, TO BE DEMOLISHED
EXISTING CATCH BASIN, TO BE DEMOLISHED
EXISTING 24" RCP, TO REMAIN
EXISTING 24" STORM PIPE, TO REMAIN
EXISTING 24" STORM PIPE, TO BE DEMOLISHED
EXISTING CONCRETE SIDEWALK, TO REMAIN
EXISTING BUILDING AND CONCRETE PAD, TO BE DEMOLISHED
EXISTING 12" PVC, TO BE DEMOLISHED
EXISTING UTILITY YARD, TO REMAIN
EXISTING CATCH BASIN, TO BE DEMOLISHED
CONCRETE CURBING AROUND FIELD, TO REMAIN
EXISTING ASPHALT SIDEWALK, TO REMAIN
EXISTING ASPHALT PAVEMENT, TO BE DEMOLISHED
EXISTING GATE TO BE AND SALVAGED RETURNED TO OWNER
EXISTING COMMUNICATIONS PEDESTAL AND SERVICE LINE, TO BE RELOCATED
EXISTING SIGN, TO BE RELOCATED
EXISTING 18" STORM PIPE, TO BE DEMOLISHED
EXISTING LIGHT POLE, TO REMAIN
EXISTING FENCE, TO REMAIN, TYP
SAWCUT LIMITS OF EXISTING ASPHALT PAVEMENT
EXISTING 12" RCP AND SIDEWALK, TO BE REPLACED
EXISTING CONCRETE SIDEWALK, TO REMAIN
EXISTING ASPHALT SIDEWALK, TO REMAIN
EXISTING FENCE, TO REMAIN
MATCHLINE A-A
DEMOLISH EXISTING FORCE MAIN AND PLUG INVERT OF EXISTING MANHOLE
DEMOLITION PLAN LEGEND :
MINOR CONTOUR, EXISTING
MAJOR CONTOUR, EXISTING
EXISTING PAVEMENT/ SIDEWALK, TO BE REMOVED
EXISTING CONCRETE
PROPOSED NEW BUILDING FOOTPRINT
FENCE LINE, EXISTING TO REMAIN
FENCE LINE, EXISTING TO BE REMOVED
OVERHEAD ELECTRIC SERVICE, EXISTING TO REMAIN
OVERHEAD ELECTRIC SERVICE, EXISTING TO BE REMOVED
UNDERGROUND COMMUNICATIONS CABLE, EXISTING TO REMAIN
STORM DRAIN, EXISTING TO REMAIN
STORM DRAIN, EXISTING TO BE REMOVED
WATER LINE, EXISTING TO REMAIN
WATER LINE, EXISTING TO BE REMOVED
SANITARY SEWER FORCE MAIN, EXISTING TO REMAIN
SANITARY SEWER FORCE MAIN, EXISTING TO REMAIN
EXISTING STORM INLET, TO BE DEMOLISHED
EXISTING STORM INLET, TO REMAIN
EXISTING COMMUNICATIONS PEDESTAL, TO BE REMOVED
EXISTING SANITARY SEWER MANHOLE, TO REMAIN
EXISTING WATER METER
EXISTING WATER VALVE, TO REMAIN
EXISTING UTILITY POLE, TO REMAIN
EXISTING LIGHT POLE
Mississippi 811
protecting Mississippi's vital flow...one call at a time
North
GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

DEMOLITION NOTES:

1. EXISTING TREE AND SHRUBS WITHIN PROJECT AREA THAT ARE NOT TO REMAIN SHALL BE REMOVED AND DISPOSED OF OFFSITE. TREE STUMPS SHALL BE REMOVED IN THEIR ENTIRETY. GRINDING OF STUMPS IS NOT ALLOWED.
2. CONTRACTOR SHALL REFERENCE ARCHITECTURAL SHEETS FOR ADDITIONAL INFORMATION PERTAINING TO FENCE DEMOLITION AND FINAL FENCE LAYOUT
3. CONTRACTOR MUST USE CAUTION DURING DEMOLITION, PARTICULARLY IN AREAS TO RECEIVE CONCRETE OR ASPHALT DEMOLITION. ANY UTILITY, STRUCTURES, OR OTHER ITEMS DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
4. THE CONTRACTOR SHALL KEEP ALL UTILITIES OPERATIONAL THROUGHOUT THE ENTIRETY OF THE PROJECT. ANY INTERRUPTION IN UTILITY SERVICE SHALL BE COORDINATED WITH THE OWNER AND AUTHORITIES HAVING JURISDICTION PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PHASE CONSTRUCTION ACTIVITIES TO PROVIDE POSITIVE STORM WATER RUNOFF AT ALL TIMES. SEE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) PLAN FOR ADDITIONAL INFORMATION ON EROSION CONTROL MEASURES REQUIRED.
6. CONTRACTOR SHALL REFERENCE SITE, GRADING, AND UTILITY PLANS TO COORDINATE PAVEMENT AND UTILITY DEMOLITION AND CONNECTION TO PROPOSED UTILITIES, PAVEMENT, ETC. PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
7. THE CONTRACTOR SHALL COORDINATE WITH THE ARCHITECT FOR ALL ELECTRIC AND UNDERGROUND CABLE DEMOLITION AND/OR RELOCATION.
8. EXISTING PIPE TO BE REMOVED SHALL BE REMOVED IN ITS ENTIRETY
9. IN ALL AREAS WHERE THE CONTRACTOR MUST CROSS THE EXISTING ASPHALT, IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPAIR THE PAVEMENT WITH A HEAVY DUTY ASPHALT PAVING SECTION. THE CONTRACTOR SHALL INCLUDE THE COST TO PERFORM THE ASPHALT REPAIRS IN HIS BASE BID IF DEEMED NECESSARY.
10. IF THE CONTRACTOR MUST CROSS AN EXISTING ITEM (PAVEMENT, SIDEWALK, ETC.) TO INSTALL A NEW IMPROVEMENT (UTILITIES, STORM DRAINAGE, ETC.), THE CONTRACTOR SHALL INCLUDE IN HIS BASE BID, ALL COST REQUIRED TO REPLACE TIE EXISTING ITEM IMPACTED BY CONSTRUCTION.

WBA
ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

WILLIAM ANDERS DENDINGER
ENGINEER
25145
STATE OF MISSISSIPPI

WED 25 AUG 2021

CONSTRUCTION DOCUMENTS

WBA # 5820

REVISIONS

1 FRI 03 SEP 2021

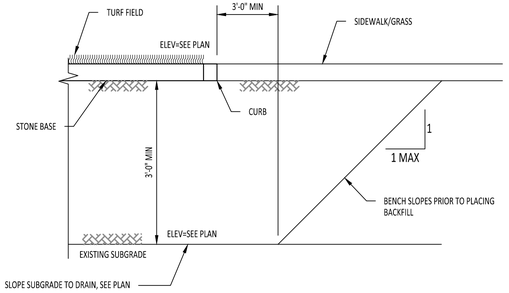
DEMOLITION PLAN
SCALE: 1"=20'-0"

SMITHERS
ENGINEERS +
CONSULTANTS

C111
DEMOLITION PLAN

OVEREXCAVATION AND BACKFILL NOTES:

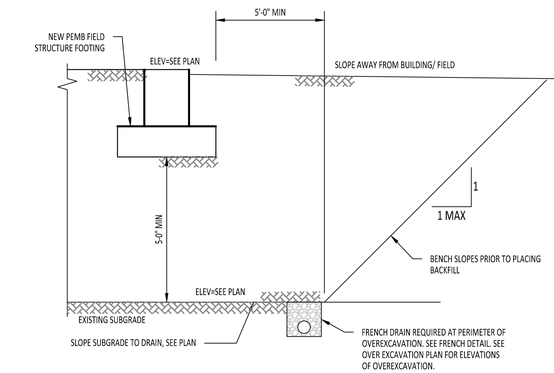
1. BELOW IS A GRAPHICAL REPRESENTATION OF THE FIELD OVEREXCAVATION AND BACKFILL. THE CONTRACTOR SHALL CLOSELY FOLLOW THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT. ANY DISCREPANCIES BETWEEN THE PLANS AND GEOTECHNICAL REPORT SHALL BE BROUGHT TO THE ATTENTION OF THE CIVIL ENGINEER PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
2. CONTRACTOR SHALL OVER EXCAVATE TO THE ELEVATIONS SHOWN ON THIS PLAN AND THE UNSATISFACTORY MATERIALS SHALL BE DISPOSED OF OFFSITE. THE BOTTOM OF EXCAVATION SHALL BE SLOPED TO DRAIN. SEE OVEREXCAVATION STORM WATER CONTROL BOX NOTE.
3. ONCE THE OVEREXCAVATION GRADE IS REACHED, THE OWNER'S TESTING LABORATORY (CTL) SHALL VISUALLY OBSERVE THE BOTTOM OF THE OVEREXCAVATION FOR POTENTIALLY SOFT, WET OR UNSTABLE AREAS.
4. THE BOTTOM OF THE OVEREXCAVATION SHALL BE PROOFROLLED IN ACCORDANCE WITH THE EARTHWORK SPECIFICATION. ANY AREAS OF INSTABILITY SHALL BE MITIGATED AT THE DIRECTION OF THE GEOTECHNICAL ENGINEER.
5. TESTING OF SUBGRADE MATERIALS SHALL BE PERFORMED IN ACCORDANCE WITH THE EARTHWORK SPECIFICATION.
6. THE AREA SHALL THEN BE BACKFILLED WITH SUITABLE MATERIALS WITHIN 2% OF OPTIMUM MOISTURE CONTENT IN LIFTS NOT EXCEEDING 8" AND COMPACTED TO A MINIMUM 98% STANDARD PROCTOR DRY DENSITY (ASTM D 698). FIELD DENSITY AND LABORATORY TESTING SHALL BE PERFORMED BY THE CTL IN ACCORDANCE WITH THE EARTHWORK SPECIFICATION. WHERE CONTROLLED MECHANICAL TAMPERS ARE USED TO COMPACT FILL MATERIALS, THE LOOSE LIFT THICKNESS SHALL BE LIMITED TO 5".
7. THE SIDES OF THE OVEREXCAVATION SHALL BE BENCHED PRIOR TO PLACEMENT OF SUITABLE FILL MATERIALS.



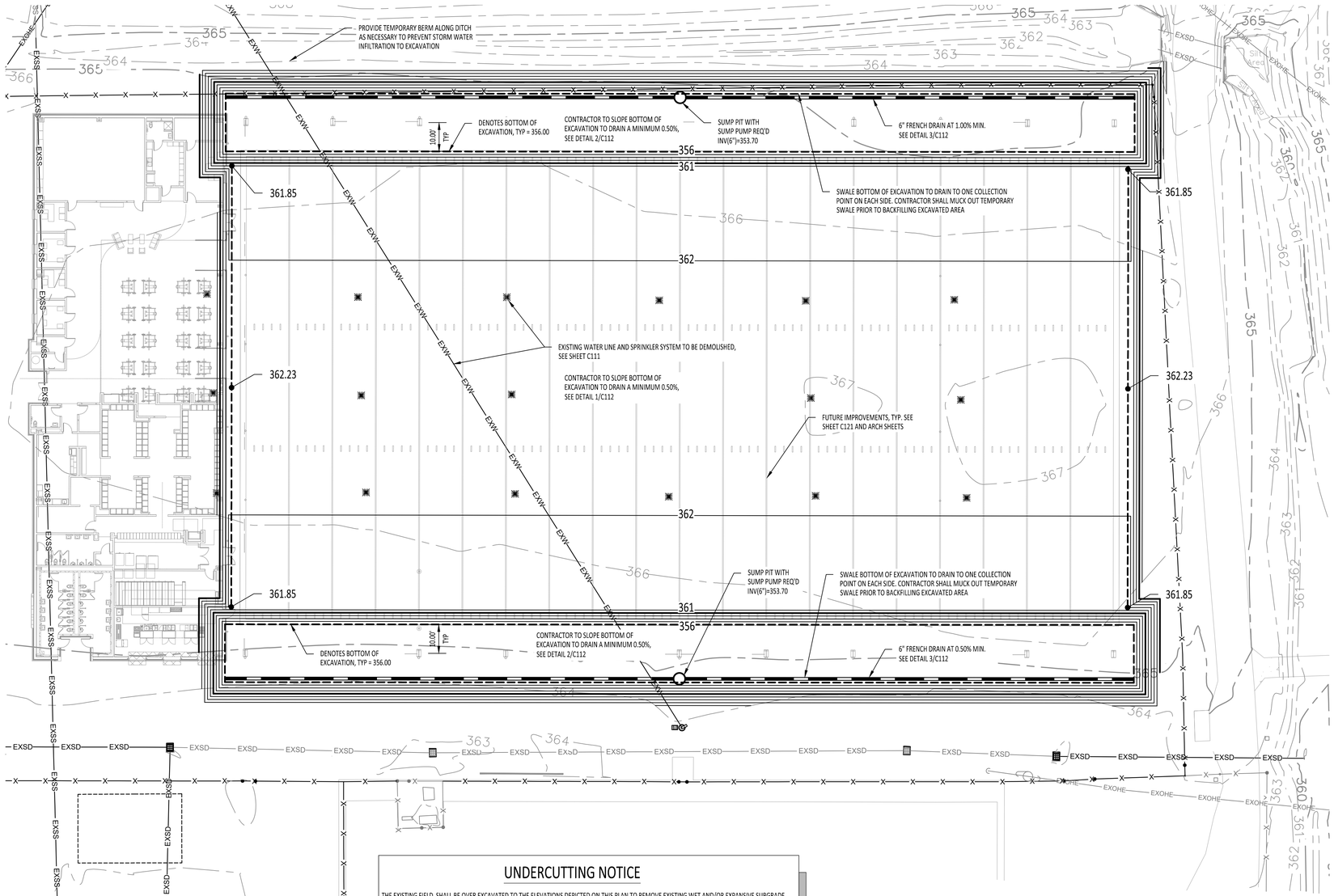
1 / C112 FIELD OVEREXCAVATION AND BACKFILL
SCALE: NOT TO SCALE

OVEREXCAVATION AND BACKFILL NOTES:

1. BELOW IS A GRAPHICAL REPRESENTATION OF THE PEMB FIELD STRUCTURE FOOTINGS OVEREXCAVATION AND BACKFILL. THE CONTRACTOR SHALL CLOSELY FOLLOW THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT. ANY DISCREPANCIES BETWEEN THE PLANS AND GEOTECHNICAL REPORT SHALL BE BROUGHT TO THE ATTENTION OF THE CIVIL ENGINEER PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
2. CONTRACTOR SHALL OVER EXCAVATE THE PEMB FIELD STRUCTURE FOOTINGS TO THE ELEVATIONS SHOWN ON THIS PLAN AND DISPOSED OF OFFSITE. THE BOTTOM OF EXCAVATION SHALL BE SLOPED TO DRAIN FROM THE BUILDING AREA. SEE BUILDING OVEREXCAVATION STORM WATER CONTROL BOX NOTE.
3. ONCE THE OVEREXCAVATION GRADE IS REACHED, THE CTL SHALL VISUALLY EXAMINE THE BOTTOM OF THE OVEREXCAVATION FOR POTENTIALLY SOFT, WET OR UNSTABLE AREAS.
4. THE BOTTOM OF THE OVEREXCAVATION SHALL BE PROOFROLLED IN ACCORDANCE WITH THE EARTHWORK SPECIFICATION. ANY AREAS OF INSTABILITY SHALL BE MITIGATED AT THE DIRECTION OF THE GEOTECHNICAL ENGINEER.
5. TESTING OF SUBGRADE MATERIALS SHALL BE PERFORMED IN ACCORDANCE WITH THE EARTHWORK SPECIFICATION.
6. THE AREA SHALL THEN BE BACKFILLED WITH SUITABLE MATERIALS WITHIN 2% OF OPTIMUM MOISTURE CONTENT IN LIFTS NOT EXCEEDING 8" AND COMPACTED TO A MINIMUM 98% STANDARD PROCTOR DRY DENSITY (ASTM D 698). FIELD DENSITY AND LABORATORY TESTING SHALL BE PERFORMED BY THE CTL IN ACCORDANCE WITH THE EARTHWORK SPECIFICATION. WHERE CONTROLLED MECHANICAL TAMPERS ARE USED TO COMPACT FILL MATERIALS, THE LOOSE LIFT THICKNESS SHALL BE LIMITED TO 5".
7. THE SIDES OF THE OVEREXCAVATION SHALL BE BENCHED PRIOR TO PLACEMENT OF SUITABLE FILL MATERIALS.



2 / C112 TYPICAL PEMB FIELD STRUCTURE FOOTING OVEREXCAVATION AND BACKFILL
SCALE: NOT TO SCALE



UNDERCUTTING NOTICE

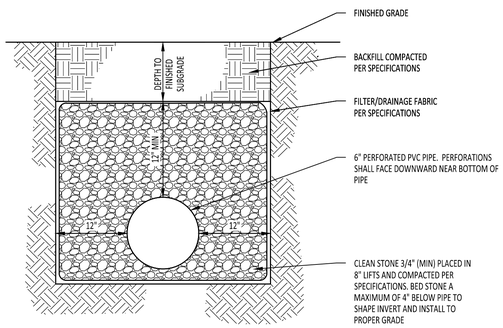
THE EXISTING FIELD SHALL BE OVER EXCAVATED TO THE ELEVATIONS DEPICTED ON THIS PLAN TO REMOVE EXISTING WET AND/OR EXPANSIVE SUBGRADE SOILS IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. ALL OVER EXCAVATION SHALL BE BACKFILLED WITH SUITABLE FILL MATERIALS COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR DENSITY. OVEREXCAVATION AND PLACEMENT OF FILL MATERIALS SHALL MEET ALL REQUIREMENTS STATED IN THE GEOTECHNICAL REPORT. THE OWNER'S CONSTRUCTION TESTING LABORATORY SHALL BE PRESENT TO OBSERVE ALL EXCAVATION AND FILLING WORK.

OVEREXCAVATION STORM WATER CONTROL

THE CONTRACTOR'S BASE BID SHALL INCLUDE ALL COSTS NECESSARY TO CONTROL STORM WATER AND GROUND WATER IN THE OVEREXCAVATION AREAS. THIS INCLUDES DIVERSION BERMS, PUMPING, AND ANY OTHER MEANS NECESSARY. DISCHARGE OF STORM WATER FROM OVEREXCAVATION AREAS SHALL MEET ALL LOCAL, STATE, AND FEDERAL REQUIREMENTS. THE CONTRACTOR SHALL UPDATE THE EROSION CONTROL PLAN AS NECESSARY TO SEQUENCE THIS WORK. IF THE CONTRACTOR OBSERVES SUBSURFACE WATER DURING EXCAVATION WORK, THEY SHALL NOTIFY THE DESIGN TEAM AND OWNER'S CONSTRUCTION TESTING LABORATORY FOR REVIEW.

OVEREXCAVATION PLAN LEGEND:

327	EXISTING MINOR CONTOUR
380	EXISTING MAJOR CONTOUR
344	MINOR EXCAVATION CONTOUR
345	MAJOR EXCAVATION CONTOUR
	NEW STORM DRAIN LINE
EXOHE	EXISTING OVERHEAD ELECTRIC SERVICE
EXSD	EXISTING STORM DRAIN
EXSS	EXISTING SANITARY SEWER LINE
EXUC	EXISTING UNDERGROUND COMMUNICATIONS
EXW	EXISTING WATER LINE



3 / C112 FRENCH DRAIN
SCALE: NOT TO SCALE

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

Mississippi 811
protecting Mississippi's vital flow...one call at a time

OVEREXCAVATION PLAN
SCALE: 1"=20'-0"

North

WBA ARCHITECTURE

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PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

WILLIAM ANDERS DENDINGER
DENDINGER PROFESSIONAL ENGINEER
25145
STATE OF MISSISSIPPI

WED 25 AUG 2021

CONSTRUCTION DOCUMENTS

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NO	DESCRIPTION	DATE
1		FRI 03 SEP 2021

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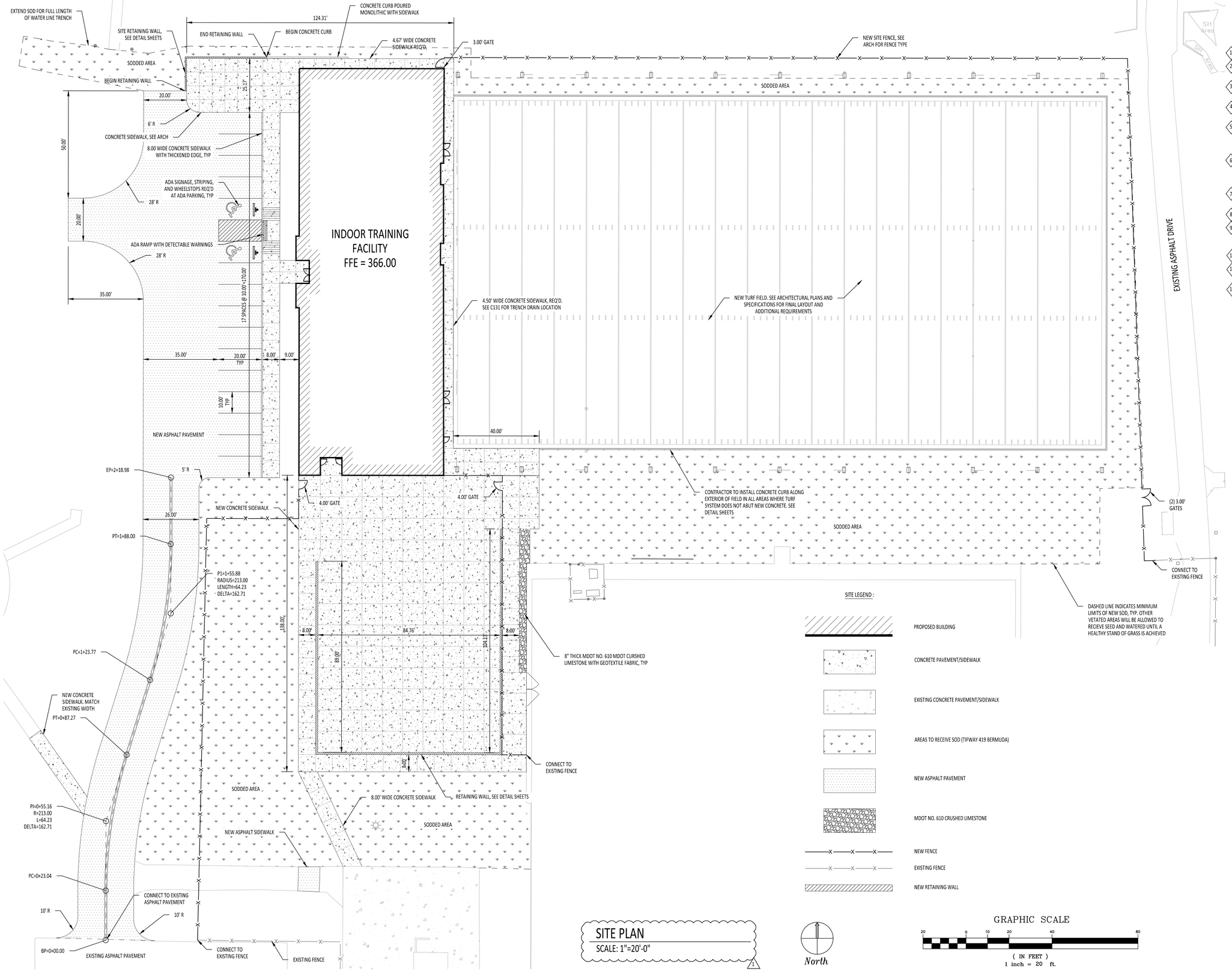
C112
OVEREXCAVATION PLAN



SITE PLAN
SCALE: 1"=20'-0"

SITE PLAN NOTES:

1. ALL DIMENSIONS SHALL BE TO FACE OF CURB UNLESS NOTED OTHERWISE.
2. ALL CURBS SHALL BE CONCRETE UNLESS NOTED OTHERWISE. SEE DETAIL SHEET FOR ADDITIONAL INFORMATION.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE A SMOOTH TRANSITION BETWEEN EXISTING AND PROPOSED PAVING AREAS.
4. HANDICAP PARKING AND ACCESS RAMPS SHALL MEET CITY OF PEARL AND CURRENT ADA STANDARDS.
5. SIDEWALK WIDTH VARIES. CONTROL JOINTS SHALL BE PLACED WHERE SHOWN ON PLAN AND CONSTRUCTION JOINTS SHALL BE PLACED EVERY 32' O.C. MIN. REFERENCE SIDEWALK DETAIL PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION.
6. PARKING LOT STRIPES SHALL BE 4" WIDE WHITE WATERBORNE PAINT MEETING SPECIFICATION TT-P-1952B. HANDICAP PARKING STRIPING SHALL MEET CITY OF PEARL AND ADA CODE REQUIREMENTS. ALL PAVEMENT MARKINGS AND STRIPING SHALL BE PAINTED USING 2 COATS OF PAINT.
7. ALL PAINTED PAVEMENT MARKINGS SUCH AS DIRECTIONAL ARROWS AND LETTERING SHALL BE PAINTED USING TEMPLATES.
8. CONTRACTOR SHALL COMPLY TO ALL APPLICABLE LOCAL AND STATE CODES
9. ISOLATION JOINT TYPICAL AT FIXED STRUCTURES (BUILDING, RETAINING WALLS, DRAINAGE STRUCTURES, MANHOLES, LIGHT POLE BASES, BOLLARDS, ETC). SEE DETAIL SHEET FOR ADDITIONAL INFORMATION.
10. SEE DETAIL SHEET FOR CONCRETE JOINT REQUIREMENTS.
11. CONCRETE LANDING AREAS SHALL BE CONSTRUCTED WITH A 10" THICK EDGE ON ALL SIDES.
12. ALL SIGNAGE AND PAVEMENT MARKINGS SHALL MEET CITY OF PEARL STANDARDS.

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
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PEARL, MS 39208

WILLIAM ANDERS DENDINGER — 25145 — STATE OF MISSISSIPPI — ENGINEER

WED 25 AUG 2021

CONSTRUCTION DOCUMENTS

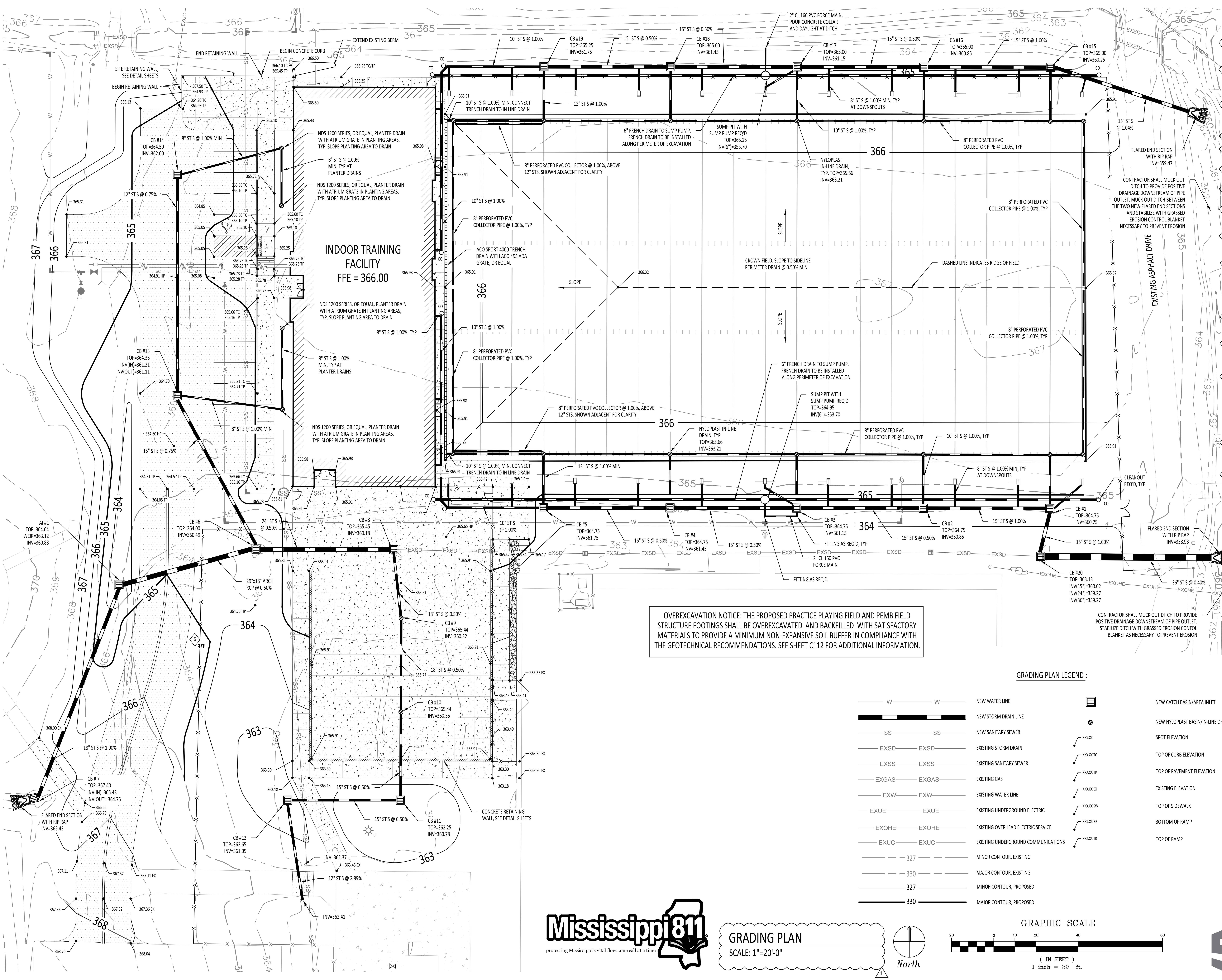
WBA # 5820

REVISIONS

NO	DESCRIPTION	DATE
1		FRI 03 SEP 2021

SMITHERS ENGINEERS + CONSULTANTS

C121
SITE PLAN



OVEREXCAVATION NOTICE: THE PROPOSED PRACTICE PLAYING FIELD AND PEMB FIELD STRUCTURE FOOTINGS SHALL BE OVEREXCAVATED AND BACKFILLED WITH SATISFACTORY MATERIALS TO PROVIDE A MINIMUM NON-EXPANSIVE SOIL BUFFER IN COMPLIANCE WITH THE GEOTECHNICAL RECOMMENDATIONS. SEE SHEET C112 FOR ADDITIONAL INFORMATION.

GRADING NOTES:

1. CONTRACTOR SHALL GRADE AREA AROUND NEW CATCH BASINS TO ENSURE POSITIVE STORM WATER DISCHARGE FROM THE DRAINAGE AREA UPSTREAM OF THE CATCH BASIN.
2. ALL STORM SEWER (ST S) PIPE 12" AND LARGER SHALL BE CORRUGATED POLYETHYLENE (HP STORM), UNLESS NOTED OTHERWISE. ALL STORM PIPE 10" AND LESS SHALL BE SDR 26 PVC UNLESS NOTED OTHERWISE. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
3. ALL ADA ROUTES SHALL MEET CITY OF PEARL AND ADA CODE REQUIREMENTS. LONGITUDINAL SLOPE ON ALL ADA ROUTES SHALL NOT EXCEED 1:20. TRANSVERSE SLOPES ON ALL ADA ROUTES SHALL NOT EXCEED 1:50.
4. ELEVATION OF NEW EDGE OF PAVEMENT SHALL MATCH EXISTING.
5. EXISTING SLOPES GREATER THAN 6:1 SHALL BE BENCHED PRIOR TO PLACING FILL.
6. AI #1 AN AREA INLET CONSTRUCTED PER THE AREA INLET DETAIL ON THE DETAIL SHEETS.
7. CONSTRUCT 6' SHOULDER WITH 5% SLOPE ON EACH SIDE OF DRIVE. SEE PAVEMENT DETAILS FOR MORE INFORMATION.
8. CONTRACTOR SHALL REFERENCE MEP SHEETS, THIS SET, FOR ADDITIONAL INFORMATION ON INSTALLATION AND CONNECTION OF ROOF DRAINS AND RAIN LEADERS.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY INSPECTIONS, APPROVALS AND/OR CERTIFICATIONS REQUIRED BY CODES AND AUTHORITIES.
10. CATCH BASINS SHALL BE MDOT TYPE SS-3 WITH EAST JORDAN IRON WORKS V-5726 GRATES OR APPROVED EQUAL. GRATES IN PEDESTRIAN AREAS SHALL BE ADA, HEEL PROOF GRATES. CB #1-#5, CB #9-#10, AND CB #15-#19 SHALL BE NYLOPLAST, OR EQUAL, WITH AN ADA, HEEL PROOF GRATE. REFER TO DETAIL SHEETS FOR ADDITIONAL INFORMATION. DRAINAGE STRUCTURE, SIZE AND PIPE CONNECTION SHALL BE SIZED TO ACCOUNT FOR SKEW OF PIPE.
11. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE AS SHOWN ON THIS SHEET. ANY WATER TRAPS WILL REQUIRE REMOVING AND REPLACING BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
12. THE CONTRACTOR SHALL CLOSELY FOLLOW COMPACTION REQUIREMENTS FOR OPEN TRENCHES AS DESCRIBED IN THE PROJECT SPECIFICATIONS. COMPACTION TESTING REQUIREMENTS AND REPORTS SHALL BE PROVIDED TO THE OWNER AS NOTED IN THE SPECIFICATIONS.
13. EXISTING UNDERGROUND UTILITY LINES ARE SHOWN ON THE PLANS BASED UPON THE BEST INFORMATION AVAILABLE TO THE ENGINEER. THE ENGINEER CANNOT AND DOES NOT WARRANT THAT THIS INFORMATION IS COMPLETE OR ACCURATE. THE CONTRACTOR MUST COORDINATE DIRECTLY WITH THE INVOLVED UTILITY OWNERS TO HAVE THE UNDERGROUND UTILITY LINES FIELD VERIFIED PRIOR TO CONSTRUCTION. IF PROPOSED UTILITIES ARE FOUND IN CONFLICT WITH EXISTING UTILITIES, THE ENGINEER SHALL BE NOTIFIED AND THE PROPOSED UTILITIES SHALL BE INSTALLED IN A DESIGNATED LOCATION TO AVOID CONFLICT.
14. TWO 45° FITTINGS SHALL BE INSTALLED WHERE STORM PIPES CONNECT AT 90°. CLEANOUTS, WHERE SHOWN, SHALL BE INSTALLED AT THE DOWNSTREAM 45° FITTING.
15. CONTRACTOR SHALL REFERENCE GEOTECHNICAL REPORT "PEARL HIGH SCHOOL INDOOR TRAINING FACILITY" PREPARED BY W GEOTECHNICAL AND TESTING, INC. DATED MARCH 2021 FOR ALL SUBGRADE PREPARATION AND PAVEMENT CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER OF ANY DISCREPANCY BETWEEN THE GEOTECHNICAL REPORT AND CONSTRUCTION DOCUMENTS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.

GRADING PLAN LEGEND :

Symbol	Description
W — W	NEW WATER LINE
	NEW STORM DRAIN LINE
SS — SS	NEW SANITARY SEWER
EXSD — EXSD	EXISTING STORM DRAIN
EXSS — EXSS	EXISTING SANITARY SEWER
EXGAS — EXGAS	EXISTING GAS
EXW — EXW	EXISTING WATER LINE
EXUE — EXUE	EXISTING UNDERGROUND ELECTRIC
EXOHE — EXOHE	EXISTING OVERHEAD ELECTRIC SERVICE
EXUC — EXUC	EXISTING UNDERGROUND COMMUNICATIONS
327	MINOR CONTOUR, EXISTING
330	MAJOR CONTOUR, EXISTING
327	MINOR CONTOUR, PROPOSED
330	MAJOR CONTOUR, PROPOSED
	NEW CATCH BASIN/AREA INLET
	NEW NYLOPLAST BASIN/IN-LINE DRAIN/PLANTER DRAIN
XXX.XX	SPOT ELEVATION
XXX.XX TC	TOP OF CURB ELEVATION
XXX.XX TP	TOP OF PAVEMENT ELEVATION
XXX.XX EX	EXISTING ELEVATION
XXX.XX SW	TOP OF SIDEWALK
XXX.XX BR	BOTTOM OF RAMP
XXX.XX TR	TOP OF RAMP

Mississippi 811
protecting Mississippi's vital flow...one call at a time

GRADING PLAN
SCALE: 1"=20'-0"

North

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

WILLIAM ANDERS DENDINGER, LICENSED PROFESSIONAL ENGINEER 25145, STATE OF MISSISSIPPI

WED 25 AUG 2021

CONSTRUCTION DOCUMENTS

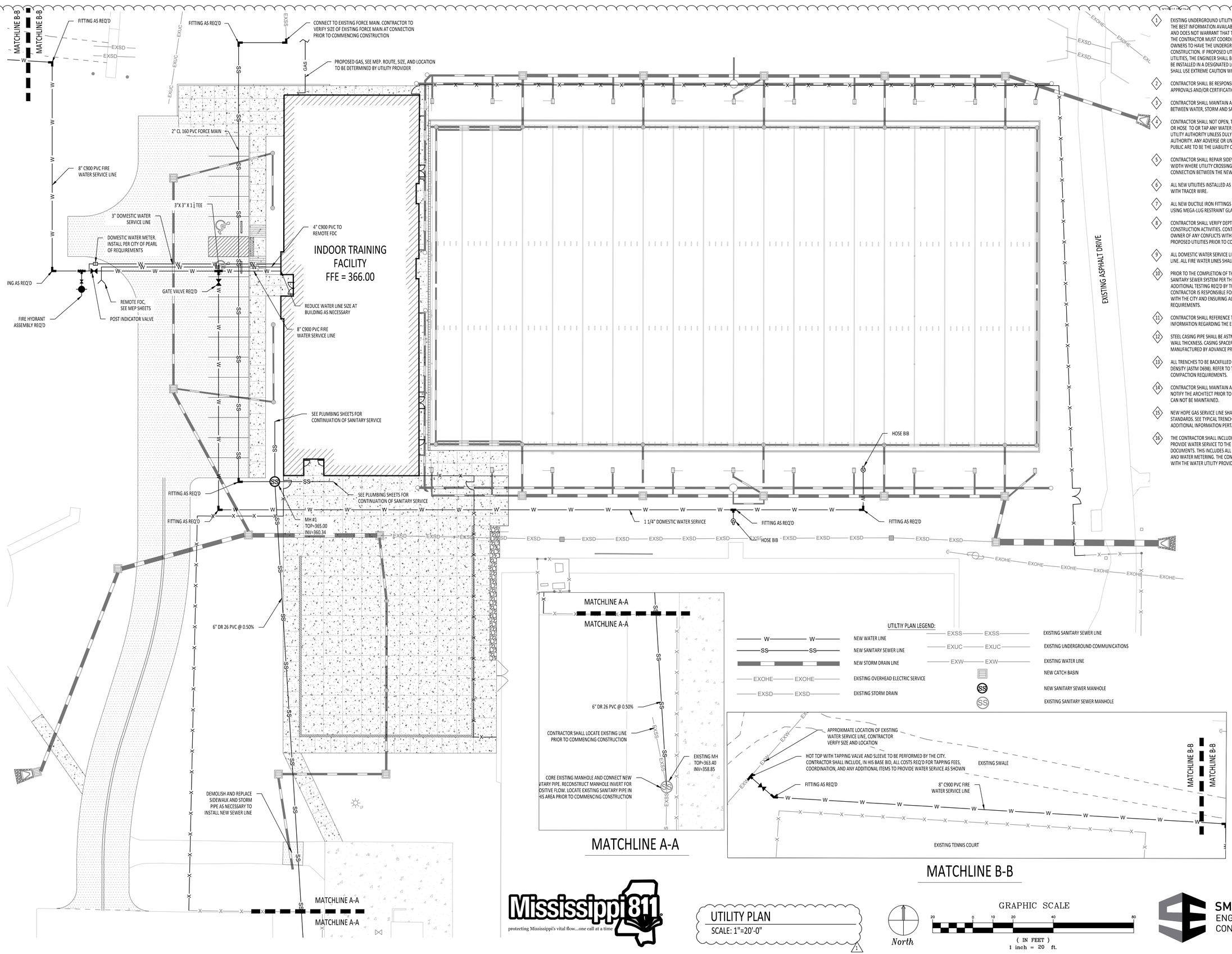
WBA # 5820

REVISIONS

NO.	DESCRIPTION	DATE
1		FRI 03 SEP 2021

SMITHERS ENGINEERS + CONSULTANTS

C131
GRADING PLAN



1. EXISTING UNDERGROUND UTILITY LINES ARE SHOWN ON THE PLANS BASED UPON THE BEST INFORMATION AVAILABLE TO THE ENGINEER. THE ENGINEER CANNOT AND DOES NOT WARRANT THAT THIS INFORMATION IS COMPLETE OR ACCURATE. THE CONTRACTOR MUST COORDINATE DIRECTLY WITH THE INVOLVED UTILITY OWNERS TO HAVE THE UNDERGROUND UTILITY LINES FIELD VERIFIED PRIOR TO CONSTRUCTION. IF PROPOSED UTILITIES ARE FOUND IN CONFLICT WITH EXISTING UTILITIES, THE ENGINEER SHALL BE NOTIFIED AND THE PROPOSED UTILITIES SHALL BE INSTALLED IN A DESIGNATED LOCATION TO AVOID CONFLICT. CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR ACTIVE UTILITIES.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY INSPECTIONS, APPROVALS AND/OR CERTIFICATIONS REQUIRED BY CODES AND AUTHORITIES.
3. CONTRACTOR SHALL MAINTAIN A 10' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN WATER, STORM AND SANITARY SEWER.
4. CONTRACTOR SHALL NOT OPEN, TURN OFF, INTERFERE WITH OR ATTACH ANY PIPE OR HOSE TO OR TAP ANY WATER MAIN OR OTHER UTILITIES BELONGING TO THE UTILITY AUTHORITY UNLESS DULY AUTHORIZED TO DO SO BY THE UTILITY AUTHORITY. ANY ADVERSE OR UNSCHEDULED DISRUPTIONS OF SERVICE TO THE PUBLIC ARE TO BE THE LIABILITY OF THE CONTRACTOR.
5. CONTRACTOR SHALL REPAIR SIDEWALK PER SIDEWALK DETAIL TO MATCH EXISTING WIDTH WHERE UTILITY CROSSING IS REQ'D. CONTRACTOR SHALL ENSURE A SMOOTH CONNECTION BETWEEN THE NEW AND EXISTING SIDEWALK.
6. ALL NEW UTILITIES INSTALLED AS A PART OF THIS PROJECT SHALL BE INSTALLED WITH TRACER WIRE.
7. ALL NEW DUCTILE IRON FITTINGS (TEES, ELBOWS, VALVES, ETC.) TO BE INSTALLED USING MEGA-LUG RESTRAINT GLANDS.
8. CONTRACTOR SHALL VERIFY DEPTH OF EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL NOTIFY THE ENGINEER AND OWNER OF ANY CONFLICTS WITH THE DEPTH OF THE EXISTING UTILITIES AND PROPOSED UTILITIES PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
9. ALL DOMESTIC WATER SERVICE LINES SHALL BE HDPE PRESSURE CLASS 200 WATER LINE. ALL FIRE WATER LINES SHALL BE DR 18 C900 PVC UNLESS NOTED OTHERWISE.
10. PRIOR TO THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL TEST THE SANITARY SEWER SYSTEM PER THE TECHNICAL SPECIFICATIONS AND ANY ADDITIONAL TESTING REQ'D BY THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL TESTING REQUIREMENTS WITH THE CITY AND ENSURING ALL NEW SANITARY SEWER ITEMS MEET THOSE REQUIREMENTS.
11. CONTRACTOR SHALL REFERENCE THE ELECTRICAL PLANS, THIS SET, FOR ALL INFORMATION REGARDING THE ELECTRICAL SITE LAYOUT.
12. STEEL CASING PIPE SHALL BE ASTM A 252, GRADE 2 WITH SCHEDULE 40 MINIMUM WALL THICKNESS. CASING SPACERS SHALL BE MODEL SSI8 DESIGNED AND MANUFACTURED BY ADVANCE PRODUCTS & SYSTEMS OR APPROVED EQUAL.
13. ALL TRENCHES TO BE BACKFILLED AND COMPACTED TO 98% STANDARD PROCTOR DENSITY (ASTM D698). REFER TO THE TECHNICAL SPECIFICATIONS FOR ADDITIONAL COMPACTION REQUIREMENTS.
14. CONTRACTOR SHALL MAINTAIN A 3' CLEARANCE AROUND ALL FIRE HYDRANTS. NOTIFY THE ARCHITECT PRIOR TO COMMENCING CONSTRUCTION IF CLEARANCE CAN NOT BE MAINTAINED.
15. NEW HDPE GAS SERVICE LINE SHALL MEET ALL NFPA 58 AND STATE OF MISSISSIPPI STANDARDS. SEE TYPICAL TRENCHING DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION PERTAINING TO LAYING OF NEW GAS LINES.
16. THE CONTRACTOR SHALL INCLUDE IN HIS BASE BID ALL WORK REQUIRED TO PROVIDE WATER SERVICE TO THE PROPOSED NEW BUILDING AS SHOWN ON THE BID DOCUMENTS. THIS INCLUDES ALL REQUIREMENTS RELATED TO WATER TAPPING AND WATER METERING. THE CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS WITH THE WATER UTILITY PROVIDER PRIOR TO COMMENCING CONSTRUCTION.

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

WILLIAM ANDERS DENLINGER — LICENSED PROFESSIONAL ENGINEER — 25145 — STATE OF MISSISSIPPI — 4-23-2021

WED 25 AUG 2021

CONSTRUCTION DOCUMENTS

WBA # 5820

REVISIONS

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Mississippi 811 — protecting Mississippi's vital flow...one call at a time

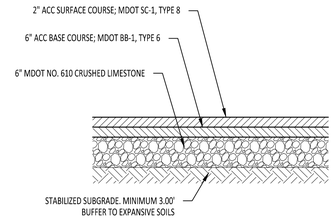
UTILITY PLAN
SCALE: 1"=20'-0"

North

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

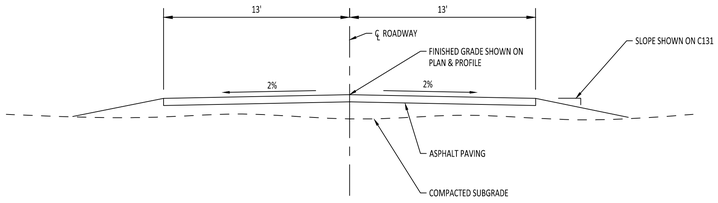
SMITHERS ENGINEERS + CONSULTANTS

C141
UTILITY PLAN



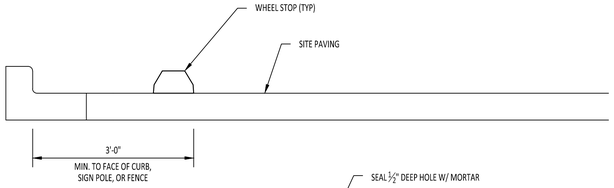
ASPHALT PAVING

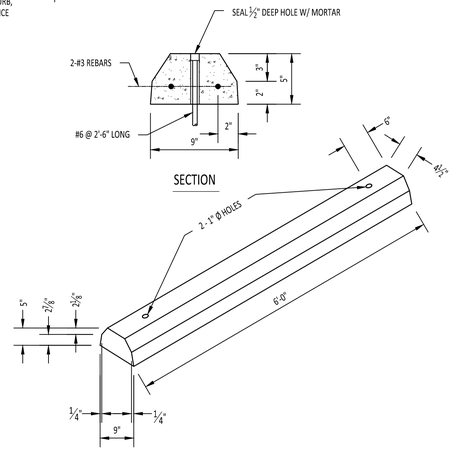
1. FOR PREPARATION OF PAVEMENT SUBGRADE, FILL PLACED IN 8 INCH LIFTS TO WITHIN 8 INCHES OF FINISHED SUBGRADE ELEVATION IN FILL AREAS AND AT LEAST THE UPPER 8 INCHES OF SUBGRADE IN ALL AREAS TO BE PAVED SHALL BE COMPACTED TO AT LEAST 98% OF THE MATERIAL'S MAXIMUM STANDARD PROCTOR DRY DENSITY (ASTM D-698). FILL PLACED BELOW THIS LEVEL SHALL BE COMPACTED TO AT LEAST 98% OF THE MATERIAL'S MAXIMUM DRY DENSITY. THE SOIL'S WATER CONTENT SHALL BE AT -2% TO +2% OF THE SOIL'S OPTIMUM MOISTURE VALUE AT TIME OF COMPACTION. WHERE HAND OPERATED MECHANICAL TAMPERS ARE USED, THE LOOSE LIFT THICKNESS SHALL NOT EXCEED 5".
2. AFTER PROOFROLLING WITH A LOADED TANDEM-AXLE DUMP TRUCK AND REPAIRING DEEP SUBGRADE DEFICIENCIES, THE ENTIRE SUBGRADE SHALL BE SCARIFIED TO A DEPTH OF 6 INCHES AND UNIFORMLY COMPACTED TO AT LEAST 98% OF STANDARD PROCTOR.
3. AGGREGATE GRAVEL BASE COURSE MIXTURES SHALL BE MDOT SIZE NO. 610 CRUSHED LIMESTONE. COMPACTED TO 100% OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-698(STANDARD PROCTOR) AT -2% TO +2% OF THE SOILS OPTIMUM MOISTURE CONTENT AT THE TIME OF COMPACTION.
4. ASPHALT CONCRETE SURFACE COURSE SHALL BE MDOT SC-1, TYPE 8 AND ASPHALT CONCRETE BASE COURSE SHALL BE MDOT BB-1, TYPE 6 IN ACCORDANCE WITH THE 1990 EDITION OF THE MISSISSIPPI STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION.
6. CONTRACTOR SHALL PROVIDE A PRIME COAT AND TACK COAT. SEE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION.
7. THE FIRST 12" OF STABILIZED SUBGRADE MATERIAL UNDER PAVEMENT SHALL BE LIME TREATED USING 6% HYDRATED LIME BY DRY WEIGHT OF SOIL. LIME TREATMENT SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 307 OF THE 1990 EDITION OF THE MISSISSIPPI STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION USING THE CLASS C LIME TREATMENT PROCEDURE. LIME TREATMENT SHALL EXTEND NOT LESS THAN 2' BEYOND PAVEMENT EDGES.
8. SOURCE: GEOTECHNICAL ENGINEERING REPORT PREPARED BY W GEOTECHNICAL AND TESTING, INC. AND DATED MARCH 12, 2021. PAVEMENT PREPARATION AND CONSTRUCTION SHALL BE IN CONFORMANCE WITH ALL GEOTECHNICAL RECOMMENDATIONS. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY BETWEEN THE PLANS AND GEOTECHNICAL REPORT PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.



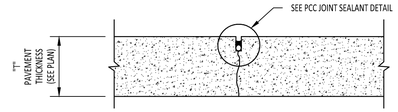
TYPICAL SECTION 26' ROADWAY (SECTION A-A)
SCALE: NTS

1 C202 **PAVEMENT SECTIONS**
SCALE: NOT TO SCALE

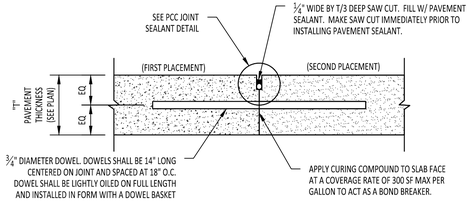




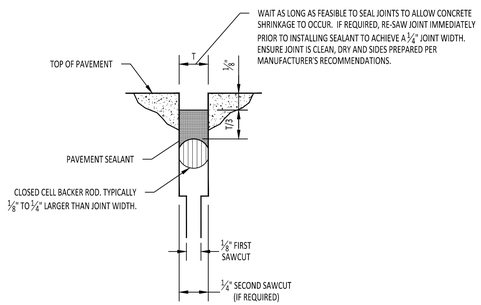
2 C202 **PRECAST WHEELSTOP**
SCALE: 3/4"=1'-0"



CONTRACTION JOINT



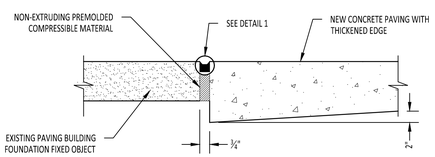
CONSTRUCTION JOINT



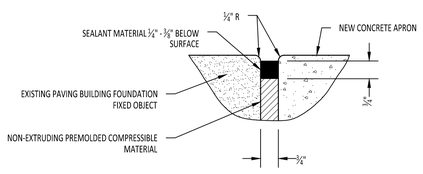
PCC JOINT

NOTES:
1. ENSURE JOINTS ARE CLEAN AND DRY PRIOR TO THE APPLICATION OF THE JOINT SEALANT.
2. INSTALL CLOSED CELL BACKER ROD AFTER JOINTS HAVE BEEN CLEANED AND DRIED IN ACCORDANCE WITH SEALANT MANUFACTURER'S REQUIREMENTS.
3. INSTALL BACKER ROD AT CONSISTENT AND UNIFORM DEPTH.
4. JOINT SEALANT APPLICATION SHALL BE IN STRICT COMPLIANCE WITH SEALANT MANUFACTURER'S REQUIREMENTS.
5. COMPACT SUBGRADE TO 95% STANDARD PROCTOR DENSITY (ASTM 698) PRIOR TO PLACING CONCRETE PAVEMENT.
6. CONCRETE STRENGTH SHALL BE 4000 PSI MIN.

3 C202 **CONCRETE JOINT**
SCALE: NOT TO SCALE

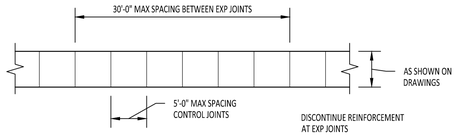


ISOLATION JOINT (IJ)

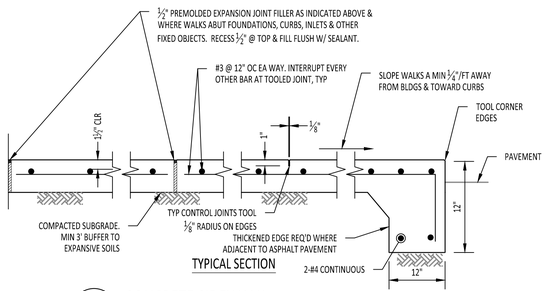


DETAIL 1 ISOLATION JOINT

4 C202 **CONCRETE ISOLATION JOINT**
SCALE: NOT TO SCALE

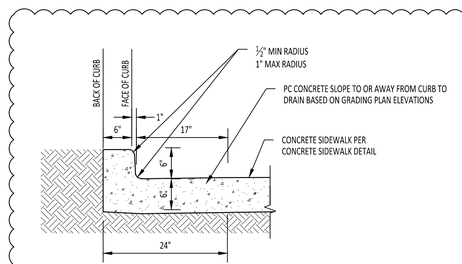


TYPICAL PLAN



TYPICAL SECTION

5 C202 **CONCRETE SIDEWALK**
SCALE: NOT TO SCALE



CURB AND GUTTER AT ASPHALT PAVEMENT

6 C202 **CURB AND GUTTER**
SCALE: NOT TO SCALE

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

WILLIAM ANDERS DENDINGER — LICENSED PROFESSIONAL ENGINEER — 25145 — STATE OF MISSISSIPPI

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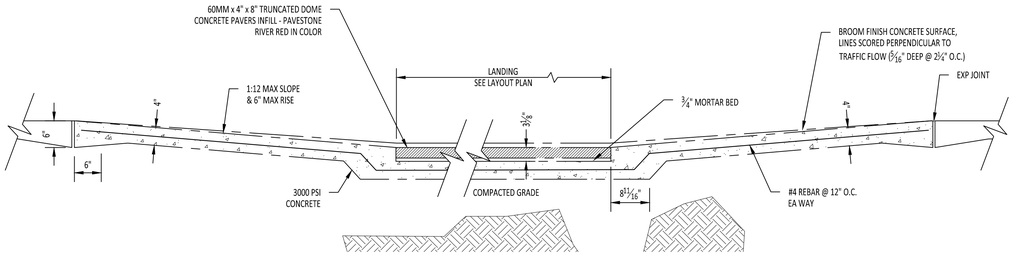
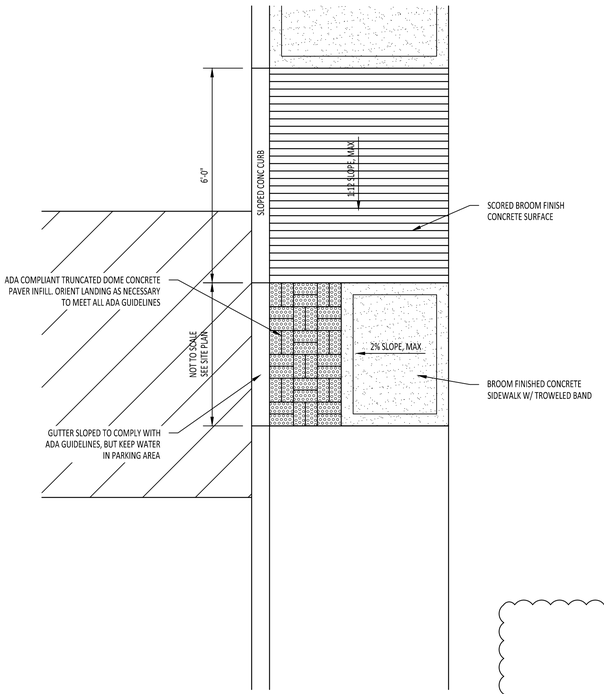
C202 CIVIL DETAILS

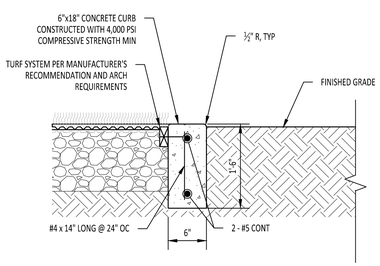


SECTION

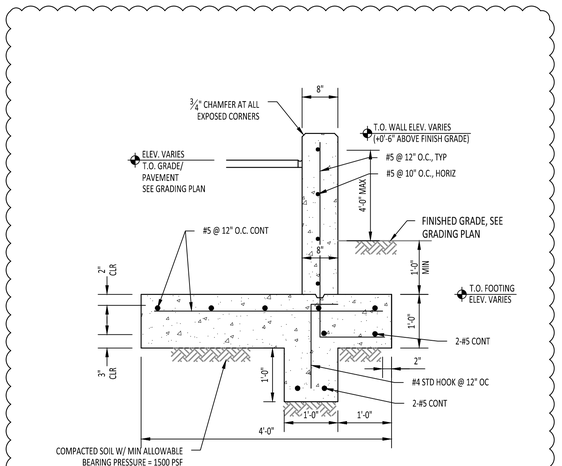


PLAN

1 C203 ADA SIDEWALK RAMP
SCALE: NOT TO SCALE



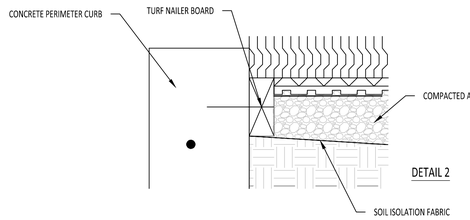
3 C203 TURF FIELD PERIMETER CURB
SCALE: NOT TO SCALE



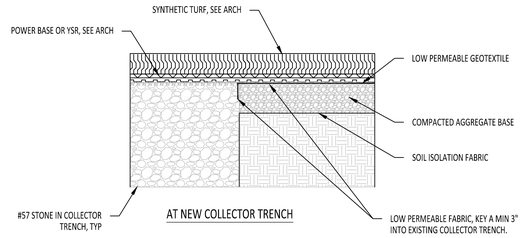
NOTES:
1. CONCRETE SHALL BE MIN 4,000 PSI COMPRESSIVE STRENGTH
2. CONTRACTOR SHALL INSTALL ½" EXPANSION JOINTS AT 25' O.C. MAX IN WALL STEM. PROVIDE ⅜"x24" LONG SMOOTH DOWELS AT 18" O.C. IN WALL STEM AT JOINTS, WITH BACKER ROD AND DOW 888 SEALANT OR APPROVED EQUAL IN JOINT. ONE END OF SMOOT DOWEL SHALL BE SLEEVED TO ALLOW FOR HORIZONTAL WALL MOVEMENT.

4 C203 SITE RETAINING WALL DETAIL
SCALE: NOT TO SCALE

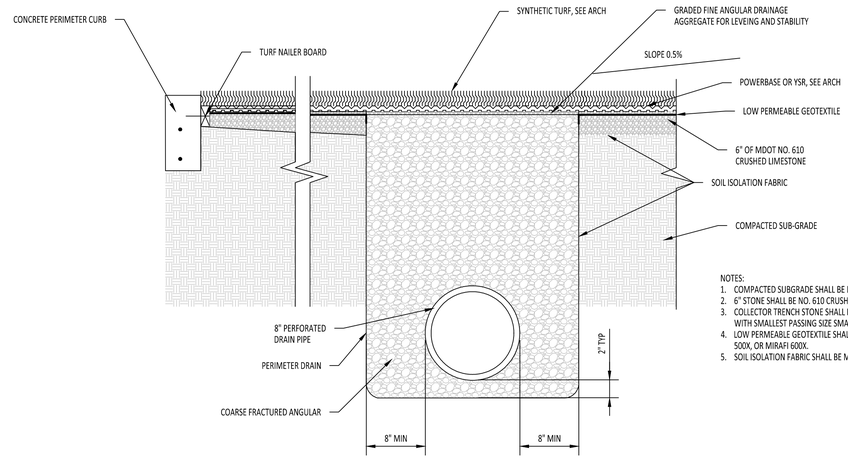
1



DETAIL 2

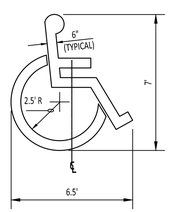


AT NEW COLLECTOR TRENCH



NOTES:
1. COMPACTED SUBGRADE SHALL BE LASER GRADED
2. 6" STONE SHALL BE NO. 610 CRUSHED LIMESTONE.
3. COLLECTOR TRENCH STONE SHALL BE WASHED GRAVEL SIZED WITH SMALLEST PASSING SIZE SMALLER THAN PERFORATIONS.
4. LOW PERMEABLE GEOTEXTILE SHALL BE DUPONT SF65, MIRAFI 500X, OR MIRAFI 600X.
5. SOIL ISOLATION FABRIC SHALL BE MIRAFI 140N, OR EQUAL

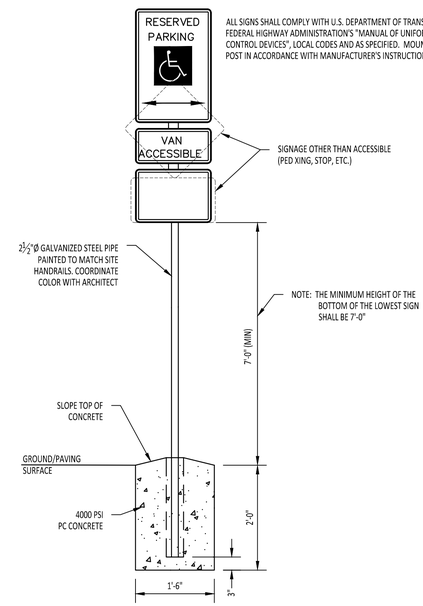
2 C203 FIELD SECTIONS AND COLLECTOR PIPE DETAILS
SCALE: NOT TO SCALE



ACCESSIBLE PARKING SYMBOL

LOCATE AT EDGE OF PARKING SPACE UNLESS ACCOMPANIED BY "VAN" LETTERING

5 C203 ADA PARKING SYMBOL
SCALE: 1/2"=1'-0"



ALL SIGNS SHALL COMPLY WITH U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES", LOCAL CODES AND AS SPECIFIED. MOUNT SIGNS TO POST IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

6 C203 ADA SIGN DETAIL
SCALE: NOT TO SCALE

WBA ARCHITECTURE

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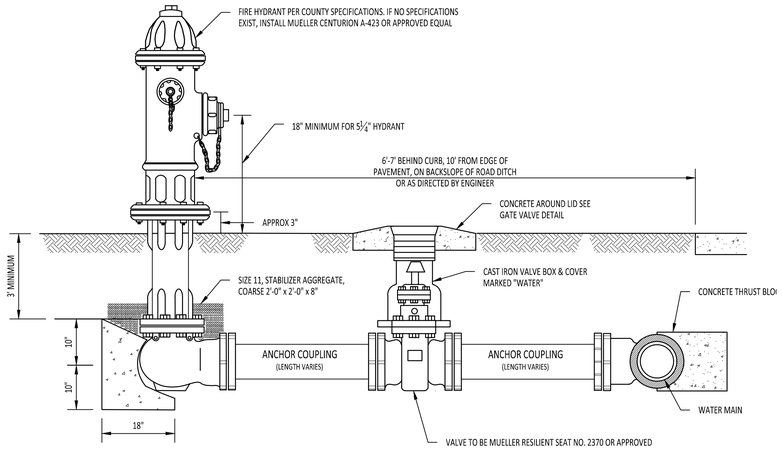
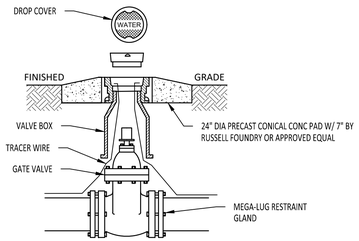
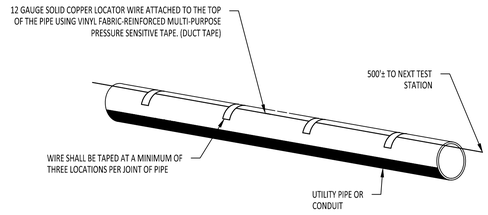


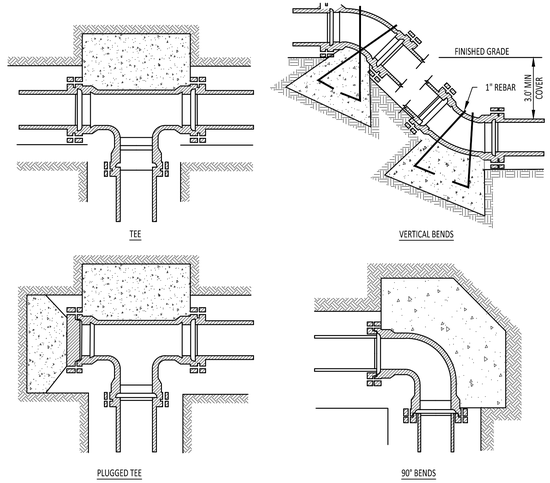
1 C207 FIRE HYDRANT ASSEMBLY
SCALE: NOT TO SCALE



2 C207 GATE VALVE
SCALE: NOT TO SCALE

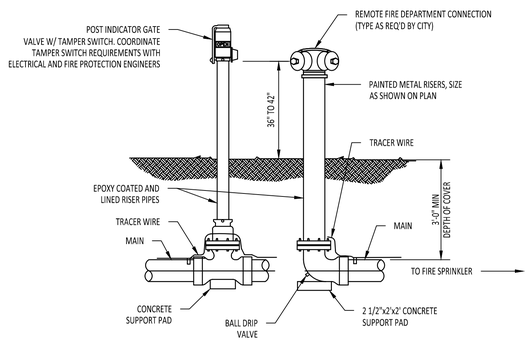


3 C207 LOCATOR WIRE INSTALLATION
SCALE: 1/2"=1'-0"



NOMINAL PIPE DIAMETER (IN.)	DEAD END OR TEE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4	2.0	2.0	2.0	2.0	2.0
6	2.0	2.0	2.0	2.0	2.0
8	3.0	3.0	2.0	2.0	2.0
12	5.0	6.0	4.0	3.0	3.0
16	8.0	12.0	6.0	4.0	4.0
4	——	——	6.0 (.22)	4.0 (.15)	4.0 (.15)
6	——	——	14.0 (.52)	6.0 (.22)	4.0 (.15)
8	——	——	27.0 (1.0)	9.0 (.33)	6.0 (.22)
12	——	——	68.0 (2.5)	22.0 (.80)	9.0 (.33)
16	——	——	90. (3.33)	52.0 (1.9)	18.0 (.67)
Volume of blocks including soil load CU.FT. (CU.YDS.)					

4 C207 THRUST BLOCKS FOR WATER MAINS
SCALE: 1"=1'-0"



NOTES:

1. LANDSCAPE PLANTING, WHEN FULLY GROWN, SHALL NOT OBSCURE VALVE OR FIRE DEPARTMENT CONNECTION (THREE FEET MINIMUM CLEARANCE REQ'D ON ALL SIDES).
2. ALL UNDERGROUND BOLTS, NUTS AND WASHERS SHALL BE 316 STAINLESS STEEL.
3. PROVIDE A MINIMUM OF 2 CY OF CLEAN 3/4" GRAVEL AROUND BALL DRIP VALVE.
4. PROVIDE BOLLARD PROTECTION AS SHOWN ON THE PLANS.
5. LOCATE A SINGLE SWING CHECK VALVE ON THE FDC LINE IMMEDIATELY INSIDE THE BUILDING TO PREVENT FLOW FROM THE FIRE SPRINKLER SYSTEM TO THE FDC.
6. POST INDICATOR VALVE AND REMOTE FDC SHALL MEET ALL REQUIREMENTS OF NFPA 24 AND ANY ADDITIONAL REQUIREMENT OF THE AUTHORITY HAVING JURISDICTION.

5 C207 REMOTE FIRE DEPT CONNECTION AND POST INDICATOR VAVLVE
SCALE: NOT TO SCALE

1

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

WILLIAM ANDERS DENDINGER
LICENSED PROFESSIONAL
ENGINEER
25145
STATE OF MISSISSIPPI

WED 25 AUG 2021

CONSTRUCTION DOCUMENTS

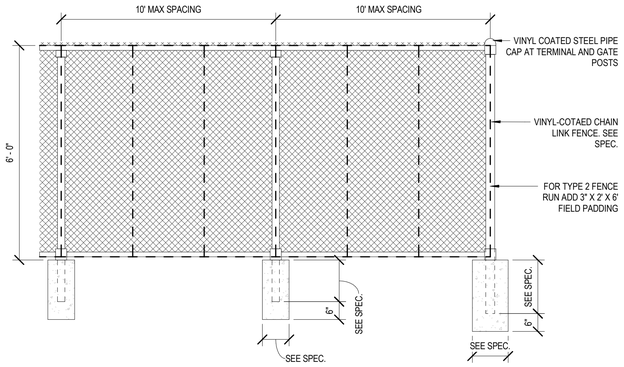
WBA # 5820

REVISIONS

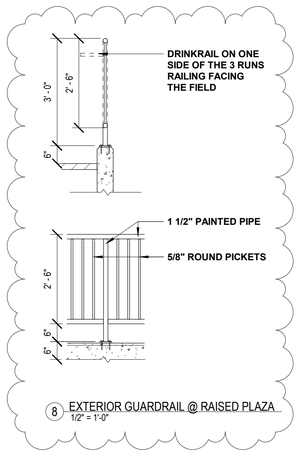
NO.	DESCRIPTION	DATE
1		FRI 03 SEP 2021

SMITHERS ENGINEERS + CONSULTANTS

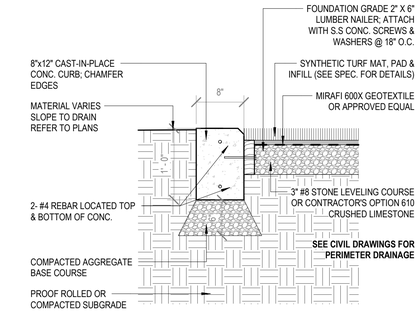
C207
CIVIL DETAILS



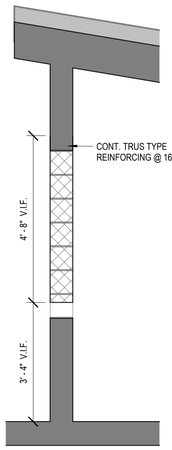
2 FENCE RUN DTL - FBALL & BBALL
1/2" = 1'-0"



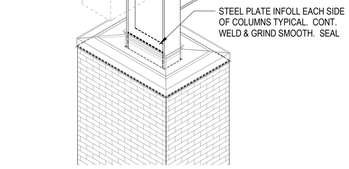
8 EXTERIOR GUARDRAIL @ RAISED PLAZA
1/2" = 1'-0"



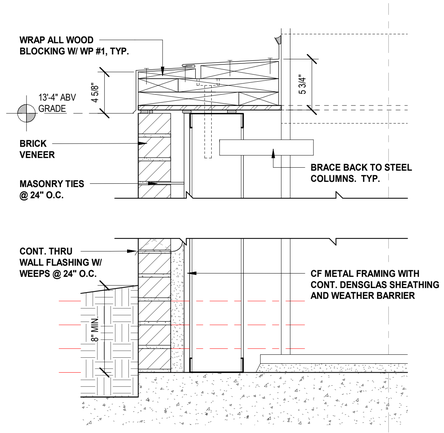
3 SYN TURF - PERIMETER CURB
1" = 1'-0"



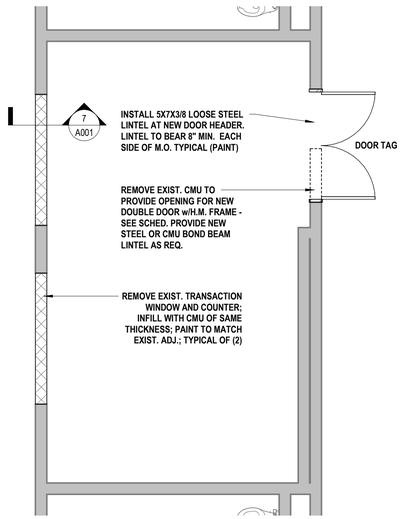
7 Detail 9
1/2" = 1'-0"



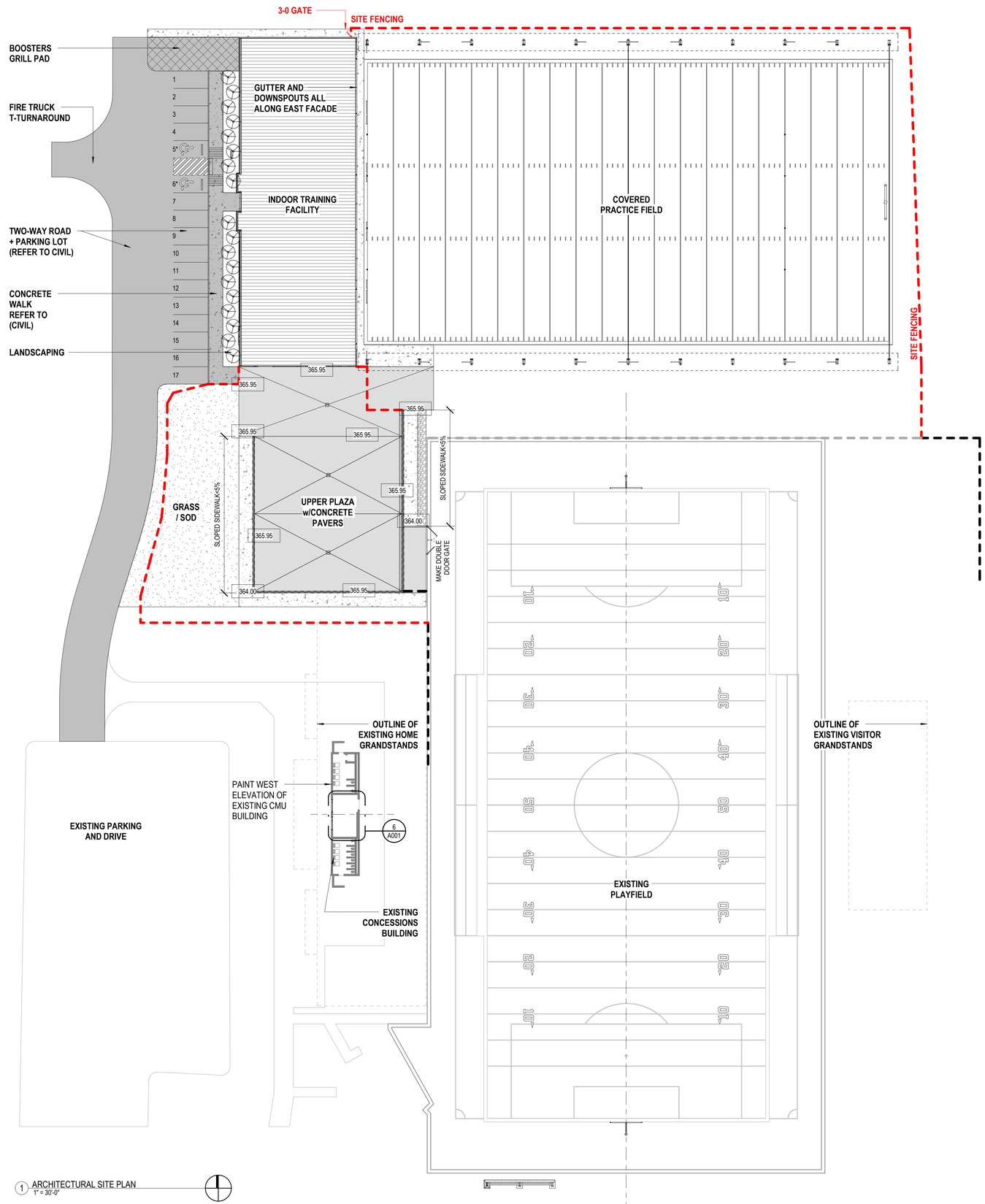
5 3D - SCOREBOARD PILASTER



4 SCOREBOARD PILASTERS DETAIL
1 1/2" = 1'-0"



6 EXISTING CONCESSIONS PLAN
1/4" = 1'-0"



1 ARCHITECTURAL SITE PLAN
1" = 30'-0"

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

REGISTERED ARCHITECT
JAMES RICHMOND WIER, Jr.
4446
STATE OF MISSISSIPPI

WED 25 SEP 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

REVISIONS

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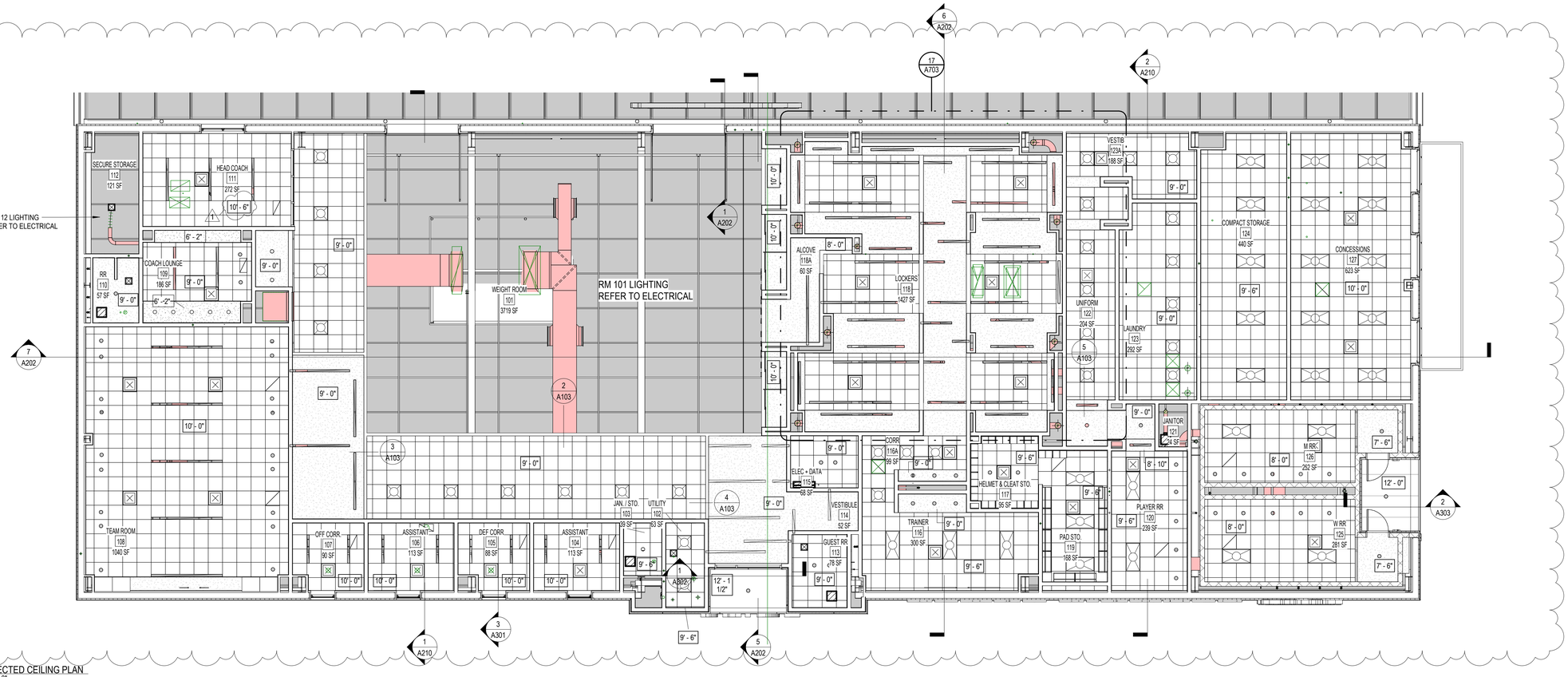
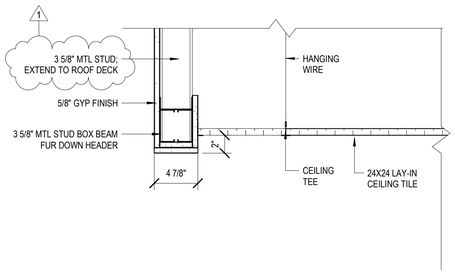
1	ADDENDUM NO. 1	Date 1

A001
ARCHITECTURAL SITE PLAN

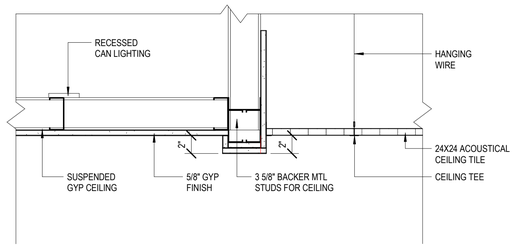


1 REFLECTED CEILING PLAN
1/8" = 1'-0"

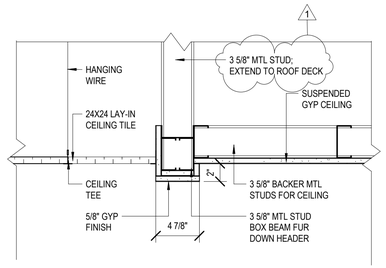
NORTH



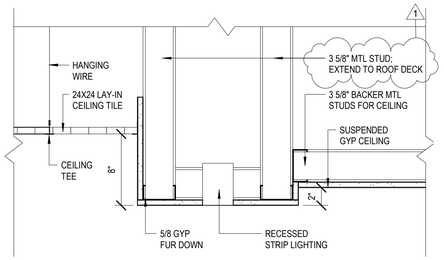
2 CEILING DETAIL - 1
1 1/2" = 1'-0"



3 CEILING DETAIL - 2
1 1/2" = 1'-0"



4 CEILING DETAIL - 3
1 1/2" = 1'-0"



5 CEILING DETAIL - 4
1 1/2" = 1'-0"

RCP GENERAL NOTES

A. REFER TO FP. DWGS. FOR ALL AUTOMATIC FIRE SUPPRESSION SYS. REQ. G.C. TO COORD. SPRINKLER SYS. W/ WORK OF ALL OTHER TRADES.

B. CONFIRM LIGHTING LAYOUT W/ ARCH. PRIOR TO INSTALLATION.

C. REFER TO MECH. & ELEC. DWGS. FOR WALL MTD. GRILLES & DIFFUSERS & ALL OTHER ADDITIONAL FIXTURES, DEVICES & ITEMS NOT SHOWN.

D. INSTALL ALL CEILING FIXTURES AS DIMENSIONED ON RCPs. IN ROOMS/SPACES W/ ONLY ONE FIXTURE, CENTER EA. WAY.

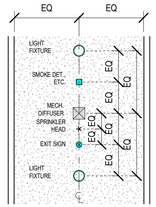
E. FOR TYP. CONDITIONS, FOLLOW INSTALLATION PARAMETERS AS SHOWN BELOW.

F. FOR ALL ATYPICAL CONDITIONS, & FOR ALL CONDITIONS WHERE CEILING COMPONENETS CANNOT BE INSTALLED AS SHOWN ON RCPs, COORDINATE EXACT LOCATIONS W/ ARCHITECT IN FIELD.

G. LIGHT FIXTURES, MECH. DIFFUSERS & GRILLES, & ALL OTHER DEVICES SHOWN ON REFLECTED CEILING PLANS (RCPs) ARE FOR COORD. PURPOSES ONLY. REFER TO MECH., ELEC., & PLUMBING/FIRE PROTECTION DWGS. FOR ALL PRICING TAKE-OFFS. COORD. W/ OWNER/ARCHITECT IN FIELD.

H. LOCATE ACCESS PANELS AS INDICATED ON DWGS. FOR ACCESS PANELS NOT SHOWN BUT REQ'D. BY PROVISIONS OF THE CONTRACT DOCUMENTS, LOCATE IN ACCORDANCE W/ APPLICABLE CODES. SUBMIT PROPOSED LOCATIONS TO THE ARCHITECT FOR REVIEW & ACCEPTANCE PRIOR TO INSTALLATION. ALL CEILING ACCESS PANELS ARE TO BE PROVIDED & INSTALLED TO MAINTAIN ALL REQ'D. FIRE RATINGS.

J. CONTRACTOR IS TO SUBMIT PROPOSED LOCATIONS TO THE ARCHITECT FOR REVIEW & ACCEPTANCE PRIOR TO INSTALLATION FOR ANY & ALL CEILING MTD. FIXTURES OR DEVICES NOT SHOWN BUT REQ'D. BY PROVISIONS OF THE CONTRACT DOCUMENTS.



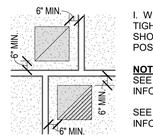
K. IN ALL CORRIDORS:

[a] ALIGN ALL RECESSED CAN LIGHT FIXTURES W/ ℄ OF CORRIDOR & DIM. AS SHOWN ON RCP.

[b] WHERE DIFFUSERS & GRILLES OCCUR, ALIGN W/ ℄ OF CORRIDOR & CENTER BETWEEN LIGHT FIXTURES.

[c] WHERE ALL OTHER ELEC. DEVICES OCCUR IN CEILINGS, CENTER BETWEEN ADJACENT LIGHT FIXTURES, DIFFUSERS, GRILLES, ETC. WHERE POSSIBLE.

[d] WHERE SPRINKLER HEADS OCCUR, ALIGN W/ ℄ OF CORRIDOR & SPACE AS NECESSARY TO ACHIEVE REQUIRED COVERAGE.

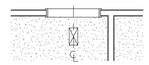


I. WHERE DIFFUSERS & GRILLES OCCUR TIGHT TO ROOM CORNERS, DIM. AS SHOWN IN ALL CONDITIONS WHERE POSSIBLE.

NOTE:
SEE ELEC. DWGS. FOR LIGHT FIXTURE INFORMATION.

SEE MECH. DWGS. FOR HVAC INFORMATION.

REFER TO EXT. ELEVATIONS FOR ADDITIONAL LIGHTING & MECH. REQ.



M. WHERE DIFFUSERS & GRILLES OCCUR AT DOORWAYS, ALIGN AT CENTERLINE OF DOORWAY AS SHOWN. POSITION IN OTHER DIRECTION AS DIM. ON RCP. COORD. W/ ARCHITECT IN FIELD U.N.O.

RCP LEGEND

CEILING TYPE LEGEND:

- ACOUS. PANEL CLNG ASY. - SUSP. FROM STRUCT.
- GYP. BD. CLG. OR SOFFIT ASY. - RIGIDLY ATTACHED TO STRUCT.
- EXPOSED STRUCTURE , NO CEILING

CEILING SYMBOL LEGEND:

- RECESSED FIXTURE
- SURFACE MTD. FIXTURE
- 2X2 RECESSED FIXTURE
- 2X4 RECESSED FIXTURE
- SURFACE MTD. FIXTURE
- STRIP LIGHT FIXTURE
- PENDANT FIXTURE
- PENDANT DOWNLIGHT FIXTURE
- WALL MTD. FIXTURE
- RECESSED LINEAR SLOTLIGHT
- EXIT SIGN
- HVAC SUPPLY REGISTER
- HVAC RETURN REGISTER
- HVAC EXHAUST REGISTER
- CEILING FAN

WBA ARCHITECTURE

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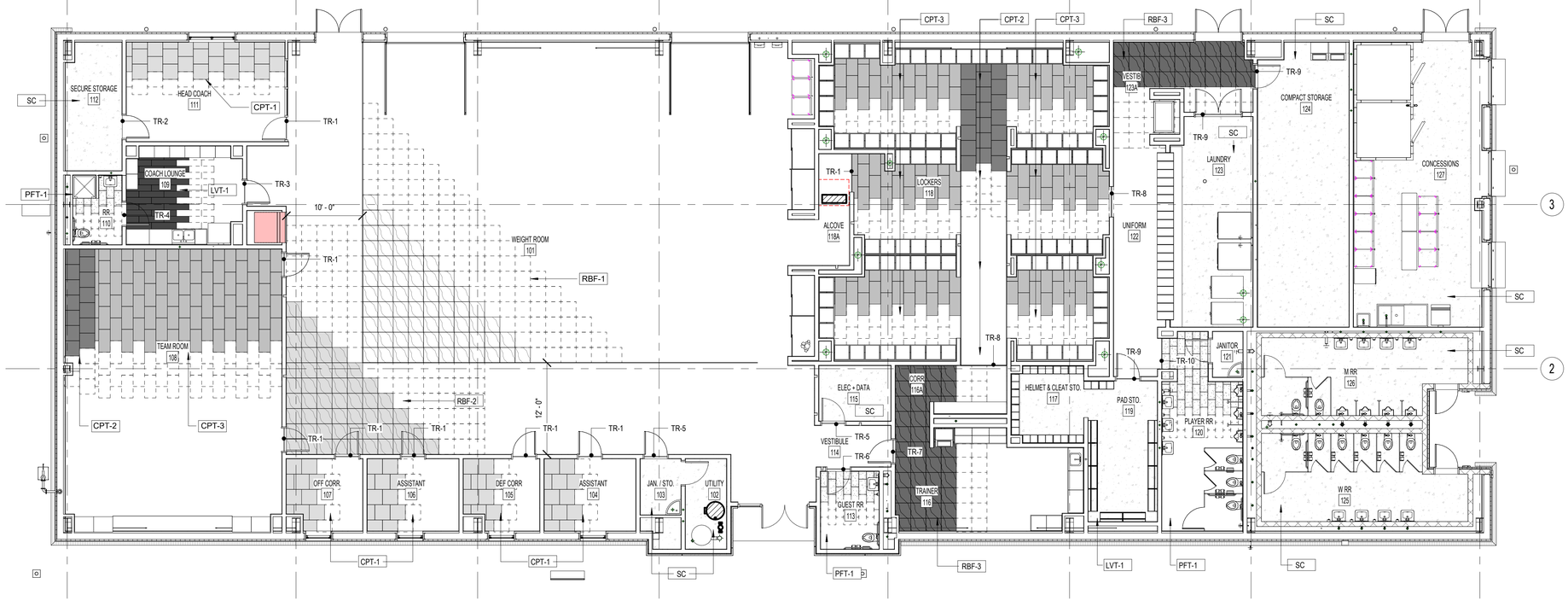
A103
REFLECTED CEILING PLAN



1 FINISH FLOOR PLAN
1/8" = 1'-0"

NORTH

0' 4' 8' 16' 32'

FINISH KEY

- SC
- CPT-1 ASHLAR
- CPT-2 ASHLAR
- CPT-3 ASHLAR
- LVT-1 ASHLAR
- PFT-1
- RBF-1 SQUARE LAY
- RBF-2 SQUARE LAY
- RBF-3 SQUARE LAY

FINISH LEGEND

CATEGORY	FINISH CODE	TYPE	MANUF.	NAME	COLOR	SIZE	INSTALLATION METHOD	MATERIAL PRICING	COMMENTS
CEILING FINISH	ACT-1	ACOUS. CLG. - GENERIC	ARMSTRONG	ULTIMA BEVELED TEGULAR 9/16	WHITE/FINE	24" X 24"			
CEILING FINISH	EXP	EXPOSED CEILING STRUCTURE, PTD.	TBD			TBD			
CEILING FINISH	GYP	GYPSUM WALLBOARD CEILING, PAINTED	TBD			TBD			
COUNTERTOP	PLAM-1	COUNTERTOP, PLASTIC LAMINATE - COLOR 1	WILSONART	STANDARD LAMINATE	CRISP LINEN 4942-38	TBD			
COUNTERTOP	SST-1	COUNTERTOP, STAINLESS STEEL	TBD			TBD			
FLOOR FINISH	CPT-1	CARPET - STYLE 1	J+J FLOORING	KINETEX - NETWORK	FIREWALL 2852	24" X 24"	ASHLAR	$3.00/SF	
FLOOR FINISH	CPT-2	CARPET - STYLE 2	J+J FLOORING	KINETEX - NETWORK	FABRIC 2917	24" X 24"	ASHLAR	$3.00/SF	
FLOOR FINISH	CPT-3	CARPET - STYLE 3	J+J FLOORING	KINETEX - Z FACTOR	STATISTIC 2861	18" X 36"	ASHLAR	$3.00/SF	
FLOOR FINISH	LVT-1	LUXURY VINYL TILE	INTERFACE	DRAWN LINES	A00908 SILVER	9.845" X 39.38"	ASHLAR	$3.00/SF	
FLOOR FINISH	PFT-1	PORCELAIN FLOOR TILE - FIELD TILE	DALTILE	VOLUME 1.0 COVE BASE	STEREO GREY VL73	12" X 24" X 5/16"	VERTICAL RUNNING BOND. 33% OFFSET	$2.90/SF	GROUT: LATICRETE 60 DUSTY GREY
FLOOR FINISH	RBF-1	RUBBER FLOORING, STYLE 1	TARKETT	TRIUMPH	MICROTONE RAINSTORM	24" X 24" 9.53MM THICK	SQUARE LAY	$11.50/SF	
FLOOR FINISH	RBF-2	RUBBER FLOORING, STYLE 2	TARKETT	TRIUMPH	MICROTONE MARINO	24" X 24" 9.53MM THICK	SQUARE LAY	$11.50/SF	
FLOOR FINISH	RBF-3	RUBBER FLOORING, STYLE 3	TARKETT	INERTIA	MICROTONE RAINSTORM	24" X 24" 6.35MM THICK	SQUARE LAY	$8.25/SF	
FLOOR FINISH	SC	SEALED CONCRETE	TBD			TBD			
FLOOR TRANSITION	TR-1	RBF-1 OR RBF-2 TO CPT	-	RESILIENT TRANSITION	TBD	TBD			
FLOOR TRANSITION	TR-2	CPT TO SC	-	RESILIENT REDUCER	TBD	TBD			
FLOOR TRANSITION	TR-3	RBF-2 TO LVT-1	-	RESILIENT TRANSITION	TBD	TBD			
FLOOR TRANSITION	TR-4	LVT-1 TO PFT-1	SCHLUTER SYSTEMS	STAINLESS STEEL	TBD	TBD			
FLOOR TRANSITION	TR-5	RBF-2 TO SC	-	RESILIENT REDUCER	TBD	TBD			
FLOOR TRANSITION	TR-6	RBF-2 TO PFT-1	SCHLUTER SYSTEMS	STAINLESS STEEL	TBD	TBD			
FLOOR TRANSITION	TR-7	RBF-2 TO RBF-3	-	RESILIENT TRANSITION	TBD	TBD			
FLOOR TRANSITION	TR-8	RBF-3 TO CPT	-	RESILIENT TRANSITION	TBD	TBD			
FLOOR TRANSITION	TR-9	RBF-3 TO SC	-	RESILIENT REDUCER	TBD	TBD			
FLOOR TRANSITION	TR-10	RBF-3 TO PFT-1	SCHLUTER SYSTEMS	STAINLESS STEEL	TBD	TBD			
MILLWORK	PLAM-1	MILLWORK, PLASTIC LAMINATE - COLOR 1	FORMICA	NATURAL GRAIN	BEIGE ELM	TBD			
MILLWORK	PLAM-2	MILLWORK, PLASTIC LAMINATE - COLOR 2	WILSONART	STANDARD LAMINATE	DOVE GREY D92-60	TBD			
MILLWORK	WD-1	MILLWORK, WHITE OAK, STAINED	-	-	-	TBD			
WALL BASE	PWB-1	PORCELAIN WALL BASE, STYLE 1	DALTILE	VOLUME 1.0 COVE BASE	STEREO GREY VL73	6" X 12"		$7.22/PIECE	
WALL BASE	RB-1	RUBBER BASE, COLOR 1	JOHNSONITE	THERMOPLASTIC (DURACOVE) SERIES	DOCKSIDE WG 199	4"		$1.25/ LINEAR FT	
WALL BASE	WB-1	WOOD BASE, PAINTED COLOR 1 (WHITE)	TBD			TBD			
WALL FINISH	CWT-1	CERAMIC WALL TILE - STYLE 1	ANATOLIA	SOHO	CEMENT CHIC, GLOSSY	3" X 6"	HORIZTONAL STACK BOND	$2.42/SF	GROUT: LATICRETE 60 DUSTY GREY

FINISH LEGEND

CATEGORY	FINISH CODE	TYPE	MANUF.	NAME	COLOR	SIZE	INSTALLATION METHOD	MATERIAL PRICING	COMMENTS
WALL FINISH	CWT-2	CERAMIC WALL TILE - STYLE 2	DALTILE	COLOR WHEEL COLLECTION-CLASSIC	GALAXY 1469	3" X 6"	HORIZTONAL STACK BOND	$4.03/SF	GROUT: LATICRETE 60 DUSTY GREY
WALL FINISH	FRP	FIBER REINFORCED PANELING	TBD		TO BE SELECTED FROM MANUFACTURERS FULL RANGE	TBD			
WALL FINISH	P-1	WALL PAINT - MAIN WALL COLOR	SHERWIN WILLIAMS		SW 7004 SNOWBOUND	TBD			
WALL FINISH	P-2	WALL PAINT - ACCENT COLOR	SHERWIN WILLIAMS		SW 7658 GRAY CLOUDS	TBD			
WALL FINISH	P-3	WALL PAINT - ACCENT COLOR	SHERWIN WILLIAMS		SW 9177 SALTY DOG	TBD			
WALL FINISH	PWT-1	PORCELAIN WALL TILE	DALTILE	VOLUME 1.0	SONIC WHITE VL75	12" X 24"	VERTICAL RUNNING BOND. 33% OFFSET	$2.90/SF	GROUT: LATICRETE 60 DUSTY GREY
WALL FINISH	WG-1	WALL GRAPHIC - STYLE 1	TBD			TBD			
WALL FINISH	WG-2	WALL GRAPHIC - STYLE 2	TBD			TBD			
WALL FINISH	WG-3	WALL GRAPHIC - STYLE 3	TBD			TBD			
WALL FINISH	WG-4	WALL GRAPHIC - STYLE 4	TBD			TBD			
WALL FINISH	WG-5	WALL GRAPHIC - STYLE 5	TBD			TBD			

FINISH SCHEDULE

ROOM #	ROOM NAME	FLOOR FIN.	BASE	Wall Finish Up	Wall Finish Down	Wall Finish Left	Wall Finish Right	CEILING FIN.	MILLWORK	COUNTER TOP	COMMENTS
101	WEIGHT ROOM	RBF-1, RBF-2	RB-1	P-2	P-2,P-3, WG-1	P-2, P-3	P-2, WG-2	EXP., ACT-1, GYP	WD-1		
102	UTILITY	SC	RB-1	P-1	P-1	P-1	P-1	ACT-1			
103	JAN. / STO.	SC	RB-1	P-1	P-1	P-1	P-1	ACT-1			
104	ASSISTANT	CPT-1	RB-1	P-1	P-1	P-1	P-1	ACT-1	DESK, PLAM-1		
105	DEF CORR	CPT-1	RB-1	P-1	P-1	P-1	P-1	ACT-1			
106	ASSISTANT	CPT-1	RB-1	P-1	P-1	P-1	P-1	ACT-1	DESK, PLAM-1		
107	OFF CORR.	CPT-1	RB-1	P-1	P-1	P-1	P-1	ACT-1			
108	TEAM ROOM	CPT-2/CPT-3	RB-1	WG-3	P-2, P-3	P-1	P-1	ACT-1, GYP	WD-1		EXPOSED STRUCTURE PTD. P-3
109	COACH LOUNGE	LVT-1	RB-1	P-3	P-3, CWT-1	P-1	P-1	ACT-1	PLAM-2	PLAM-1	
110	RR	PFT-1	PWB-1	PWT-1, P-1	PWT-1	PWT-1	P-1	GYP			
111	HEAD COACH	CPT-1	RB-1	P-1	P-1	P-1	P-1	ACT-1			
112	SECURE STORAGE	SC	RB-1	P-1	P-1	P-1	P-1	EXP			
113	GUEST RR	PFT-1	PWB-1	P-1	PWT-1	PWT-1	PWT-1	ACT-1			
114	VESTIBULE	RBF-3	RB-1	P-2	P-2	P-2	P-2	ACT-1			
115	ELEC + DATA	SC	RB-1	P-1	P-1	P-1	P-1	ACT-1			
116	TRAINER	RBF-3	RB-1	P-1	WG-4	P-1	P-1, CWT-2	ACT-1	PLAM-1, PLAM-2	PLAM-1	
116A	CORR	RBF-3	RB-1	P-1	P-1	P-1	P-1	ACT-1	PLAM-1		
117	HELMET & CLEAT STO.	SC	RB-1	P-1	P-1	P-1	P-1	ACT-1			
118	LOCKERS	CPT-2/CPT-3	RB-1	P-1,P-3	P-1, P-3	P-1, WG-5	P-1, WG-5	ACT-1, GYP			
118A	ALCOVE	RBF-1	RB-1	P-1	P-1	P-1	P-1	GYP			
119	PAD STO.	SC	RB-1	P-1	P-1	P-1	P-1	ACT-1			
120	PLAYER RR	PFT-1	PWB-1	PWT-1, P-2	PWT-1	PWT-1, CWT-2	PWT-1	ACT-1			
121	JANITOR	SC	RB-1	P-1	P-1	P-1	P-1	ACT-1			
122	UNIFORM	RBF-3	RB-1	P-2	P-2	P-2	P-2, P-3	ACT-1, GYP			
123	LAUNDRY	SC	RB-1	P-2	P-2	P-2	P-2	ACT-1			
123A	VESTIB	RBF-3	RB-1	P-2	P-2	P-2	P-2	ACT-1			
124	COMPACT STORAGE	SC	RB-1	P-1	P-1	P-1	P-1	ACT-1			
125	W RR	SC	RB-1	EPOXY PTD. CMU, P-2	EPOXY PTD. CMU, P-2	EPOXY PTD. CMU, P-2	EPOXY PTD. CMU, P-2	ACT-1			
126	M RR	SC	RB-1	EPOXY PTD. CMU, P-2	EPOXY PTD. CMU, P-2	EPOXY PTD. CMU, P-2	EPOXY PTD. CMU, P-2	ACT-1			
127	CONCESSIONS	SC	RB-1	FRP	FRP	FRP	FRP	ACT-1			

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

WED 25 SEP 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	Date 1

A106
FINISH FLOOR PLAN, SCHEDULE, AND LEGEND

GENERAL ASSEMBLY NOTES:
1. SEE SPECIFICATIONS FOR MORE DETAILED REQUIREMENTS OF EA. ASSEMBLY ITEM, TYP.
2. COORD. FRAMING W/ STRUCT. DWGS.
3. COORD. SHEATHING W/ STRUCT. DWGS. TAPE ALL JOINTS & SEAL ALL PENETRATIONS.
4. COORD. MASONRY REINFORCING W/ STRUCT. DWGS.
5. SEE FINISH SCHED. FOR INTERIOR FINISH MATERIALS

ROOF ASSEMBLIES:

TYP. INSUL. METAL ROOF PANEL ASSEMBLY:
- CFR INSULATED METAL ROOF PANEL SYSTEM
- PURLIN (BY PEMD MANUF.)

WALLS ASSEMBLIES:

TYP. MASONRY VENEER ON PRE-ENGINEERED METAL BUILDING WALL ASSEMBLY
- MASONRY VENEER ANCHORED TO INSUL. METAL PANEL w/TIES @24" O.C. HORIZ. MAX. AND 16" O.C. VERT. MAX.
- AIR SPACE
- INSULATED METAL PANEL BACKUP WALL SYSTEM
- METAL BUILDING GIRTS
- 2.5" COLD FORMED METAL FRAMING (1)
- 5/8" GYPSUM BOARD
- OTHER INTERIOR FINISHES AS NOTED IN SCHEDULE

TYP. MASONRY VENEER ON CMU WALL ASSEMBLY
- MASONRY VENEER ANCHORED TO INSUL. METAL PANEL w/TIES @24" O.C. HORIZ. MAX. AND 16" O.C. VERT. MAX.
- AIR SPACE
- INSULATED METAL PANEL BACKUP WALL SYSTEM
- 7/8" METAL FURRING CHANNEL
- CMU MASONRY WALL w/HORIZ. REINFORCEMENT 16" O.C. VERT. MAX.
- PAINTED CMU INTERIOR AS PER SCHEDULE

TYP. INSUL. METAL PANEL ON PRE-ENGINEERED METAL BUILDING ASSEMBLY
- CF ARCHITECTURAL VERTICAL INSUL. METAL WALL PANEL
- METAL GIRTS - PROVIDED BY METAL BLDG. MANUF.
- 2.5" COLD FORMED METAL FRAMING (1)
- 5/8" GYPSUM BOARD
- OTHER INTERIOR FINISHES AS NOTED IN SCHEDULE

TYP. INSUL. METAL PANEL PARAPET ASSEMBLY
- CF ARCHITECTURAL VERTICAL INSUL. METAL WALL PANEL
- METAL GIRTS - PROVIDED BY METAL BLDG. MANUF.
- CONT. 1/2" PLYWOOD SHEATHING
- CONT. WEATHER BARRIER
- METAL PARAPET LINER PANEL (1)

TYP. INSUL. METAL PANEL ON CMU WALL ASSEMBLY
- CF ARCHITECTURAL VERTICAL INSUL. METAL WALL PANEL
- METAL FURRING CHANNEL
- CMU MASONRY WALL w/HORIZ. REINFORCEMENT 16" O.C. VERT. MAX.
- PAINTED CMU INTERIOR AS PER SCHEDULE

TYP. ACM PANEL ON CFSF WALL ASSEMBLY
- ACM WALL PANEL
- 2" CONT. GALVANIZED CHANNELS BTWN. RIGID INSUL.
- 2" CONT. RIGID INSULATION
- CONT. PLYWOOD SHEATHING
- WATERPROOFING
- 6" COLD FORMED MTL FRAMING FILLED W/CONT. BATT. INSUL.
- 5/8" GYPSUM BOARD
- OTHER INTERIOR FINISHES AS NOTED IN SCHEDULE

FOUNDATION ASSEMBLIES:

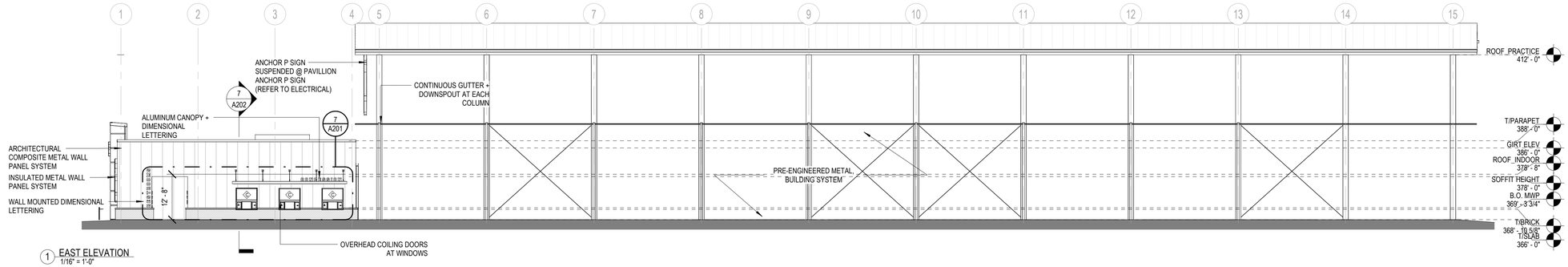
TYP. SLAB-ON-GRADE ASSEMBLY
- CONCRETE FOUNDATION SYSTEM (SEE STRUCT.)
- CONT. UNDER SLAB VAPOR BARRIER
- GRAVEL FILL (SEE STRUCT. & CONFIRM W/ GEO-TECH.)
- COMPACTED SUBGRADE

BASIS OF DESIGN NOTES

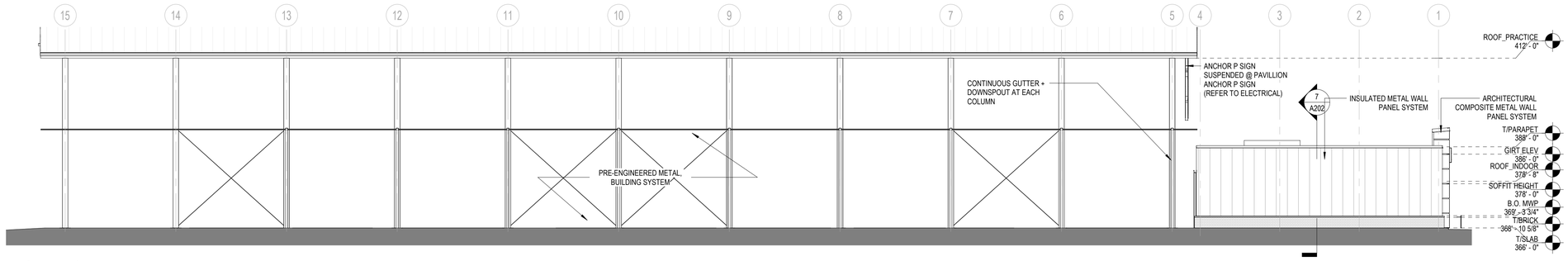
INSULATED METAL WALL PANEL SYSTEM:
CENTRIA VERSAWALL

ARCHITECTURAL COMPOSITE METAL WALL PANEL:
EVO+ ZERO RIVET SYSTEM

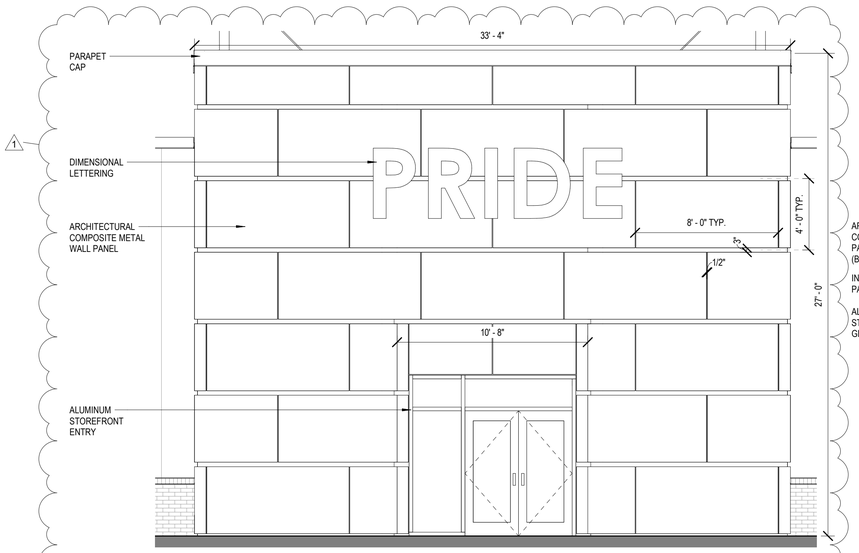
ALUMINUM FRAMED STOREFRONT:
EFCO 403(T)



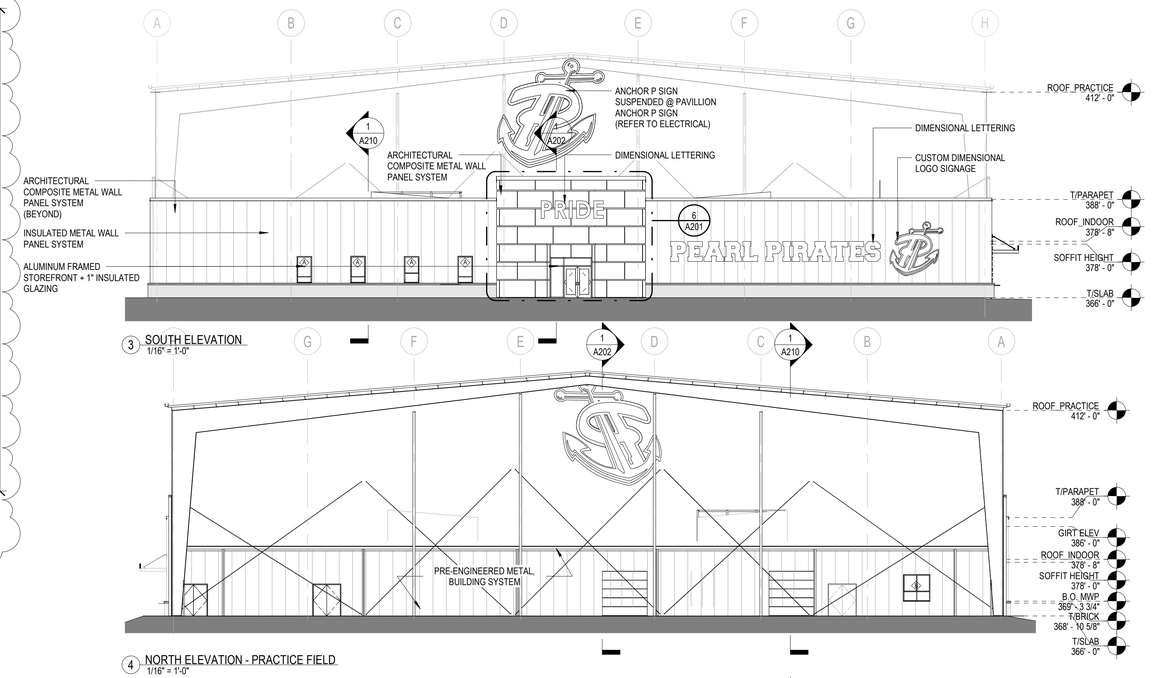
1 EAST ELEVATION
1/16" = 1'-0"



2 WEST ELEVATION
1/16" = 1'-0"

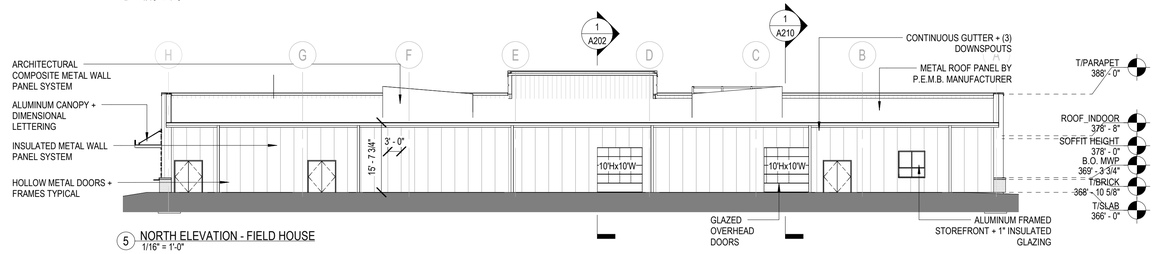


6 ENLARGED ENTRY - ELEVATION
1/4" = 1'-0"

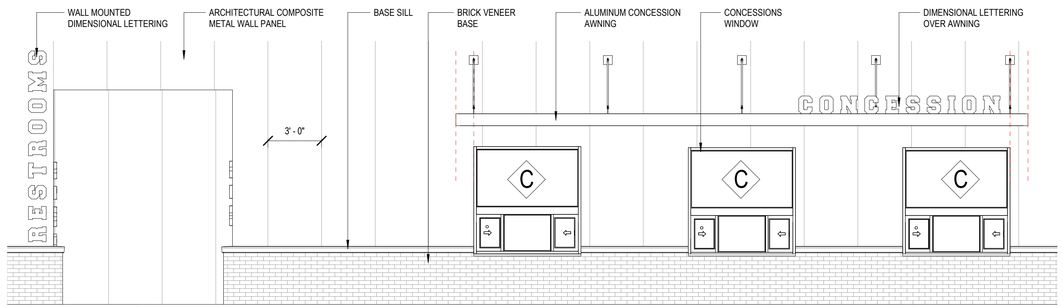


3 SOUTH ELEVATION
1/16" = 1'-0"

4 NORTH ELEVATION - PRACTICE FIELD
1/16" = 1'-0"



5 NORTH ELEVATION - FIELD HOUSE
1/16" = 1'-0"



7 RESTROOMS AND CONCESSION - ELEVATION
1/4" = 1'-0"

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

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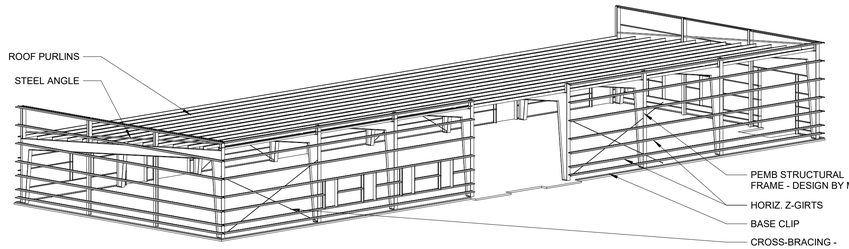
WBA # 5820

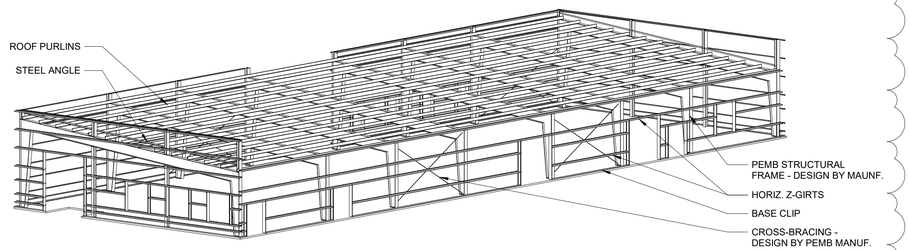
REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	Date 1

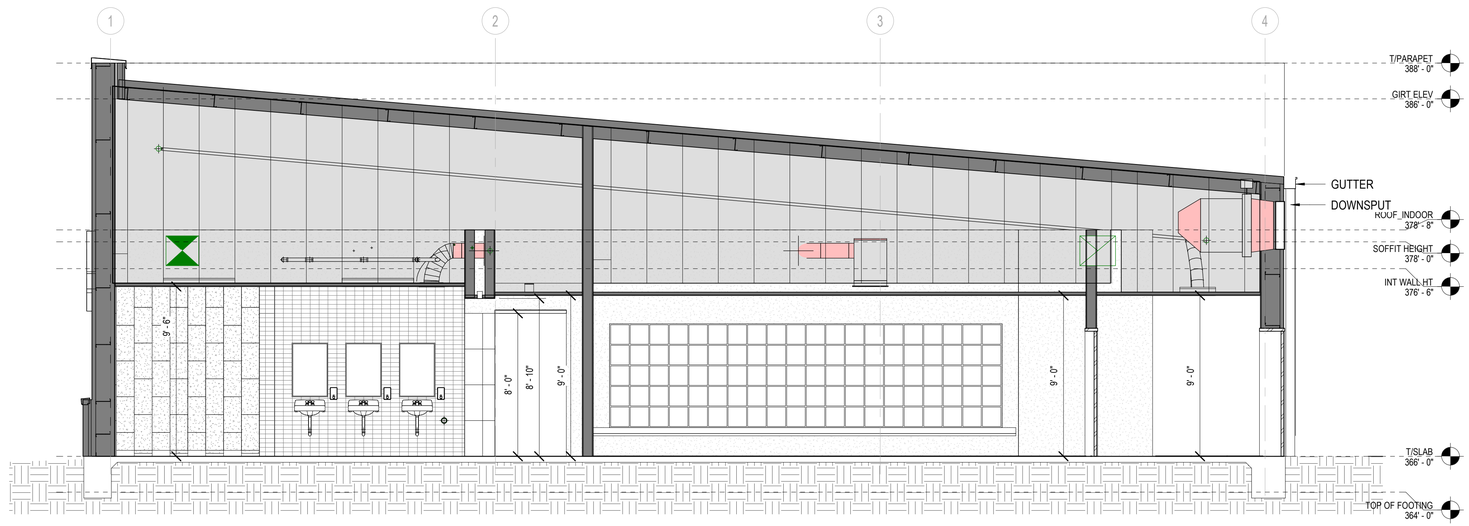
A201
EXTERIOR ELEVATIONS



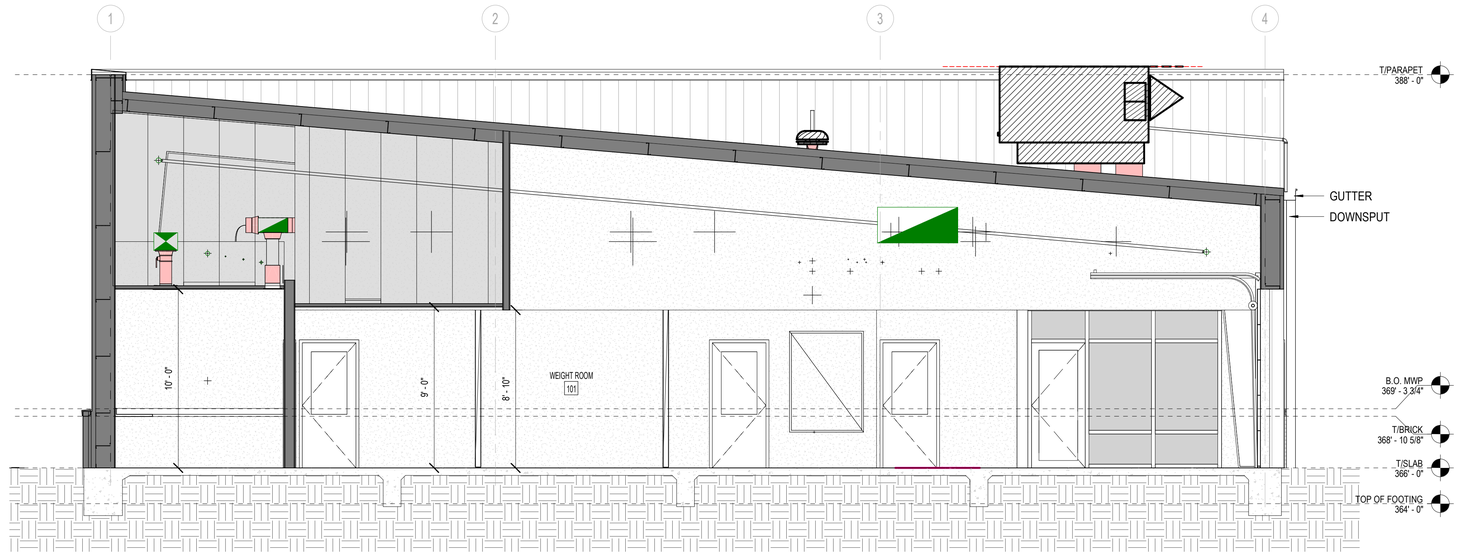
4 PMB NW AXON - SEE SPEC 13.3419



3 PEMB FRAMING AXON - SEE SPEC 13.3419



2 ENLARGED SECTION
1/4" = 1'-0"



1 ENLARGED SECTION
1/4" = 1'-0"

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

REGISTERED ARCHITECT
JAMES RICHMOND WIER, Jr.
4446
STATE OF MISSISSIPPI

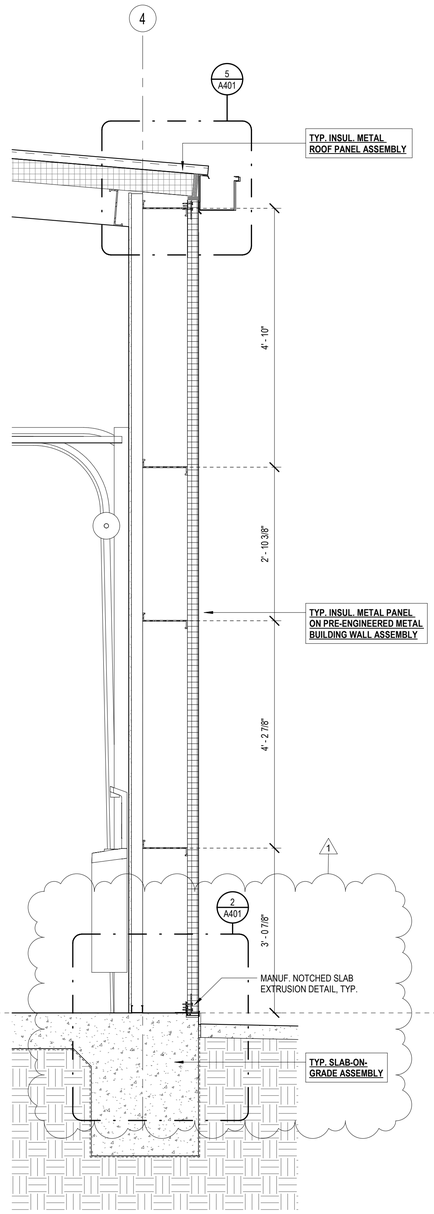
WED 25 SEP 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

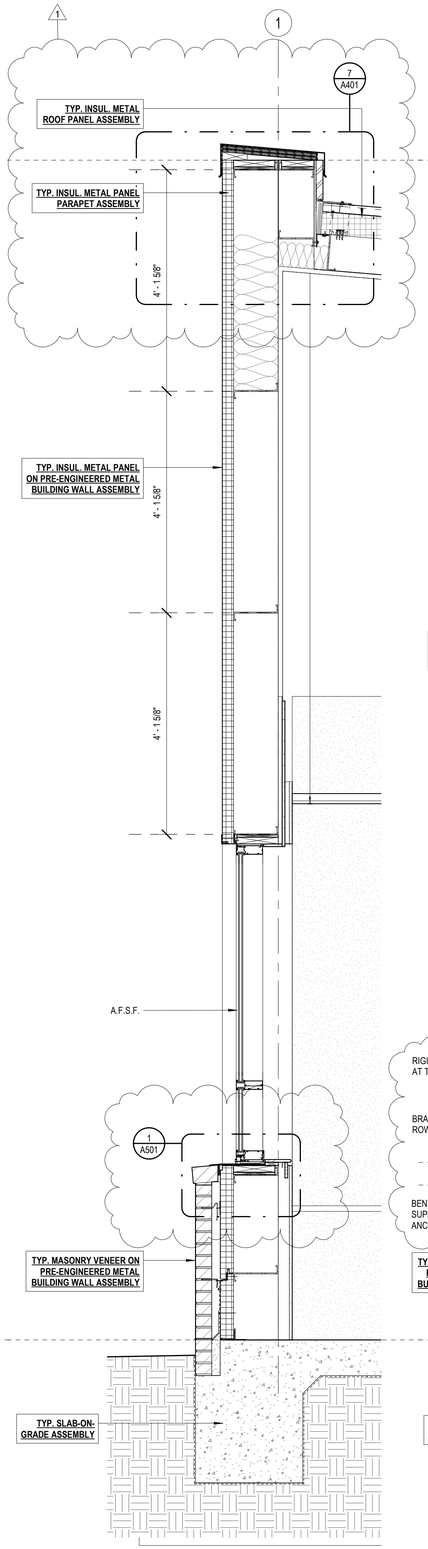
REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	Date 1

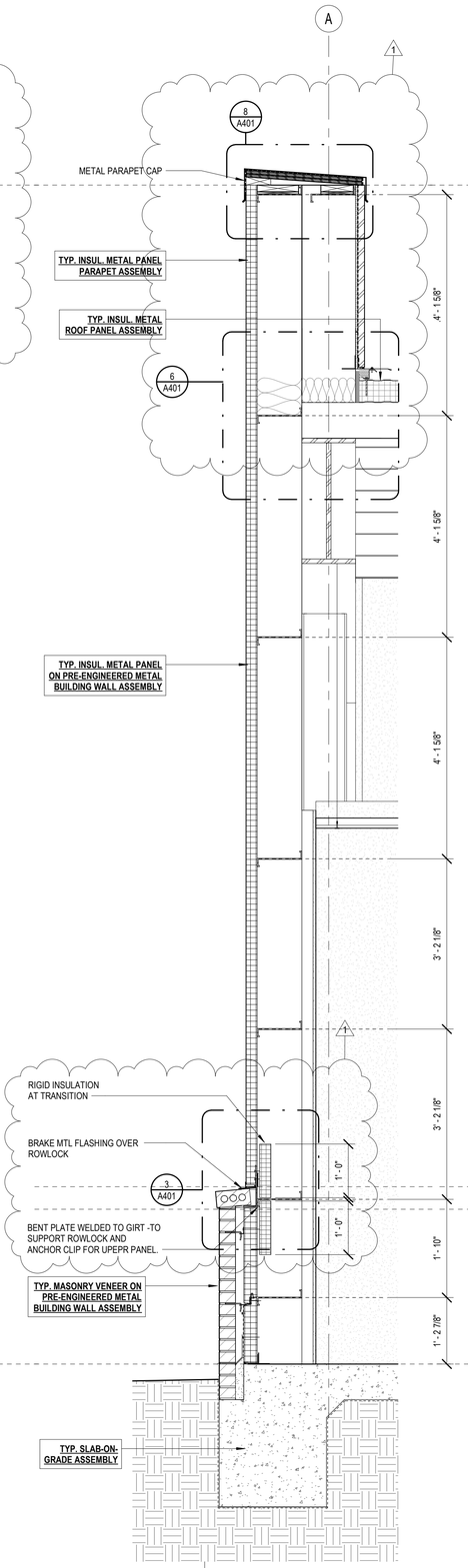
A210
ENLARGED SECTIONS



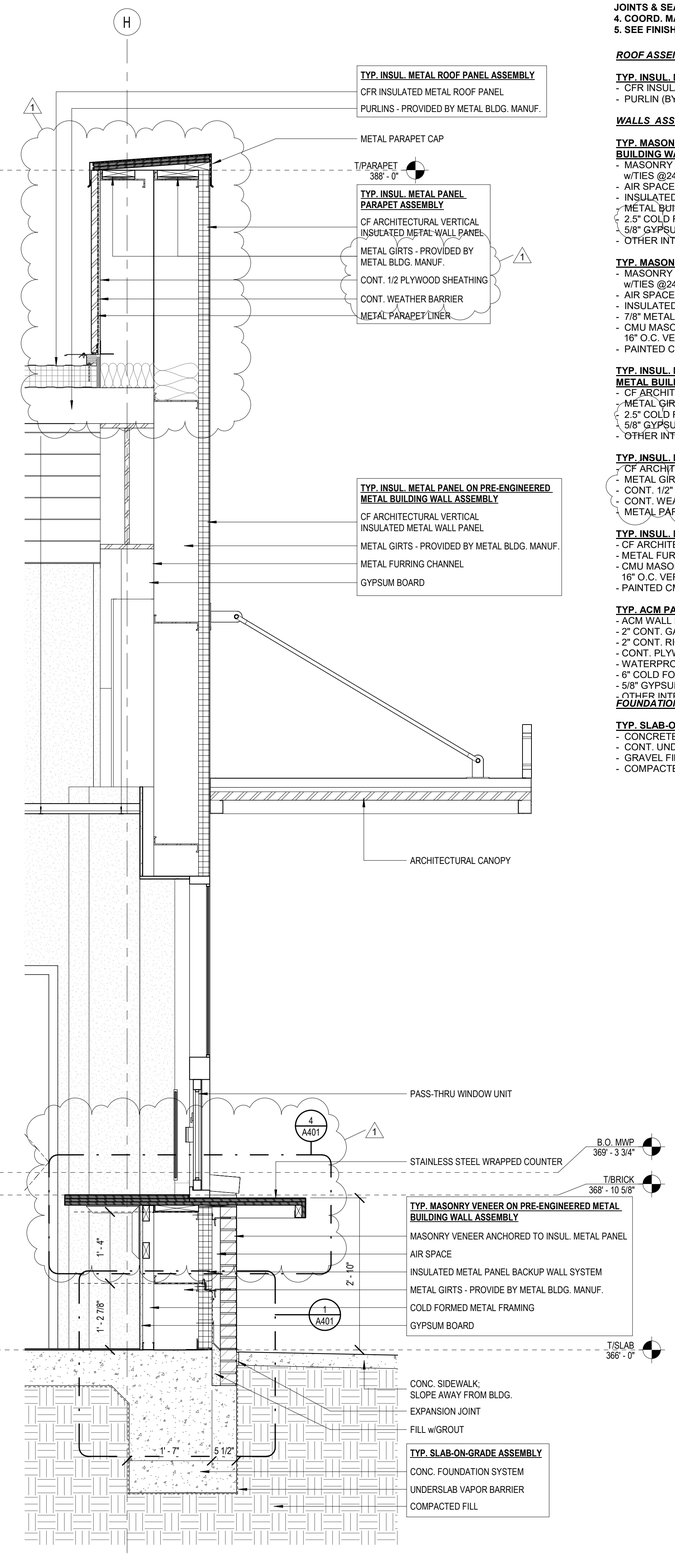
4 EAVE WALL SECTION
3/4" = 1'-0"



3 PARAPET WALL SECTION
3/4" = 1'-0"



2 WALL SECTION
3/4" = 1'-0"



1 WALL SECTION
3/4" = 1'-0"

GENERAL ASSEMBLY NOTES:
1. SEE SPECIFICATIONS FOR MORE DETAILED REQUIREMENTS OF EA. ASSEMBLY ITEM, TYP.
2. COORD. FRAMING W/ STRUCT. DWGS.
3. COORD. SHEATHING W/ STRUCT. DWGS. TAPE ALL JOINTS & SEAL ALL PENETRATIONS.
4. COORD. MASONRY REINFORCING W/ STRUCT. DWGS.
5. SEE FINISH SCHED. FOR INTERIOR FINISH MATERIALS

ROOF ASSEMBLIES:

TYP. INSUL. METAL ROOF PANEL ASSEMBLY:
- CFR INSULATED METAL ROOF PANEL SYSTEM
- PURLIN (BY PEMD MANUF.)

WALLS ASSEMBLIES:

TYP. MASONRY VENEER ON PRE-ENGINEERED METAL BUILDING WALL ASSEMBLY
- MASONRY VENEER ANCHORED TO INSUL. METAL PANEL w/TIES @24" O.C. HORIZ. MAX. AND 16" O.C. VERT. MAX.
- AIR SPACE
- INSULATED METAL PANEL BACKUP WALL SYSTEM
- METAL BUILDING GIRTS
- 2.5" COLD FORMED METAL FRAMING
- 5/8" GYPSUM BOARD
- OTHER INTERIOR FINISHES AS NOTED IN SCHEDULE

TYP. MASONRY VENEER ON CMU WALL ASSEMBLY
- MASONRY VENEER ANCHORED TO INSUL. METAL PANEL w/TIES @24" O.C. HORIZ. MAX. AND 16" O.C. VERT. MAX.
- AIR SPACE
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- 7/8" METAL FURRING CHANNEL
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- CONT. 1/2" PLYWOOD SHEATHING
- CONT. WEATHER BARRIER
- METAL PARAPET LINER PANEL

TYP. INSUL. METAL PANEL ON CMU WALL ASSEMBLY
- CF ARCHITECTURAL VERTICAL INSUL. METAL WALL PANEL
- METAL FURRING CHANNEL
- CMU MASONRY WALL w/HORIZ. REINFORCEMENT 16" O.C. VERT. MAX.
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TYP. ACM PANEL ON CFSF WALL ASSEMBLY
- ACM WALL PANEL
- 2" CONT. GALVANIZED CHANNELS BTWN. RIGID INSUL.
- 2" CONT. RIGID INSULATION
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- WATERPROOFING
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FOUNDATION ASSEMBLIES:

TYP. SLAB-ON-GRADE ASSEMBLY
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- CONT. UNDER SLAB VAPOR BARRIER
- GRAVEL FILL (SEE STRUCT. & CONFIRM W/ GEO-TECH.)
- COMPACTED SUBGRADE

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

REGISTERED ARCHITECT
JAMES RICHMOND WIER, Jr.
4446
STATE OF MISSISSIPPI

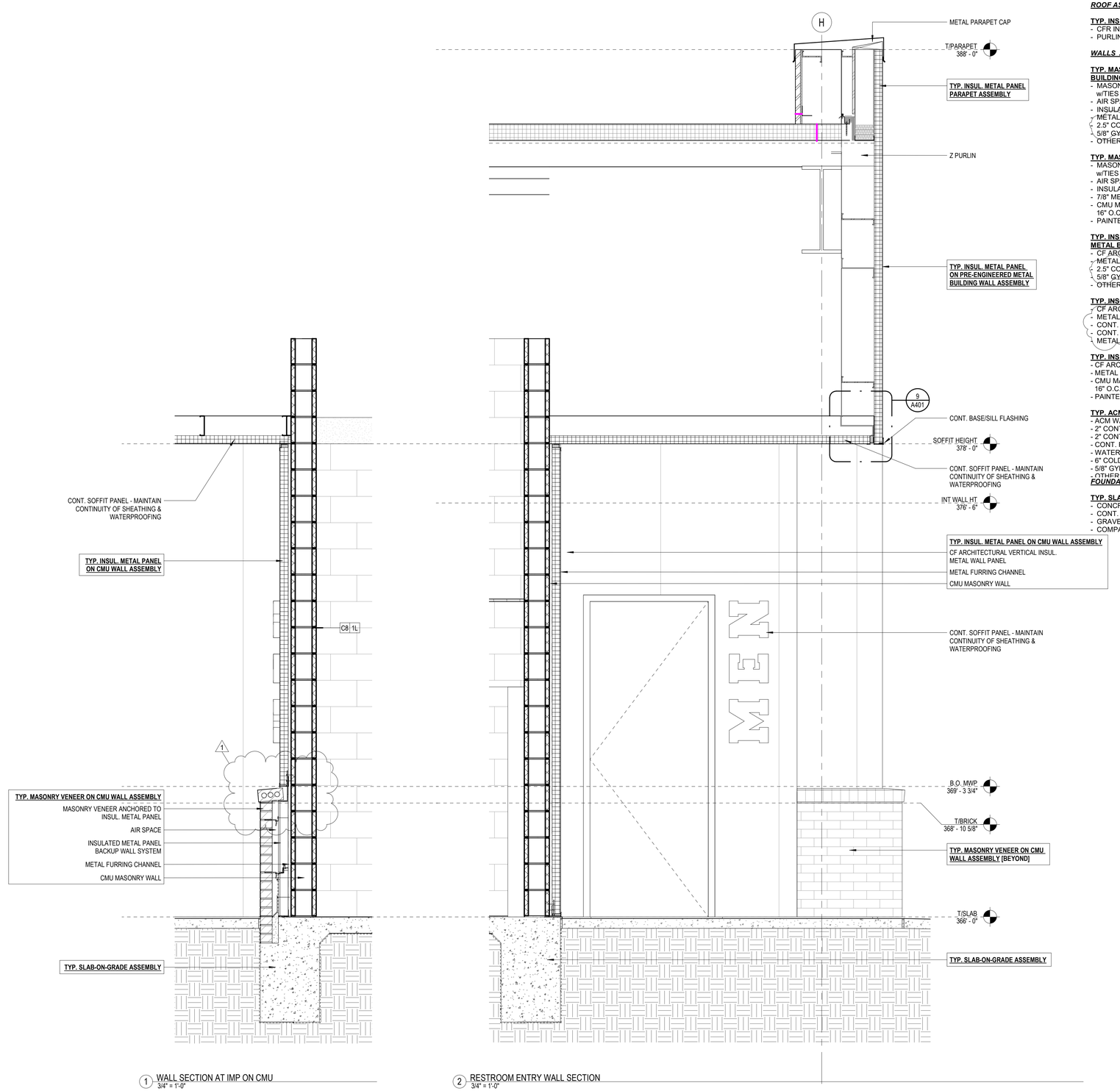
WED 25 SEP 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	Date 1

A301
WALL SECTIONS



1 WALL SECTION AT IMP ON CMU
3/4" = 1'-0"

2 RESTROOM ENTRY WALL SECTION
3/4" = 1'-0"

GENERAL ASSEMBLY NOTES:
1. SEE SPECIFICATIONS FOR MORE DETAILED REQUIREMENTS OF EA. ASSEMBLY ITEM, TYP.
2. COORD. FRAMING W/ STRUCT. DWGS.
3. COORD. SHEATHING W/ STRUCT. DWGS. TAPE ALL JOINTS & SEAL ALL PENETRATIONS.
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ROOF ASSEMBLIES:

TYP. INSUL. METAL ROOF PANEL ASSEMBLY:
- CFR INSULATED METAL ROOF PANEL SYSTEM
- PURLIN (BY PEMD MANUF.)

WALLS ASSEMBLIES:

TYP. MASONRY VENEER ON PRE-ENGINEERED METAL BUILDING WALL ASSEMBLY
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TYP. INSUL. METAL PANEL PARAPET ASSEMBLY
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- METAL GIRTS - PROVIDED BY METAL BLDG. MANUF.
- CONT. 1/2" PLYWOOD SHEATHING
- CONT. WEATHER BARRIER
- METAL PARAPET LINER PANEL

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- CF ARCHITECTURAL VERTICAL INSUL. METAL WALL PANEL
- METAL FURRING CHANNEL
- CMU MASONRY WALL w/HORIZ. REINFORCEMENT 16" O.C. VERT. MAX.
- PAINTED CMU INTERIOR AS PER SCHEDULE

TYP. ACM PANEL ON CFSF WALL ASSEMBLY
- ACM WALL PANEL
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- 2" CONT. RIGID INSULATION
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- WATERPROOFING
- 6" COLD FORMED MTL FRAMING FILLED W/CONT. BATT. INSUL.
- 5/8" GYPSUM BOARD
- OTHER INTERIOR FINISHES AS NOTED IN SCHEDULE

FOUNDATION ASSEMBLIES:

TYP. SLAB-ON-GRADE ASSEMBLY
- CONCRETE FOUNDATION SYSTEM (SEE STRUCT.)
- CONT. UNDER SLAB VAPOR BARRIER
- GRAVEL FILL (SEE STRUCT. & CONFIRM W/ GEO-TECH.)
- COMPACTED SUBGRADE

WBA ARCHITECTURE

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REGISTERED ARCHITECT
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4446
STATE OF MISSISSIPPI

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REVISIONS

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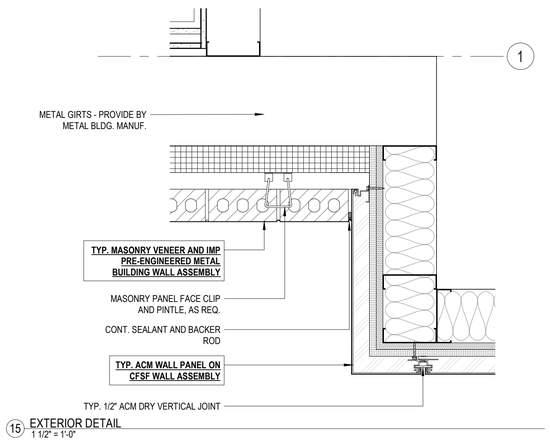
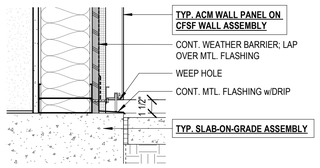
1	ADDENDUM NO. 1	Date 1

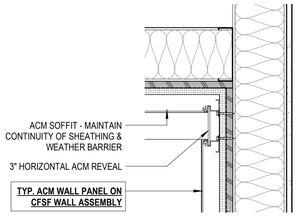
A303
WALL SECTIONS



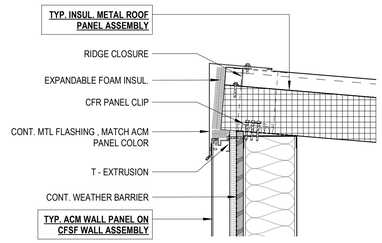
15 EXTERIOR DETAIL
1 1/2" = 1'-0"



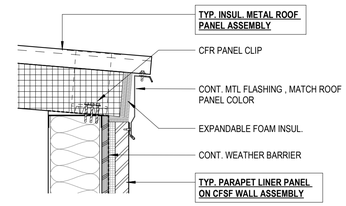
14 ACM BASE DETAIL
1 1/2" = 1'-0"



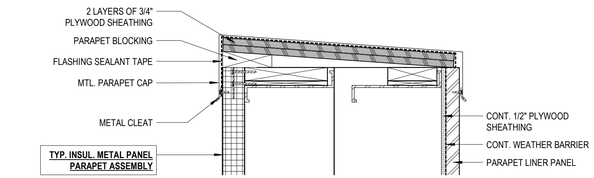
10 ACM SOFFIT EDGE DETAIL
1 1/2" = 1'-0"



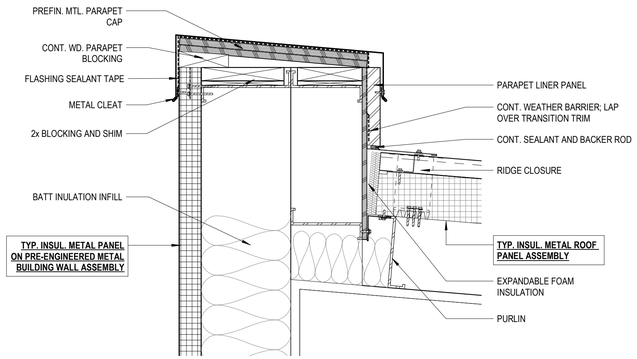
13 ACM HIGH EAVE DETAIL
1 1/2" = 1'-0"



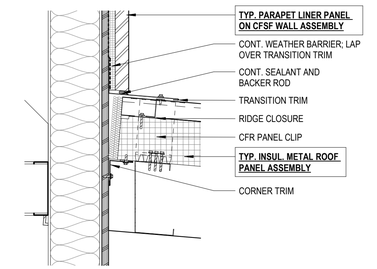
12 ACM LOW EAVE DETAIL
1 1/2" = 1'-0"



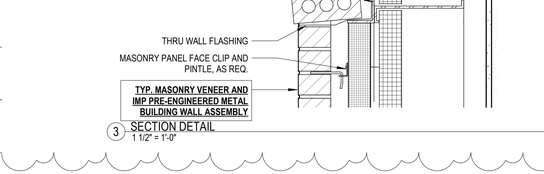
8 SECTION DETAIL
1 1/2" = 1'-0"



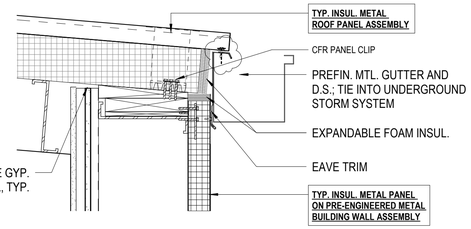
7 SECTION DETAIL
1 1/2" = 1'-0"



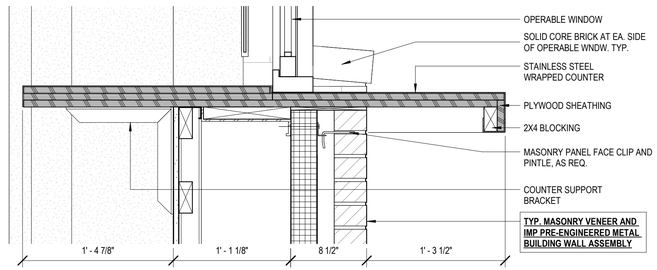
11 ACM PARAPET TRANSITION
1 1/2" = 1'-0"



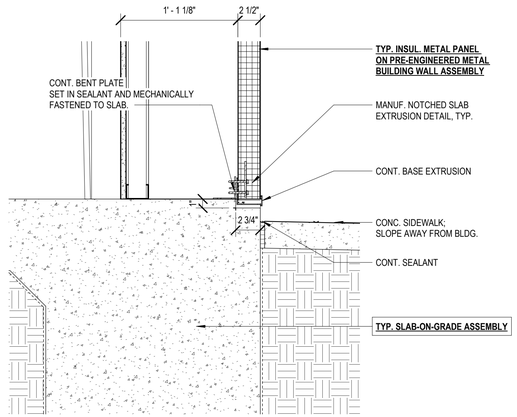
6 SECTION DETAIL
1 1/2" = 1'-0"



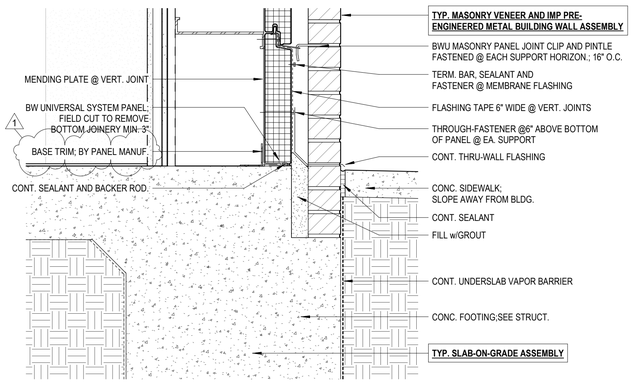
5 SECTION DETAIL
1 1/2" = 1'-0"



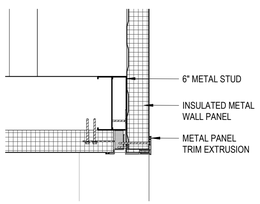
4 SECTION DETAIL
1 1/2" = 1'-0"



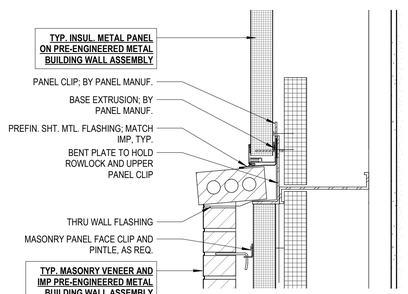
2 SECTION DETAIL
1 1/2" = 1'-0"



1 SECTION DETAIL
1 1/2" = 1'-0"



9 RESTROOM ENTRY SOFFIT DETAIL
1 1/2" = 1'-0"



3 SECTION DETAIL
1 1/2" = 1'-0"

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

REGISTERED ARCHITECT
JAMES RICHMOND WIER, Jr.
4446
STATE OF MISSISSIPPI

WED 25 SEP 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

REVISIONS

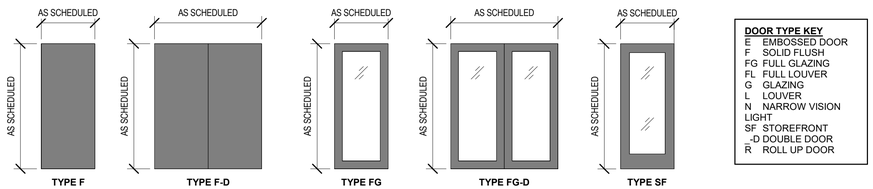
NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	Date 1

A401
EXTERIOR DETAILS

DOOR SCHEDULE

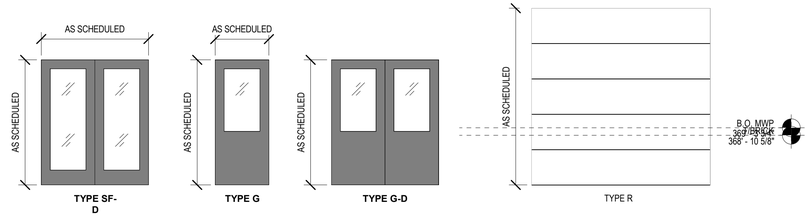
OPENING		OPENING SIZE		DOOR			FRAME						
TAG	ROOM NAME	WIDTH	HEIGHT	TYPE	MTL	FIN	TYPE	MTL	FIN	JAMB	HEAD	SILL	REMARKS
101.1	WEIGHT ROOM	6' - 0"	7' - 0"	SF-D	AL	- -	02	AL	PNT	2/A501	1/A501	4/A501	
101.2	WEIGHT ROOM	6' - 0"	7' - 0"	F-D	HM	PNT	01	HM	PNT	7/A501	6/A501	4/A501	
102	UTILITY	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
103	WEIGHT ROOM	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
104	WEIGHT ROOM	3' - 0"	7' - 0"	G	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
105	WEIGHT ROOM	3' - 0"	7' - 0"	G	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
106	WEIGHT ROOM	3' - 0"	7' - 0"	G	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
107	WEIGHT ROOM	3' - 0"	7' - 0"	G	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
108.1	WEIGHT ROOM	3' - 0"	7' - 0"	G	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
108.2	WEIGHT ROOM	3' - 0"	7' - 0"	G	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
109	COACH LOUNGE	3' - 0"	7' - 0"	G	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
110	RR	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
111	HEAD COACH	3' - 0"	7' - 0"	SF	AL	- -	04	AL	PNT	2/A501	1/A501	4/A501	
112	HEAD COACH	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
113	GUEST RR	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
115	ELEC + DATA	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
118		6' - 0"	7' - 0"	F-D									
119	PAD STO.	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
120	CONCESSIONS	6' - 0"	7' - 0"	F-D	HM	PNT	01	HM	PNT	7/A501	6/A501	4/A501	
121	PLAYER RR	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
121A	TRAINER	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
123.2	VESTIB	6' - 0"	7' - 0"	F-D	HM	PNT	01	HM	PNT	7/A501	6/A501	4/A501	
124	COMPACT STORAGE	3' - 0"	7' - 0"	F	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	
125	W RR	3' - 0"	8' - 0"	F	HM	PNT	01	HM	PNT	11/A501	10/A501	4/A501	
126	M RR	3' - 0"	8' - 0"	F	HM	PNT	01	HM	PNT	11/A501	10/A501	4/A501	
128	LAUNDRY	6' - 0"	7' - 0"	F-D	WD	PNT	01	HM	PNT	9/A501	8/A501	4/A501	

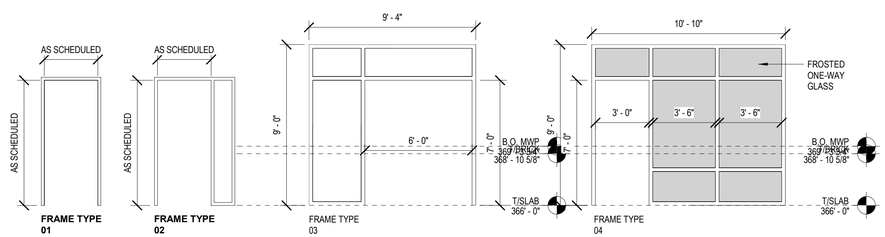
DOOR AND FRAME TYPES



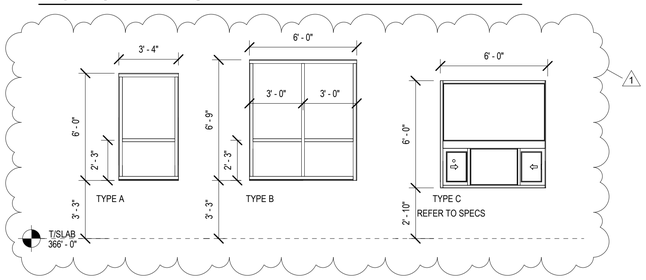
DOOR TYPE KEY

E	EMBOSSED DOOR
F	SOLID FLUSH
FG	FULL GLAZING
FL	FULL LOUVER
G	GLAZING
L	LOUVER
N	NARROW VISION LIGHT
SF	STOREFRONT
-D	DOUBLE DOOR
R	ROLL UP DOOR

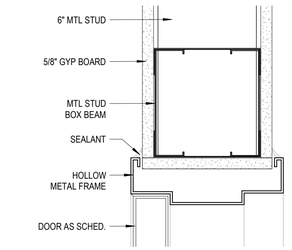




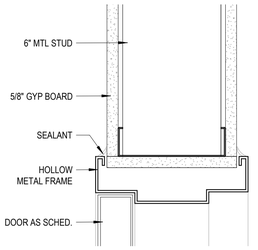
WINDOW TYPES



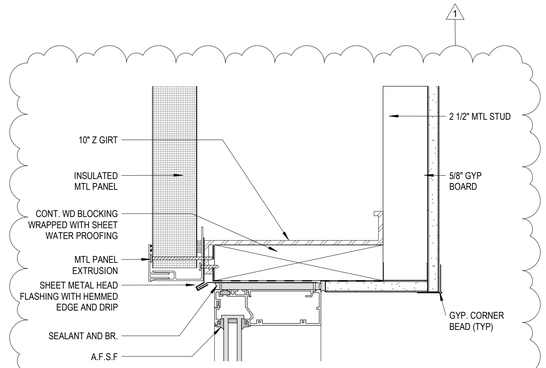
HEAD JAMB AND SILL DETAILS



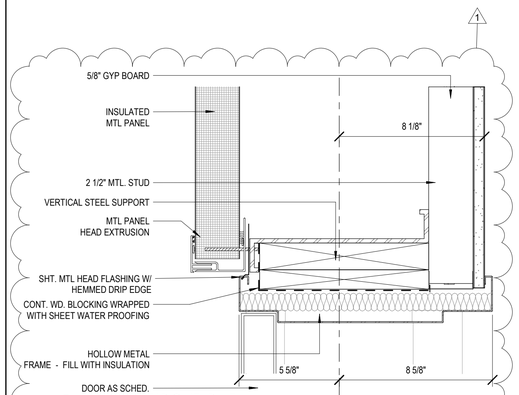
11 TYP INTERIOR DOOR HEAD @ MTL STUDS
3" = 1'-0"



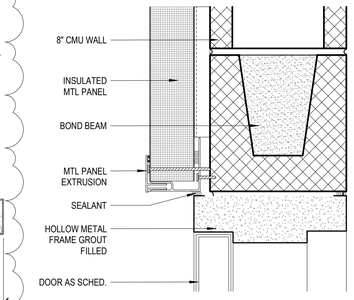
10 TYP INTERIOR DOOR JAMB @ MTL STUDS
3" = 1'-0"



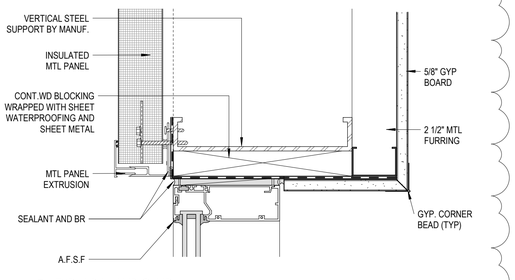
9 TYP. WDW HEAD @ IMP
3" = 1'-0"



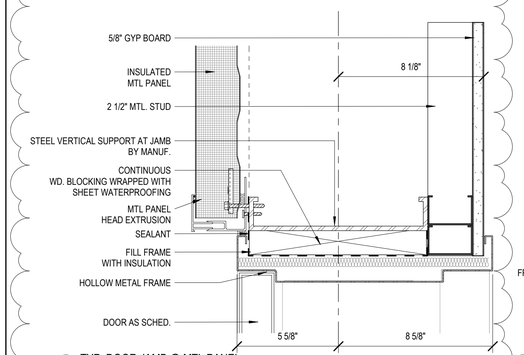
8 TYP. DOOR HEAD @ MTL PANEL
3" = 1'-0"



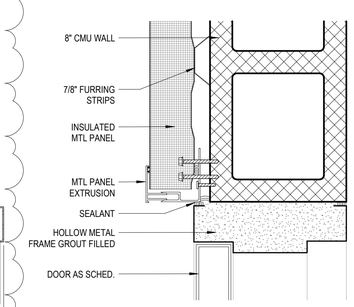
7 TYP DOOR HEAD @ CMU
3" = 1'-0"



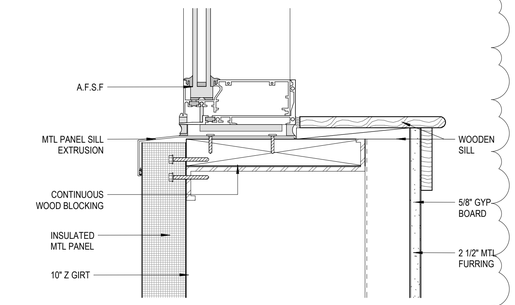
6 TYP. WDW JAMB @ IMP
3" = 1'-0"



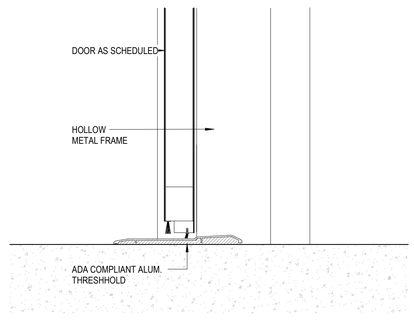
5 TYP. DOOR JAMB @ MTL PANEL
3" = 1'-0"



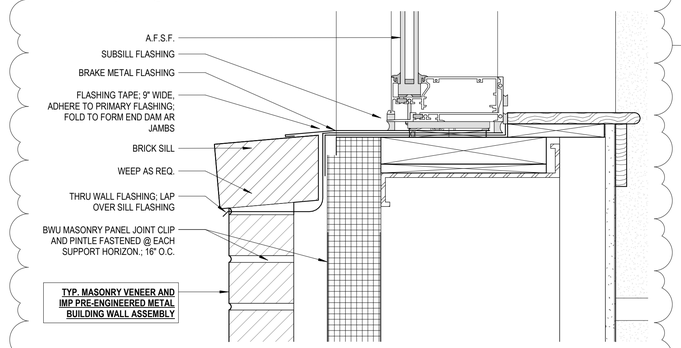
4 TYP DOOR JAMB @ CMU
3" = 1'-0"



3 TYP. WDW SILL @ IMP
3" = 1'-0"



2 TYP. DOOR @ MTL PANEL - SILL DETAIL
3" = 1'-0"



1 TYP. WDW SILL @ BRICK
3" = 1'-0"

WBA ARCHITECTURE

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PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

REGISTERED ARCHITECT
JAMES RICHMOND WIER, Jr.
#4146
STATE OF MISSISSIPPI

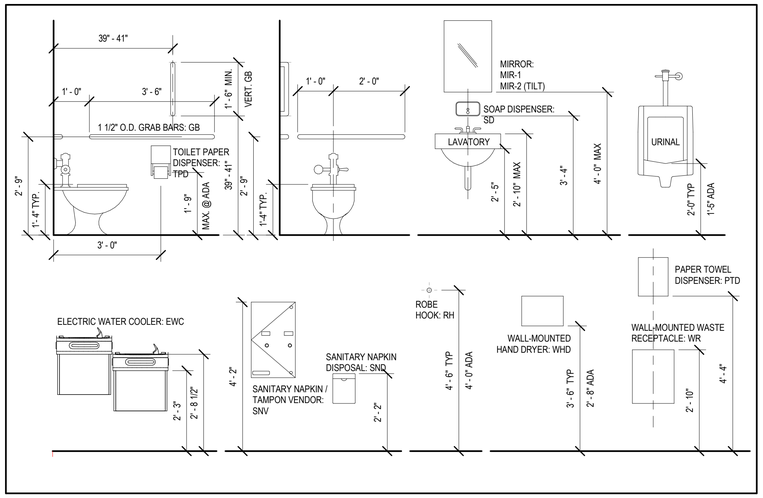
WED 25 SEP 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

REVISIONS

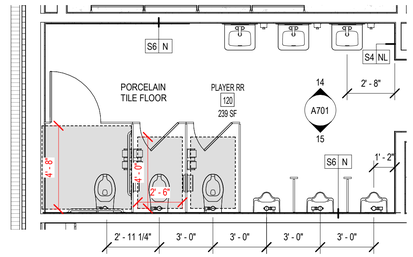
NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	Date 1

A501
DOORS & WINDOWS

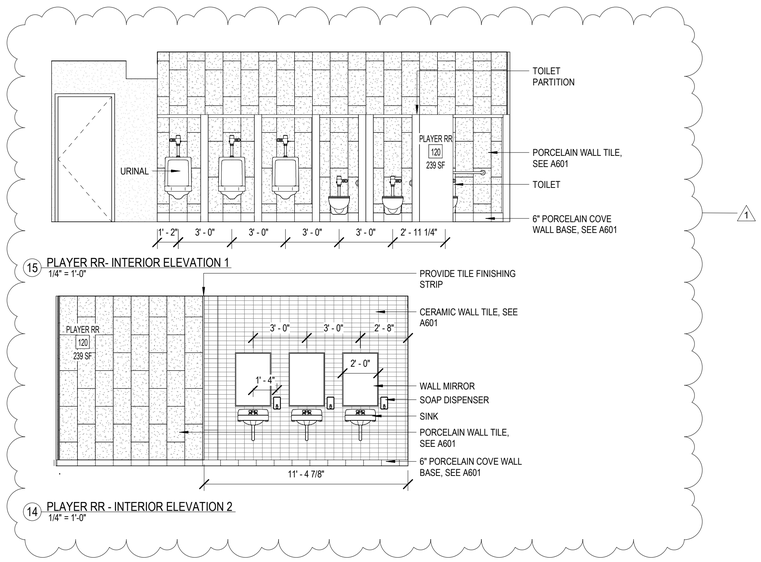


TOILET ACCESSORIES

A	WALL MOUNTED SOAP DISPENSER
B	PAPER TOWEL DISPENSER
C	MIRROR
D	TRASH RECEPTACLE
E	TOILET PAPER DISPENSER
F	SANITARY NAPKIN RECEPTACLE
G	WALL MOUNTED SANITARY NAPKIN DISPENSER
H	GRAB BAR
I	JANITORIAL SINK
J	EDF- BOTTLE FILLER

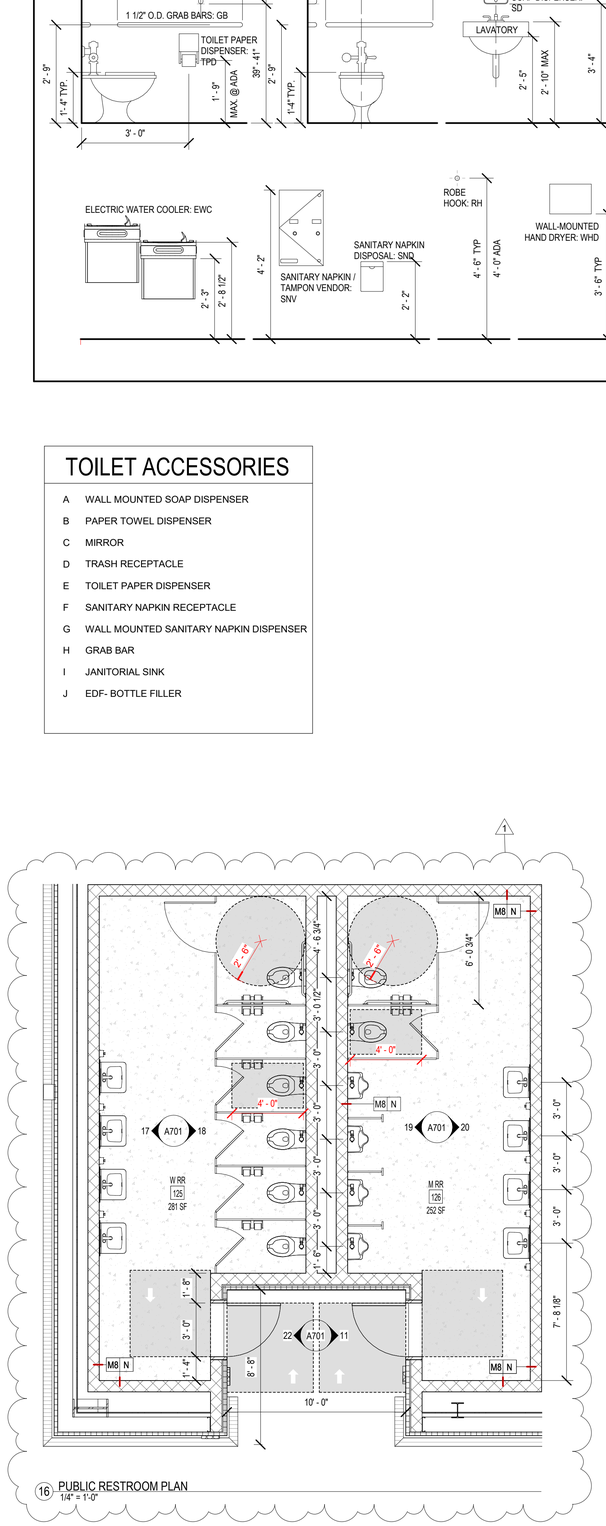


21 PLAYER'S RESTROOM PLAN
1/4" = 1'-0"

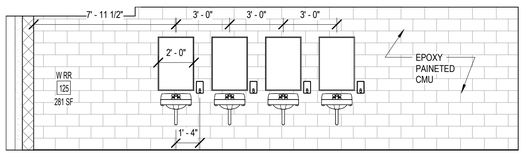


15 PLAYER RR- INTERIOR ELEVATION 1
1/4" = 1'-0"

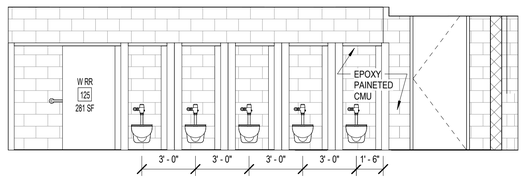
14 PLAYER RR - INTERIOR ELEVATION 2
1/4" = 1'-0"



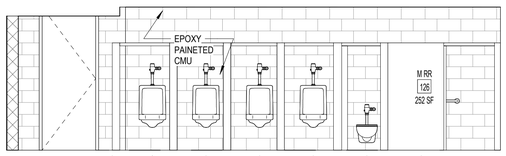
16 PUBLIC RESTROOM PLAN
1/4" = 1'-0"



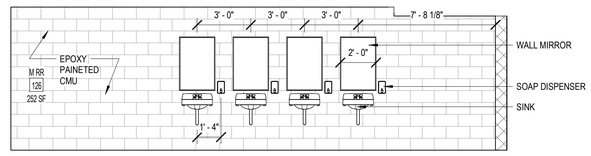
17 WOMENS - INTERIOR ELEVATION 1
1/4" = 1'-0"



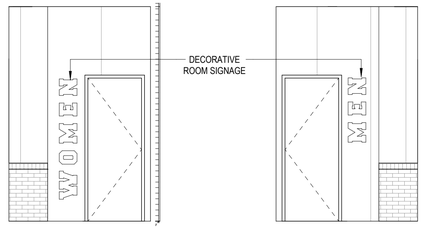
18 WOMENS - INTERIOR ELEVATION 2
1/4" = 1'-0"



19 MENS - INTERIOR ELEVATION 1
1/4" = 1'-0"



20 MENS - INTERIOR ELEVATION 2
1/4" = 1'-0"



22 WOMEN'S ENTRANCE - INTERIOR ELEVATION
1/4" = 1'-0"

11 MENS ENTRANCE - INTERIOR ELEVATION
1/4" = 1'-0"

WBA ARCHITECTURE

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4446
STATE OF MISSISSIPPI

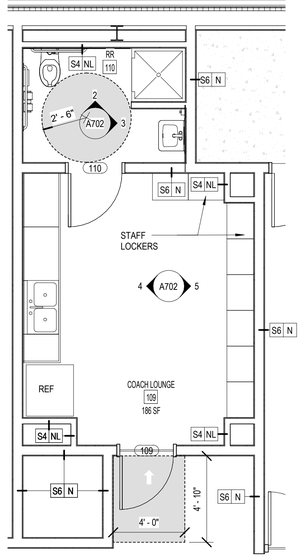
WED 25 SEP 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

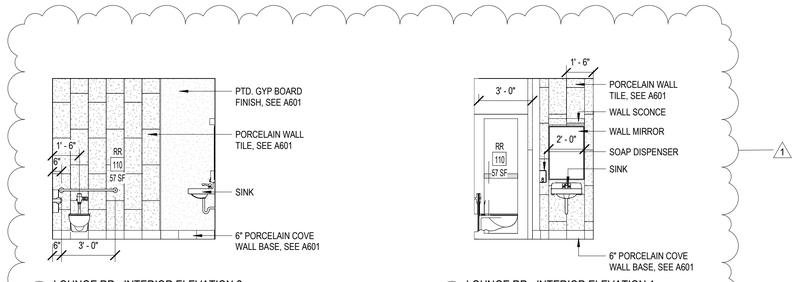
REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	Date 1

A701
ENLARGED PLANS & INTERIOR ELEVATIONS

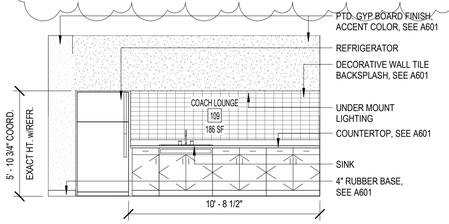


1 COACH LOUNGE PLAN
1/4" = 1'-0"

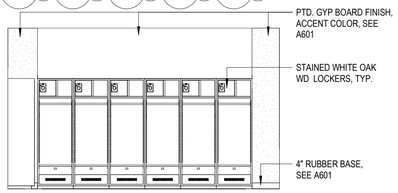


2 LOUNGE RR - INTERIOR ELEVATION 2
1/4" = 1'-0"

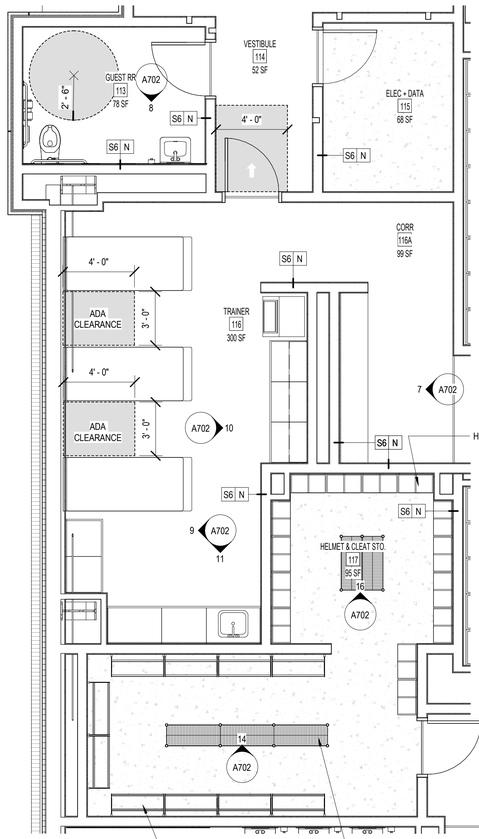
3 LOUNGE RR - INTERIOR ELEVATION 1
1/4" = 1'-0"



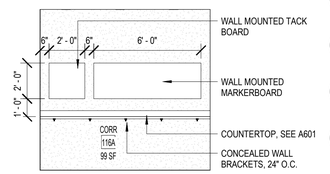
4 COACH LOUNGE - INTERIOR ELEVATION
1/4" = 1'-0"



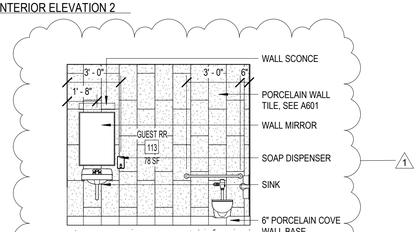
5 COACH LOUNGE - INTERIOR ELEVATION 2
1/4" = 1'-0"



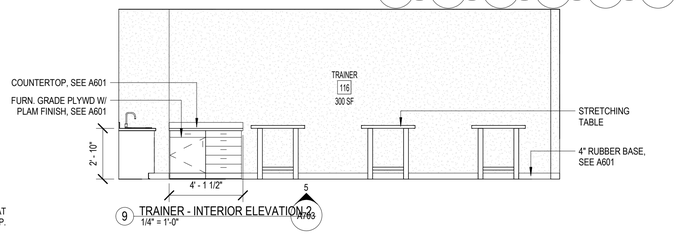
6 TRAINING ROOM PLAN
1/4" = 1'-0"



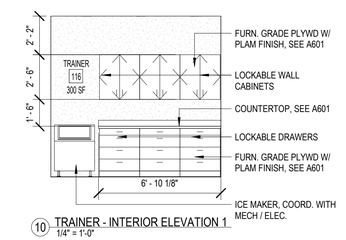
7 CORRIDOR - INTERIOR ELEVATION
1/4" = 1'-0"



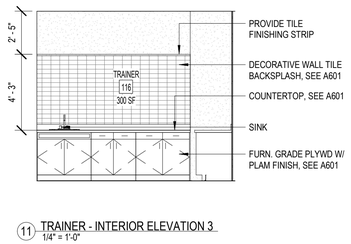
8 GUEST RR - INTERIOR ELEVATION
1/4" = 1'-0"



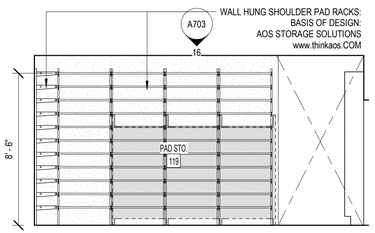
9 TRAINER - INTERIOR ELEVATION 2
1/4" = 1'-0"



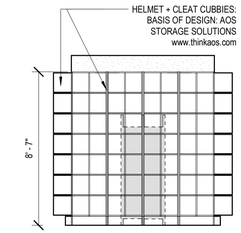
10 TRAINER - INTERIOR ELEVATION 1
1/4" = 1'-0"



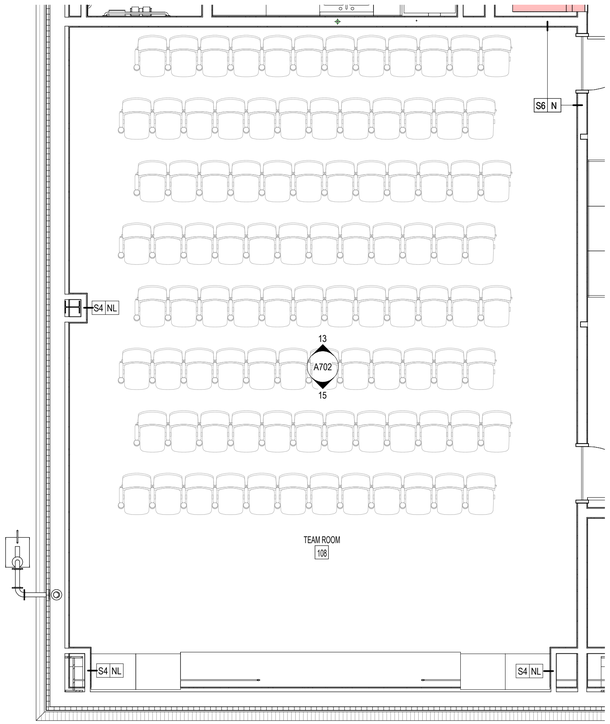
11 TRAINER - INTERIOR ELEVATION 3
1/4" = 1'-0"



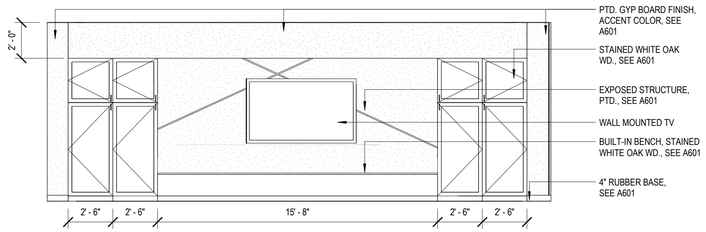
14 STORAGE - INTERIOR ELEVATION 2
1/4" = 1'-0"



16 INTERIOR ELEVATION
1/4" = 1'-0"



12 TEAM ROOM PLAN
1/4" = 1'-0"



15 TEAM ROOM - INTERIOR ELEVATION 1
1/4" = 1'-0"

13 TEAM ROOM - INTERIOR ELEVATION 2
1/4" = 1'-0"

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

REGISTERED ARCHITECT
JAMES RICHMOND WIER, Jr.
4446
STATE OF MISSISSIPPI

WED 25 SEP 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	Date 1

A702
ENLARGED PLANS & INTERIOR ELEVATIONS

ELECTRICAL LEGEND

GENERAL NOTES

1. ALL EQUIPMENT AND DEVICES ARE TO BE FLUSH MOUNTED UNLESS OTHERWISE NOTED.
2. DEVICES NOTED AS "GFI" SHALL BE GROUND FAULT CIRCUIT INTERRUPTING DEVICES.
3. DEVICES NOTED AS "WP" SHALL BE WEATHERPROOF WHILE-IN-USE.
4. PROVIDE UNSWITCHED POWER TO EMERGENCY BATTERY PACKS.

LUMINAIRES (See Light Fixture Schedule)

NOTE: THE NUMBER INSIDE THE CIRCLE IS THE CIRCUIT NUMBER. THE LETTER BESIDE THE SYMBOL IS THE FIXTURE TYPE DESCRIBED IN THE LIGHT FIXTURE SCHEDULE.

- 2'X4' RECESSED FIXTURE.
- 2'X4' RECESSED EMERGENCY FIXTURE.
- SURFACE MOUNTED OR SUSPENDED FIXTURE.
- SURFACE MOUNTED OR SUSPENDED EMERGENCY FIXTURE.
- RECESSED CEILING FIXTURE.
- CEILING MOUNTED EXIT SIGN. PROVIDE CHEVRONS AS INDICATED BY ARROWS.
- EXIT SIGN WITH EMERGENCY LIGHTING.
- WALL MOUNTED EXIT SIGN. PROVIDE CHEVRONS AS INDICATED BY ARROWS.
- EMERGENCY LIGHTING.
- WALL MOUNTED FIXTURE.

MISCELLANEOUS

- C — CONTACTOR.
- PE — PHOTOCELL.
- J — CEILING MOUNTED JUNCTION BOX.
- J — WALL MOUNTED JUNCTION BOX.
- FLEXIBLE CONNECTION TO EQUIPMENT.

RECEPTACLES

- DUPLEX RECEPTACLE, NEMA 5-20R, MOUNTED 18" A.F.F. TO CENTERLINE OF BOX UNLESS NOTED OTHERWISE.
- DOUBLE DUPLEX RECEPTACLE, NEMA 5-20R, ONE COVER PLATE, MOUNTED 18" A.F.F. TO CENTERLINE OF BOX UNLESS NOTED OTHERWISE.
- DOUBLE DUPLEX RECEPTACLE, NEMA 5-20R, ONE COVER PLATE, MOUNTED WITH BOTTOM OF BOX 2" ABOVE COUNTER WITH BACKSPLASH, AND 6" ABOVE COUNTER WITHOUT BACKSPLASH. WHERE RECEPTACLE IS SHOWN IN AN AREA WITH NO COUNTER, MOUNT 45"A.F.F. TO CENTERLINE OF BOX.
- DUPLEX RECEPTACLE, NEMA 5-20R, MOUNTED WITH BOTTOM OF BOX 2" ABOVE COUNTER WITH BACKSPLASH AND 6" ABOVE COUNTER WITHOUT BACKSPLASH. WHERE RECEPTACLE IS SHOWN IN AN AREA WITH NO COUNTER, MOUNT 45"A.F.F. TO CENTERLINE OF BOX.
- DR — DUPLEX RECEPTACLE, NEMA 5-20R, FOR DRINKING FOUNTAIN FED FROM GFCI BREAKER. MOUNTED IN ACCORDANCE WITH MANUFACTURER'S ROUGH-IN REQUIREMENTS. VERIFY CONNECTION TYPE PRIOR TO BID. PROVIDE PROPER EQUIPMENT FOR CONNECTION TYPE REQUIRED.

SWITCHES

- $ — SINGLE-POLE, SINGLE-THROW SWITCH. MOUNT CENTERLINE OF BOX AT 45"A.F.F. UNLESS NOTED OTHERWISE.
- 2P $ — DOUBLE-POLE, SINGLE-THROW, 30 AMP SWITCH. MOUNT CENTERLINE OF BOX AT 45"A.F.F. UNLESS NOTED OTHERWISE.
- 3 $ — THREE-WAY SWITCH. MOUNT CENTERLINE OF BOX AT 45"A.F.F. UNLESS NOTED OTHERWISE.
- 4 $ — FOUR-WAY SWITCH. MOUNT CENTERLINE OF BOX AT 45"A.F.F. UNLESS NOTED OTHERWISE.
- D — 600 WATT INCANDESCENT DIMMER. MOUNT CENTERLINE OF BOX AT 45"A.F.F. UNLESS NOTED OTHERWISE.
- M $ — AUTOMATIC WALL SWITCH. SENSORSWITCH #WSD-PDT OR APPROVED EQUAL. MOUNT CENTERLINE OF BOX AT 45" A.F.F. UNLESS NOTED OTHERWISE.
- M D — AUTOMATIC WALL SWITCH WITH INTEGRAL 0-10V DIMMER. LUTRON #MS-Z101 OR APPROVED EQUAL. MOUNT CENTERLINE OF BOX AT 45"A.F.F. UNLESS NOTED OTHERWISE.
- $TS — DIGITAL TIME SWITCH WITH ADJUSTABLE RANGE FROM 5 MINUTES TO 12 HOURS. FURNISH WITH AUDIBLE WARNING. SENSORSWITCH #PTS-60 OR APPROVED EQUAL. MOUNT CENTERLINE OF BOX AT 45" A.F.F. UNLESS NOTED OTHERWISE.
- $T — HORSEPOWER RATED SWITCH WITH THERMAL OVERLOADS (MANUAL MOTOR STARTER).
- MD1 — PASSIVE INFRARED AND ULTRASONIC DUAL TECHNOLOGY OCCUPANCY SENSOR WITH A 12' RADIAL COVERAGE. CEILING MOUNTED. SENSORSWITCH #CM-PDT-9 OR APPROVED EQUAL.
- MD2 — PASSIVE INFRARED AND ULTRASONIC DUAL TECHNOLOGY OCCUPANCY SENSOR WITH A 28' RADIAL COVERAGE. CEILING MOUNTED. SENSORSWITCH #CM-PDT-10 OR APPROVED EQUAL.
- MDC — PASSIVE INFRARED AND ULTRASONIC DUAL TECHNOLOGY OCCUPANCY SENSOR WITH A 2000 SQ. FT. COVERAGE. MOUNT IMMEDIATELY BELOW CEILING. SENSORSWITCH #WV-PDT-16 OR APPROVED EQUAL.
- PP — POWER PACK MOUNTED ABOVE CEILING. SENSORSWITCH #PP20 OR APPROVED EQUAL.

FIRE ALARM SYSTEM

- F — MANUAL PULL STATION. MOUNT 48"A.F.F. TO CENTERLINE OF BOX.
- STROBE. MOUNT 80"A.F.F. TO BOTTOM OF BOX.
- COMBINATION SPEAKER AND STROBE. MOUNT 80"A.F.F. TO BOTTOM OF BOX.
- 177cd — COMBINATION HORN AND STROBE 177 CANDELA. MOUNT 80"A.F.F. TO BOTTOM OF BOX.
- 177cd — STROBE 177 CANDELA. MOUNT 80"A.F.F. TO BOTTOM OF BOX.
- SMOKE DETECTOR.
- T — THERMAL DETECTOR.
- DR — DUCT SMOKE DETECTOR IN RETURN DUCT.
- DS — DUCT SMOKE DETECTOR IN SUPPLY DUCT.
- FACP — FIRE ALARM CONTROL PANEL.
- FAAN — FIRE ALARM ANNUNCIATOR PANEL.
- FS — FLOW SWITCH.
- TS — TAMPER SWITCH.
- PIV — POST INDICATOR VALVE.
- FIRE ALARM HORN AND STROBE MOUNTED ON THE CEILING TO A FLUSH MOUNTED BOX.
- FIRE ALARM STROBE MOUNTED ON THE CEILING TO A FLUSH MOUNTED BOX.

CCTV SYSTEM

- CAMERA SUPPLIED AND INSTALLED BY OWNER. CAT 6 CABLING BY CONTRACTOR.

GEAR

- ???/F-? — FUSED DISCONNECT SWITCH. TEXT INDICATES AMPACITY/NUMBER OF POLES/ENCLOSURE TYPE; F-(RATING OF FUSES).
- ???/??? — NON-FUSED DISCONNECT SWITCH. TEXT INDICATES AMPACITY/NUMBER OF POLES/ENCLOSURE TYPE.
- ?/???? — PANELBOARD.

CONDUIT AND WIRING

- CONDUCTORS IN CONDUIT CONCEALED WITHIN WALL OR CEILING. TIC MARKS INDICATE NUMBER OF CONDUCTORS. THE EQUIPMENT GROUNDING CONDUCTOR IS NOT SHOWN, BUT SHALL BE PROVIDED. SIZE THE EQUIPMENT GROUNDING CONDUCTOR AND THE CONDUIT PER THE NEC. THE ABSENCE OF TIC MARKS SIGNIFIES THAT TWO CONDUCTORS PLUS AN EQUIPMENT GROUNDING CONDUCTOR SHOULD BE PROVIDED. FOR EXAMPLE, THE MARKINGS TO THE LEFT SIGNIFY THAT THREE CONDUCTORS PLUS AN EQUIPMENT GROUNDING CONDUCTOR SHOULD BE PROVIDED.
- 10 — THE TEXT INSIDE THE ARC INDICATES THE AWG SIZE OF THE CONDUCTORS THAT SHALL BE RUN IN THE CONDUIT. THE ABSENCE OF TEXT SIGNIFIES THAT THE CONDUCTORS SHOULD BE #12 AWG.
- CIRCUITRY RUN IN STRAIGHT LINE SEGMENTS SIGNIFIES EXPOSED SURFACE-MOUNTED RACEWAY (SEE SPECIFICATIONS).
- CONDUCTORS IN CONDUIT CONCEALED BELOW GRADE OR FLOOR. TIC MARKS INDICATE NUMBER OF CONDUCTORS. THE EQUIPMENT GROUNDING CONDUCTOR IS NOT SHOWN, BUT SHALL BE PROVIDED. SIZE THE EQUIPMENT GROUNDING CONDUCTOR AND THE CONDUIT PER THE NEC. THE ABSENCE OF TIC MARKS SIGNIFIES THAT TWO CONDUCTORS PLUS AN EQUIPMENT GROUNDING CONDUCTOR SHOULD BE PROVIDED. THE MARKINGS TO THE LEFT SIGNIFY THAT THREE CONDUCTORS PLUS AN EQUIPMENT GROUNDING CONDUCTOR SHOULD BE PROVIDED.
- LA-1 — HOMERUN TO PANELBOARD. ARC DENOTES CONCEALED CIRCUITRY. TEXT DENOTES PANELBOARD NAME WITH CIRCUIT NUMBER. DEVICES HAVING CIRCUIT NUMBERS LOCATED BESIDE THEM MAY NOT SHOW THE CIRCUIT NUMBERS AT THE HOMERUN ARROWS.
- LA-1 — PARTIAL HOMERUN TO PANELBOARD. COMBINE ALL PARTIAL HOMERUNS THAT ARE ON THE SAME CIRCUIT IN A JUNCTION BOX PRIOR TO ENTERING THE PANELBOARD.
- LOW VOLTAGE CONDUCTORS USED FOR MOTION DETECTOR CIRCUITRY. SEE MANUFACTURER'S RECOMMENDATIONS FOR CONDUCTOR REQUIREMENTS.

VOLTAGE DROP CHART FOR 20A, 1Ø CIRCUITS

Voltage	Circuit Length	Conductor Size (AWG)
120	< 50'	#12
120	> 50'	#10
120	> 90'	#8
120	> 140'	#6
277	< 130'	#12
277	> 130'	#10
277	> 200'	#8
277	> 330'	#6

VOLTAGE DROP CHART NOTES:
1) CIRCUIT SIZES INDICATED ON THE DRAWINGS ARE MINIMUM REQUIREMENTS. REFER TO THIS CHART FOR UPSIZING CONDUCTORS AS NEEDED.

2) DO NOT CONNECT CONDUCTORS LARGER THAN #10 DIRECTLY TO A RECEPTACLE OR A SWITCH. PROVIDE A JUNCTION BOX TO DOWNSIZE THE CONDUCTOR TO #12 AT THE DEVICE.

3) FOR CIRCUITS LONGER THAN THOSE LISTED ABOVE, CONSULT WITH THE ENGINEER FOR CONDUCTOR SIZES.

COMMUNICATIONS

- DATA OUTLET MOUNTED 18" A.F.F. TO CENTERLINE OF BOX UNLESS NOTED OTHERWISE.
- DATA OUTLET MOUNTED WITH BOTTOM OF BOX 2" ABOVE COUNTER BACKSPLASH. WHERE THERE IS NO BACKSPLASH MOUNT 6" ABOVE COUNTER. WHERE TELEPHONE/DATA OUTLET IS SHOWN IN AN AREA WITH NO COUNTER, MOUNT 45" A.F.F. TO CENTERLINE OF BOX.
- WIRELESS ACCESS POINT.

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER	PART NUMBER	LAMPS	MOUNTING	REMARKS
A	LITHONIA	ZL1NL48-5000LM-FST-MVOLT-40K-80CRI WH-ZACVH-M100	LED, 34W 4585 LUMENS	SUSPENDED	
B	LITHONIA	EPANL-2X4-4800LM-80CRI-40K-MIN10 ZT-MVOLT	LED, 45W 5119 LUMENS	RECESSED	
BE	LITHONIA	EPANL-2X4-4800LM-80CRI-40K-MIN10 ZT-MVOLT-E10WCP	LED, 45W 5119 LUMENS	RECESSED	-WITH EMERGENCY BATTERY PACK.
C	LITHONIA	LDN6-40/15-L06AR-LS-MVOLT-GZ10	LED, 17.5W 1514 LUMENS	RECESSED	
CE	LITHONIA	LDN6-40/15-L06AR-LS-MVOLT-GZ10 E10WCP	LED, 17.5W 1514 LUMENS	RECESSED	-WITH EMERGENCY BATERRY PACK.
D	LITHONIA	LDN6-40/05-L06AR-LS-MVOLT-GZ10	LED, 5.8W 527 LUMENS	RECESSED	
DE	LITHONIA	LDN6-40/05-L06AR-LS-MVOLT-GZ10 E10WCP	LED, 5.8W 527 LUMENS	RECESSED	-WITH EMERGENCY BATTERY PACK.
F	LITHONIA	EPANL-2X2-3400LM-80CRI-40K-MIN10 ZT-MVOLT	LED, 30W 3566 LUMENS	RECESSED	
FE	LITHONIA	EPANL-2X2-3400LM-80CRI-40K-MIN10 ZT-MVOLT-E10WCP	LED, 30W 3566 LUMENS	RECESSED	-WITH EMERGENCY BATTERY PACK.
G	LITHONIA	JHBL-18000LM-PCL-WD-MVOLT GZ10-40K-80CRI-DWHXD	LED, 120W 13,162 LUMENS	SURFACE	
GE	LITHONIA	JHBL-18000LM-PCL-WD-MVOLT GZ10-40K-80CRI--E10WCP-DWHXD	LED, 120W 13,162 LUMENS	SURFACE	-WITH EMERGENCY BATTERY PACK.
J	LITHONIA	IBG-72000LM-HEF-AFL-GND-MVOLT GZ10-50K-80CRI-DWH-WGIB46	LED, 426W 72,306 LUMENS	SURFACE	PROVIDE W/ WIRE GUARD.
K	MARK ARCHITECTURE	SL2L-6-FLP-FL-80CRI-40K-600LMF MIN10-120-*-ZT	LED, 36W 3198 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
KK	MARK ARCHITECTURE	SL2L-20-FLP-FL-80CRI-40K-600LMF MIN10-120-*-ZT-MODW8XC1290C	72W 6396 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
L	MARK ARCHITECTURE	SL2L-4-FLP-FL-80CRI-40K-1000LMF MIN10-120-*-ZT	LED, 44W 3448 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
LL	MARK ARCHITECTURE	SL2L-8-FLP-FL-80CRI-40K-1000LMF MIN10-120-*-ZT-MODW4XC490C	LED, 88W 6896 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
M	MARK ARCHITECTURE	SL2L-7-FLP-FL-80CRI-40K-400LMF MIN10-120-*-ZT	LED, 28W 2156 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
ME	MARK ARCHITECTURE	SL2L-7-FLP-TG-80CRI-40K-400LMF MIN10-120-1E10WLCP-*-ZT	LED, 56W 4312 LUMENS	RECESSED	*-COLOR BY ARCHITECT. -WITH EMERGENCY BATTERY PACK.
M2	MARK ARCHITECTURE	SL2L-14-FLP-TG-80CRI-40K-400LMF MIN10-120-*-ZT	LED, 56W 4312 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
MM	MARK ARCHITECTURE	SL2L-14-FLP-TG-80CRI-40K-400LMF MIN10-120-*-ZT-MODW7XC790C	LED, 56W 4312 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
NN	MARK ARCHITECTURE	SL2L-5-FLP-FL-80CRI-40K-400LMF MIN10-120-*-ZT-MODW2XC390C	LED, 16W 1232 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
O	MARK ARCHITECTURE	SL2L-3-FLP-FL-80CRI-40K-400LMF MIN10-120-*-ZT	LED, 12W 924 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
Q	MARK ARCHITECTURE	SL2L-6-FLP-FL-80CRI-40K-400LMF MIN10-120-*-ZT	LED, 24W 1848 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
R	MARK ARCHITECTURE	SL2L-4-FLP-FL-80CRI-40K-400LMF MIN10-120-*-ZT	LED, 16W 1232 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
S	MARK ARCHITECTURE	SL2L-12-FLP-FL-80CRI-40K-400LMF MIN10-120-*-ZT	LED, 48W 3696 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
T	MARK ARCHITECTURE	SL2L-8-FLP-FL-80CRI-40K-400LMF MIN10-120-*-ZT	LED, 32W 2464 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
V	MARK ARCHITECTURE	SL2L-6-FLP-TG-80CRI-40K-600LMF MIN10-120-*-ZT	LED, 36W 3198 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
W	MARK ARCHITECTURE	SL2L-4-FLP-TG-80CRI-40K-1000LMF MIN10-120-*-ZT	LED, 44W 3448 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
X	LITHONIA	LQM-S-W-3-R-MVOLT-EL N	LED	UNIVERSAL	
Y	MARK ARCHITECTURE	SL2L-12-FLP-TG-80CRI-40K-600LMF MIN10-120-*-ZT	LED, 72W 3696 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
YE	MARK ARCHITECTURE	SL2L-12-FLP-TG-80CRI-40K-600LMF MIN10-120-1E10WLCP-*-ZT	LED, 72W 3696 LUMENS	RECESSED	*-COLOR BY ARCHITECT. -WITH EMERGENCY BATTERY PACK.
Z	MARK ARCHITECTURE	SL2L-8-FLP-TG-80CRI-40K-1000LMF MIN10-120-*-ZT	LED, 88W 6896 LUMENS	RECESSED	*-COLOR BY ARCHITECT.
AA	VISA LIGHTING	CB6505-L40K-L-MVOLT*-*	LED, 12W 1300 LUMENS	WALL	*-COLOR BY ARCHITECT.
BB	JUNO	UPLD-14IN-SWW4-90CRI-*	LED, 6.65W 75.03 LM/W	SURFACE	*-COLOR BY ARCHITECT.

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CHRISTOPHER V. GREEN — REGISTERED — ENGINEER — 16778 — STATE OF MISSISSIPPI

WBA ARCHITECTURE

PEARL HIGH SCHOOL INDOOR TRAINING FACILITY

PEARL PUBLIC SCHOOL DISTRICT
500 PIRATES COVE
PEARL, MS 39208

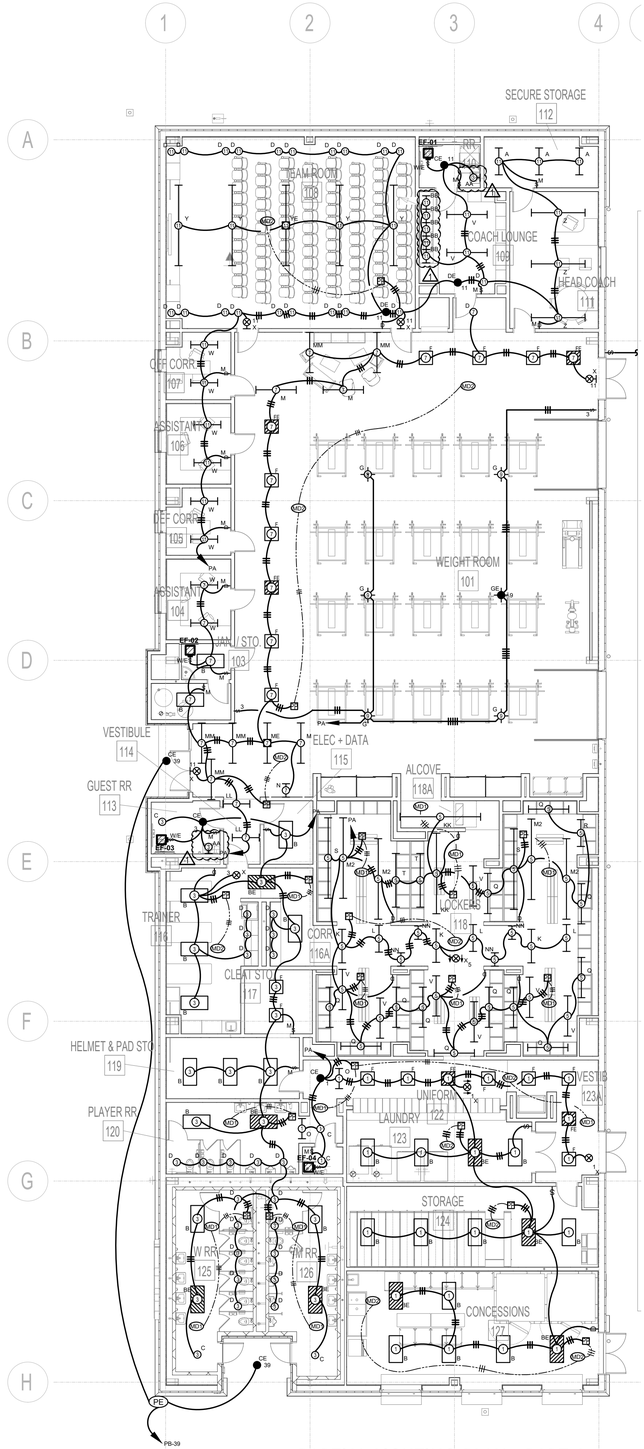
23 AUG 2021

CONSTRUCTION DOCUMENTS
WBA # 5820

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM #1	2021-09-03

E0.0
ELECTRICAL LEGEND



1 / E1.1 PARTIAL LIGHTING PLAN - PART A

Scale: 3/32" = 1'- 0"

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NO.	DESCRIPTION	DATE
1	ADDENDUM #1	2021-09-03

E1.1
PARTIAL LIGHTING PLAN - PART A