MISSISSIPPI MILITARY DEPARTMENT
State of Mississippi
1410 Riverside Drive
Jackson, Mississippi 39202-1271

Mississippi Army National Guard

INVITATION TO BID AND TECHNICAL SPECIFICATIONS FOR: RESTORATION & MODERNIZATION OF BUILDING 1471 CAMP SHELBY JOINT FORCES TRAINING CENTER CAMP SHELBY, MISSISSIPPI

PN: 28250013 – BID SET

REGISTERED ARCHITECT
SHANE M. GERMANY
5306
2/18/26
STATE OF MISSISSIPPI

BOBBY M. GINN, JR
Major General, Mississippi National Guard
The Adjutant General of Mississippi

Set of

Updated July 2025

PROJECT IDENTIFICATION

PROJECT: RESTORATION & MODERNIZATION OF BULDING 1471
CAMP SHELBY JOINT FORCES TRAINING CENTER
CAMP SHELBY, MISSISSIPPI

DATE: FEBRUARY 18, 2026

OWNER: MISSISSIPPI MILITARY DEPARTMENT
BOBBY M. GINN, JR.
MAJOR GENERAL, MISSISSIPPI NATIONAL GUARD
THE ADJUTANT GENERAL OF MISSISSIPPI

OWNER'S REPRESENTATIVE: CURTIS BODDY, JR
MISSISSIPPI MILITARY DEPARTMENT
ATTN: NGMS-SRC
1410 RIVERSIDE DRIVE
JACKSON, MISSISSIPPI 39202-1271
(601) 313-6209

ARCHITECT: LANDRY KITCHENS GERMANY ARCHITECTS, P.A.
5211 OLD HIGHWAY 11
HATTIESBURG, MISSISSIPPI 39402
601-271-7711

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CAMP SHELBY, MISSISSIPPI

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SECTION 00 11 13

LEGAL NOTICE
ADVERTISEMENT FOR BIDS
NOTICE TO CONTRACTORS

Sealed bids will be received, publicly opened and read in the office of the Adjutant General, 1410 Riverside Drive, Jackson, Mississippi, 39202-1271. Electronic Bids may be received via MAGIC portal or Physical Receipt. Prospective bidders are encouraged to monitor the Mississippi Department of Finance and Administration website for updates and future bidding opportunities.

UNTIL: 1:30PM March 26, 2026

FOR: Restoration and Modernization of Building 1471
CSJFTC, Camp Shelby, MS

Plans and specifications are available at www.llgarchplans.com. Plan holders and bidders are required to log-in or register to order bid documents. A valid email address is required for registration. Bid Documents are available via paper copy. Purchased documents are non-refundable. Any questions regarding website registration and online orders should be directed to plan house at (601) 336-6378.

A pre-bid conference will be conducted on March 12, 2026, at 10:00 am at DPW, 6600 Lee Avenue, Camp Shelby, MS. ALL PROSPECTIVE BIDDERS ARE ENCOURAGED TO ATTEND.

Bidders shall be advised that in accordance with the Mississippi Code, the Military Department has Thirty (30) calendar days to deliver a warrant to the vendor from the date an application for payment is determined to be due and payable under the terms and conditions of the contract.

The Adjutant General reserves the right to reject any and/or all bids and to waive informalities. Award of contract is subject to availability of funds. Bids will be held open for **60** days from bid date.

PUBLISH: February 18 & 25, 2026

SECTION 00 20 00

INSTRUCTION TO BIDDERS

1. PROJECT IDENTIFICATION

The construction contemplated in the following specifications and the attached or accompanying documents including plans prepared as essential parts hereof include furnishing all plant, labor, tools equipment, materials, fixtures, accessories and other things necessary for construction of project as specified herein and as shown on the drawings. The State of Mississippi, represented by the Adjutant General of said State, shall be hereinafter referred to as the Director, State Purchasing and Contracting and/or Contracting Officer. Wherever the term "Owner" is used, it shall refer to the State of Mississippi.

2. BID SECURITY

Each bid must be accompanied by certified check, cashier's check, of the bidder, or a bidder's bond equal to 5% of the total amount of the base bid. Certified checks must be issued by a bank located within the State of Mississippi. If bid is submitted electronically, the physical Certified check or Cashier's check must be placed in the hands of the MS Military Department's state personnel directly serving the procurement activity prior to the date and time set for in the advertisement.

The successful bidder, upon failure or refusal to execute and deliver the contract and bond required within ten (10) days after he/she has been notified of award of the contract to him/her, shall forfeit to the Director, State Purchasing and Contracting and/or Contracting Officer, as liquidated damages not as penalty, for such failure or refusal, the security deposited with his/her bond.

3. SITE EXAMINATION

Each bidder must inform himself/herself fully of the conditions relating to construction and labor under which the work is to be performed by visiting each site and familiarizing himself/herself with the problem's peculiar to the various items of work. Failure to visit the site will in no way relieve the successful Bidder from furnishing any materials or performing any work required to complete work in accordance with Plans, Specifications or other contract documents without additional cost to the Owner.

4. APPROVAL

The Adjutant General of the State of Mississippi shall, and does, have the right to approve any and all material and equipment used in the construction of the projects involved and to make selection thereof.

5. PERFORMANCE BONDS

The Contractor shall give a Performance Bond and Payment Bond in the amount equal to 100% of the contract price in a surety company authorized to do business in the State of Mississippi as surety

thereon. OPTIONAL: If contract price is under $25,000, contractor may accept one/final payment in lieu of Performance Bond ONLY.

If, at any time after execution and approval of this contract and performance bond required by the contract documents, the Owner shall deem any of the sureties upon such bond to be unsatisfactory, or if for any reason, such bond shall cease to be adequate security for the Owner the Contractor shall, within five (5) days after notice of the Owner to do so, furnish a new and additional bond in form and sum signed by such parties as shall be satisfactory to the owner. No further payment shall be deemed to be due, nor shall any further payment be made to the Contractor until such new bonds shall be paid for the Contractor, only bonding and surety companies that are approved in "Federal Register" 570, Surety Company Acceptable on Federal Bonds, will be acceptable to this office as underwriters.

6. EXECUTION OF BIDS

Each bid must be signed in writing by any individual authorized to enter into a binding agreement for the Business making the bid proposal. Any bid not so signed may be rejected for informality. All prices must be printed in ink or typewritten. No erasures permitted. Errors may be crossed out and corrections printed in ink or typewritten adjacent and must be initialed in ink by person delivering bid.

Should the bidder be a partnership, bid should be so signed as to show the various members making up the partnership. Should it be a company non-corporate, owner may be individual or group, this should also be made clear.

Failure to complete any and/or all bid items as required will render same irregular to the probable extent of causing rejection.

All bids must be submitted by one of the following:

Preferred Method: in a sealed envelope and addressed as shown on the bid specifications, Directions for Mailing Bids DMB Section 00 21 13 -1/1. Bids must be placed in the hands of the state personnel directly serving the procurement activity prior to the hour of the date mentioned in the advertisement. Bidder submitting bid, whether hand delivered or mailed, is responsible for ensuring that the sealed bid is delivered by the required time and the bidder assumes all risk of delivery. The time of receipt shall be determined by the time clock of the Director, State Purchasing and Contracting and/or Contracting Officer or authorized representative directly serving the procurement activity for the Mississippi Military Department. Bids received after the hour and date specified will be rejected.

Bidder hand delivering his/her bid is encouraged to **arrive 30 minutes early** to preclude any delays due to heightened security at our facility.

Bidder mailing his /her bid must ensure that the mailing envelope is marked same as described in the Direction Mailing Bids DMB Section 00 21 13 -1/1.

Second Method: Electronically via MAGIC Portal. Bidder will ensure that the opening page will be either the COR Number or Bid Does Not Exceed $75,000.00 Only, the pages to follow will be the Bid Form, etc. Bids must be electronically completed by the required date and time set for in the advertisement for bids and the bidder assumes all risk of electronic delivery. The site for MS Suppliers (Vendors) is http://www.dfa.ms.gov/dfa-offices/mmrs/mississippi-suppliers-vendors/ at the bottom it will have Self service, supplier training etc.

Bidder may modify the bid PRIOR to the scheduled closing time indicated in the Advertisement of Bids on the outside of the sealed envelope containing the bid. A facsimile will not be acceptable.

If the agency is closed for any reason, including but not limited to: acts of God, strikes, lockouts, riots, acts of war, epidemics, governmental regulations superimposed after the fact, fire, earthquakes, floods, or other natural disasters, (the "Force Majeure Events"), which closure prevents the opening of bids at the advertised date and time, all bids received shall be publicly opened and read aloud on the next business day that the agency shall be open and at the previously advertised time. The new date and time of the bid opening, as determined in accordance with this paragraph, shall not be advertised, and all Contractors, upon submission of a bid proposal, shall be deemed to have knowledge of and shall have agreed to the provisions of this paragraph. Bids shall be received by the agency until the new date and time of the bid opening as set forth herein.

The agency shall not be held responsible for the receipt of any bids for which the delivery was attempted and failed due to the closure of the agency as a result of a Force Majeure Event. Each Contractor shall be required to ensure the delivery and receipt of its bid by the agency prior to the new date and time of the bid opening.

7. FORMS

For the purpose of uniformity and equity in all proposals, and clearly indicating alternate propositions as called for, bidders will be required to use the bid form incorporated herein. Where prices are stated, they must be expressed both in figures and written words in the spaces provided for that purpose. In the case of difference in the figures and the written price, the latter will be considered binding. No amendments, alterations, insertions, provisions, or other additions made by the bidder for the purpose of changing the intent of expression of the forms provided will be allowed. Also, any changes may render the bid irregular and thereby cause its possible rejection. Loose copies of the proposal form shall be furnished to all bidders upon request.

Contractors shall hold their bids open for acceptance for a period up to sixty (60) days from the date of the bid opening. The successful bidder further agrees that upon notification of an award of the

contract, the successful bidder shall furnish the State of Mississippi a Performance Bond, Standard Form 25 and a Payment Bond, Standard Form 25A or equivalent Form from the bidders Bonding Company with good and sufficient surety. Bonds will be in the amount of 100% and in accordance with the Base Bid and/or combination of Bid Items as accepted by the Director, State Purchasing and Contracting and/or Contracting Officer.

8. TIME TO COMPLETE WORK

Bidder to whom contract is awarded must agree to commence the work within ten (10) calendar days after receipt of written notice to proceed and complete the work ready in its entirety within the time stated in Bid Form. This time will include the receipt of all Close Out Documents and final pay request to Director, State Purchasing and Contracting and/or Contracting Officer. If Substantial Completion is necessary and approved, it must be determined prior to the final completion date. Delays through no fault of the Contractor will be taken into consideration by the Director, State Purchasing and Contracting and/or Contracting Officer.

9. INTERPRETATION OF THE CONTRACT DOCUMENTS

It shall be incumbent upon all bidders to understand the provisions of the specifications and to obtain clarification prior to the time and date set for the bid opening. Such clarification will **only** be in the form of a response to a written request and received not less than six (6) working days prior to the bid opening. No clarification will be offered in a response to a telephone request.

If any person contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of plans, specifications, or other contract documents, they should contact the Architect listed on page POI-1/1.

Any interpretations of the proposed documents will be made only by addendum duly issued and a copy of such an addendum will be mailed or delivered to each person receiving a set of such documents. The Owner will not be responsible for any other explanations of the proposed documents.

Addenda modifying the specifications may be issued if time permits. No addendum will be issued within a period of two working days prior to the time and date set for the bid opening. Should it become necessary to issue an addendum within the two-day period to the bid opening, the bid date will be reset giving bidders ample time to answer the addendum. When replying to a bid request on which an addendum has been issued, the bidder shall attach a copy of the addendum signature page with the bid which will indicate the acknowledgement of receipt of that addendum and that the bid is being offered in compliance therewith. **Failure to attach a copy of the addendum signature page may result in the bid being rejected as not being in accordance with the revised specifications**.

10. DISQUALIFICATION OF BIDDER: A Bidder may be disqualified for any of the following reasons:

a. Failure to comply with the bid requirements.
b. Bidder is in arrears on existing Contracts with the Owner or another state agency.
c. Bidder is, or anticipates being, in litigation or arbitration with the Owner or another state agency.
d. Bidder has defaulted on a previous Contract.

11. CERTIFICATION OF RESPONSIBILITY (COR)

a. The Mississippi State Board of Contractors is responsible for issuing Certificates of Responsibility to Contractors. To be awarded a Contract for public work, Sections 31-3-15 and 31-3-21 of the **Mississippi Code 1972 Annotated** requires a Contractor to have a current Certificate of Responsibility at bid time and during the entire length of the job. The Certificate of Responsibility number issued becomes a significant item in all public bidding.

b. **Bids Under $75,000:** If a Bidder submits a bid not exceeding $75,000, no Certificate of Responsibility number is required; however, a notation stating the bid does not exceed $75,000 must appear on the face of the envelope, or a Certificate of Responsibility number. SEE Directions for Mailing Bids DMB section 00 21 13 - 1/1 for example.

c. **Bids Over $75,000:** Each Bidder submitting a bid in excess of $75,000 must show its Certificate of Responsibility number on the bid and on the face of the envelope containing the bid. SEE Directions for Mailing Bids DMB section 00 21 13 - 1/1 for example.

d. **Joint Venture Bid:** When multiple Contractors submit a joint venture bid in excess of $75,000, a *joint venture* Certificate of Responsibility number must be shown on the bid and on the face of the envelope containing the bid. If the Multiple-Contractor joint venture has no *joint venture* Certificate of Responsibility number, each of the Contractors participating in the bid must indicate their individual Certificate of Responsibility numbers on the bid and on the face of the envelope.

12. BID SECURITY-BIDDING REOUIREMENTS

All bids shall be accompanied by a Bid Security in the sum of five percent (5%) of the contract price. Bid Security shall be a cashier's or certified check or a duly executed copy of Bid Bond, using the Mississippi Military Department's Standard Form 24 or equivalent Form from the Bidders Bonding Company. Contractors bidding using Standard Form 24 will be furnished a copy from the Mississippi Military Department, State Purchasing and Contracting Division. (Example shown in Contract Forms BB Section 00 42 13 1/2).

13. CONTRACT BOND

Prior to award of contract, the Contractor will be expected to execute a Performance Bond, Standard Form 25 and a Payment Bond, Standard Form 25-A or equivalent Form from the bidders Bonding Company. When executed, this document will be bound here with final Contract Documents. (Example shown in Contract Forms Section, PeB Section 00 61 13.13 1/2 and PeB Section 00 61 13.16 2/2).

14. NONRESIDENT CONTRACTOR

When a Nonresident Contractor submits a bid for a public project, he/she shall attach thereto one of the following:

a. A copy of his/her resident state's current law pertaining to such state's treatment of Nonresident Contractors. As used in this section, the term "Resident Contractors" includes a nonresident person, firm or corporation that has been qualified to do business in this state and has maintained a permanent full-time office in the State of Mississippi for two (2) years prior to submission of the bid and the subsidiaries and affiliates of such a person, firm or corporation.

b. A statement indicating the State of (Name of the State) has no resident contractor preference law. Any bid submitted by a nonresident contractor which does not include either A or B of Paragraph 14 on page ITB Section 00 20 00 6/7 shall be rejected and not considered for award.

15. PROTEST

Any protest MUST be delivered, in writing, to the Owner within forty-eight (48) hours after the bid opening.

16. CONTRACT AWARD

The contract award will be made on the basis of the lowest and the best overall Base Bid and/or any combination of Bid Items as selected and accepted by the Director, State Purchasing and Contracting and/or Contracting Officer. The Director, State Purchasing and Contracting and/or Contracting Officer reserves the right to reject any and/or all bids and to adjust the contract price within funding on the basis of the quoted bid prices.

17. METHOD OF PAYMENT

Payments shall be made, and remittance information provided electronically as directed by the State of Mississippi Department of Finance and Administration (DFA). These payments shall be deposited into the bank account of the Contractor’s choice. The State of Mississippi DFA may, at its sole discretion, require the Contractor to submit invoices and supporting documentation electronically at any time during the term of this contract. Contractor understands and agrees that the State is exempt from the payment of taxes. All payments shall be in the United States currency.

Contractor shall be advised that in accordance with the Mississippi Code, the Military Department has thirty (30) calendar days to deliver a warrant to the vendor from the date the invoice is due and payable. Due and payable shall be at the time pay request has been received by the Department of Finance Administration (DFA) and has been validated by the Director, State Purchasing and Contracting and/or Contract Officer responsible for the project along with inspection report confirming work has been completed in accordance with plans, specifications and bid documents.

18. E-VERIFY PROGRAM

Contractor shall be advised that prior to Execution of the contract, **Contractor will be required to issue a certification letter to the MMD certifying E-Verify has been completed** and provide the 6-digit Company ID# issued by the Department of Homeland Security to include any Subcontractors Company IDS#'s. The Contractor agrees to comply with the Mississippi Employment Protection Act, Miss, Code Ann. 8 71-1-57, and will register and participate in the status verification system for all newly hired employees, effective for all public contracts executed after 1 Jul 08. The term "employee" as used herein means any person or entity that is hired to perform work within the State of Mississippi and to whom the Contractor is required by Federal or Mississippi law to issue a United States Internal Revenue Service Form W-2 or Form 1099.

As used herein, "status verification system" means the electronic verification of work authorization program of the Illegal Immigration Reform and Immigration Responsibility Act of 1996 that is operated by the United States Department of Homeland Security, also known as the E-Verify Program or any other successor verification system replacing the E-Verify Program. The Contractor agrees to maintain records of such compliance, and upon request of the State, to provide a copy of each such verification to the State. The Contractor agrees that any person assigned to perform services hereunder meets the employment eligibility requirements of all immigration laws of the United States and the State of Mississippi. The Contractor understands and agrees that any breach of these warranties may subject the Contractor to the following: (a) termination of this contract and ineligibility for any state of public contract in Mississippi for up to three years, with notice of such cancellation/termination being made public, or (b) the loss of any license, permit, certification or other document granted to the Contractor by an agency, department or government entity for the right to do business in Mississippi for up to one year, or (c) both, as well as any other penalties authorized by law. In the event of such cancellation/termination, the Contractor will also be liable for any additional cost incurred by the State due to the contract cancellation or loss of license or permit.

(END OF SECTION)

SECTION 00 21 13

DIRECTION FOR MAILING BIDS

ANY BID NOT MARKED ACCORDINGLY WILL BE DISQUALIFIED

ALL BIDS WILL BE PLACED IN SEALED ENVELOPE AND MARKED AS FOLLOWS:

IF BID DOES NOT EXCEED $75,000

NAME/ADDRESS OF CONTRACTOR

THE ADJUTANT GENERAL
STATE OF MISSISSIPPI
ATTN: NGMS-SRC
1410 RIVERSIDE DRIVE
JACKSON, MS 39202-1271

"BID" (Write in Title of Project as listed on specifications)

"ENCLOSED BID DOES NOT EXCEED $75,000"

IF BID DOES EXCEED $75,000

NAME/ADDRESS OF CONTRACTOR

THE ADJUTANT GENERAL
STATE OF MISSISSIPPI
ATTN: NGMS-SRC
1410 RIVERSIDE DRIVE
JACKSON, MS 39202-1271

"BID" (Write in Title of Project as listed on specifications)

"CERTIFICATE OF RESPONSIBILITY NUMBER_____

SECTION 00 40 00

BID FORM

SUBMITTED BY: _____ DATE: _____
(Name of Firm)

TO: The Adjutant General
State of Mississippi
ATTN: NGMS-SRC
1410 Riverside Drive
Jackson, MS 39202-1271

RE: RESTORATION & MODERNIZATION OF BUILDING 1471

Gentlemen:

In compliance with your advertisement for bids, the undersigned, having become thoroughly familiar with the terms and conditions of the proposed Contract Documents and with local conditions affecting the performance and costs of the work at the site in all particulars, hereby proposes and agrees to fully perform the work within the time stated and in strict accordance with proposed Contract Documents, including furnishing any and all plant, labor, and materials, and to do work required to construct and complete said work in accordance with Contract Documents, for the following sum of money:

BASE BID: All labor, materials, services and equipment necessary for the completion of the work as indicated on the plans and specifications and other contract documents for the sum of:

_____ DOLLARS AND _____ CENTS
(Words) (Words)

($_____).
(Figures)

ADDITIVE ALTERNATE NO. 1:

All labor, materials, services and equipment necessary for the completion of the work for the exterior covered porch to include the Concrete slab and Aluminum canopy indicated on plans

_____ DOLLARS AND _____ CENTS
(Words) (Words)

($_____).
(Figures)

ADDITIVE ALTERNATE NO. 2:

All labor, materials, services and equipment necessary for the completion of the work for all gutters, downspouts, cast iron downspout boots, all 4" PVC, all 6" PVC lines and all 12" PVC lines for downspout drains on Building 1471 (all piping required for catch basins to be in base bid) and specifications and other contract documents for the sum of:

_____ DOLLARS AND _____ CENTS
(Words) (Words)

($_____).
(Figures)

1. I understand that the Owner reserves the right to reject this bid and to waive informalities, but that this bid shall remain open and not be withdrawn for a period of **60** days from the date prescribed for its opening.

2. The Bidder further agrees that if awarded the contract, he/she will furnish and deliver to the Owner the *Performance Bond, Labor and Material Payment Bond, Certificate of Insurance Coverage and specified contract forms, all within ten (10) days after Notification of Acceptance of this bid. Bidder further agrees to commence work within ten (10) calendar days of the effective date of the written Notice-to-Proceed and to complete the project on or before **447** calendar days after the effective date of the Notice to Proceed. Completion will include receipt of all Close Out Documents and Final Payment received in the office of NGMS-SRC. In the case of failure on the part of the contractor to complete the work within the time fixed in the contract or any extension thereof, the contractor shall pay to the State as liquidated damages, not as penalty, the sum of **$966.16** per calendar day.

   - Or ONE PAYMENT option (Page ITB Section 00 20 00 - 6/7)

3. Notice of Acceptance, or request for additional information may be addressed to the undersigned at the address set forth below.

4. Security (Bid Bond, GSA Standard Form 24), as required by the Invitation is enclosed, and is to become the property of the Owner in the event the Contract Agreement and associated forms are not executed within the prescribed time as liquidated damages, not as penalty, for the delay and additional expense caused thereby. However, Bid Security will be returned to bidder upon contract award.

5. I agree to complete all work, to include the submission of ALL Close Out Documents and Final Pay Request in the number of consecutive calendar days stated above.

Signed: _____ _____

Title: _____ _____

_____
(Name/Address of Firm Bidding)

_____
(Phone Number of Firm Bidding)

CONTRACTOR'S CERTIFICATE OF RESPONSIBILITY NUMBER _____

The Corporation (if applicable) is chartered under the laws of the State of _____ and the names, title and business addressed of the executive are as follows:

NAMES:	ADDRESSES:
_____ President	_____ Address
_____ Secretary	_____ Address
_____ Treasurer	_____ Address

TO BE FILLED IN IF A PARTNERSHIP:

Our partnership is composed of the following individuals:

NAMES	ADDRESSES
_____	_____
_____	_____
_____	_____
_____	_____

RECEIPT OF THE FOLLOWING ADDENDA IS ACKNOWLEDGED:

ADDENDUM No.	DATED	ADDENDUM No.	DATED	ADDENDUM No.	DATED
_____	_____	_____	_____	_____	_____

END OF PROPOSAL

SECTION 00 43 00

SCOPE OF WORK & DESCRIPTION OF BID ITEMS

PART I - SCOPE OF WORK:

1.01 General Description: The work includes renovation to Building 1471 as shown on the drawings and specifications, consisting of selective demolition, site work, new metal building structure, roof, interior partitions, finishes, fire sprinkler, plumbing, mechanical, and electrical systems.

PART II - DESCRIPTION OF BID ITEMS:

2.01 Base Bid:
All labor, materials, services and equipment necessary for the completion of the work for Building 1471 and Site work as indicated in the plans and specifications and other contract documents for the sum of:

2.02 Additive Alternate No. 1:
All labor, materials, services and equipment necessary for the completion of the work Aluminum canopy connecting to the existing wood canopy at Building 1472.

2.03 Additive Alternate No. 2:
All labor, materials, services and equipment necessary for the completion of the work for all gutters, downspouts, cast iron downspout boots, all 4" PVC, all 6" PVC lines and all 12" PVC lines for downspout drains on Building 1471 (all piping required for catch basins to be in base bid) and specifications and other contract documents for the sum of:

PART III – GENERAL:

3.01 - The Owner reserves the right to accept any/or all Bid Items and to make award based upon the lowest and best overall Base Bid and/or any combination of the Bid Items in order to provide the Owner flexibility to award the contract within funding available.

3.02 - Unit Prices shall be used in determining additions to or deductions from the contract amount when authorized changes are directed in the work as shown or specified in the original contract drawings and documents. They will apply only when such changes involve materials, specifications, methods, and designs of the same as those required in like work shown and/or specified. They will not be applied to changes requiring the use of materials, specifications, or design of different character from those approved for general use under the contract as originally drawn. Unit Prices shall include the furnishing of all labor and materials, complete in place, unless otherwise noted.

3.03 - Immediately after award of the contract, or as soon thereafter as the Owner has made decision on which, if any, alternates will be selected, thoroughly and clearly advise all necessary personnel and suppliers as to the nature and extent of alternates selected by the Owner. Use all means necessary to alert those personnel and suppliers involved as to all changes in the work caused by the Owner's selection or rejection of alternates.

SECTION 00 52 00

CONTRACT FORMS - OWNER-CONTRACTOR AGREEMENT

The Owner-Contractor Agreement Form for this project will be in the form of State of Mississippi Military Department Construction Contract with Federal and State Clauses, to be executed on behalf of the State of Mississippi Military Department and the Contractor to be awarded the contract. An example of this contract is shown at Pages GC Section 00 70 00 6/33 thru GC Section 00 70 00 33/33 of this Specification Document and has been incorporated and made part of the General Conditions Section of same.

(END OF SECTION)

SECTION 00 65 00

CONDITIONS OF THE CONTRACT - CLOSE-OUT DOCUMENTS

1. The following documents, as a minimum, must be delivered to the Director, State Purchasing and Contracting and/or Contracting Officer prior to final payment and release of any and/or all retainages. The owner, through the Director, State Purchasing and Contracting and/or Contracting Officer, reserves the right to increase or decrease the type, substance and number of documents required for proper close out. Contact the A&E if you need to obtain copies of the AIA Documents as they are American Institution of Architects (AIA) official documents.

a. APPLICATION OF PAYMENT: AIA Document G-702 & G-703 (Continuation sheet).

b. CERTIFICATE OF SUBSTANTIAL COMPLETION: AIA Document G-704.

c. CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS: AIA Documents G-706 and G-706A: The Contractor shall furnish these documents complete with attached notarized statement on letterhead as follows:

"WE HEREBY CERTIFY THAT ALL BILLS FOR LABOR AND MATERIALS INCORPORATED INTO THE PROJECT UNDER OUR CONTRACT NUMBER HAVE BEEN PAID AND THAT THE OWNER IS RELEASED FROM ANY AND ALL CLAIMS AND/OR DAMAGES UNDER THIS CONTRACT."

d. CONSENT OF SURETY COMPANY TO FINAL PAYMENT: AIA Document G-707. To be completed in full by the bonding company.

e. CONTRACTOR'S NOTARIZED STATEMENT: Notarized statement from the Contractor on letterhead that project has been completed in accordance with all Contract Documents.

f. CONTRACTOR'S NOTARIZED STATEMENT OF GUARANTEE/S: Reference page GW Section 00 65 36 1/2 of specifications. Statement will be worded as follows:

"WE HEREBY GUARANTEE ALL WORK PERFORMED BY US ON THE PROJECT CONTRACT NUMBER, TO BE FREE FROM DEFECTIVE MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR, OR SUCH LONGER PERIOD OF TIME AS MAY BE STIPULATED IN THE CONTRACT DOCUMENTS."

The Contractor will secure guarantees from any and all subcontractors covering work performed by them and deliver same to the owner.

g. OPERATING AND MAINTENANCE MANUALS: All manufacturer's operating instructions and maintenance manuals will be compiled into a digital folder with PDF files and emailed to the project manager.

h. FINAL INSPECTION REPORT: Statement from the Contracting Officer's Representative or the A&E, whichever is applicable, that all punch list items have been completed, final cleaning has been accomplished and the project is ready for close out.

i. AS BUILT DRAWINGS: The Contractor shall furnish the Director, State Purchasing and Contracting and/or Contracting Officer two (2) complete digital PDF sets of "As Built Drawings", signed by the Contractor, depicting the actual construction and all changes incorporated therein.

j. DD FORM 1354: Refer to Section 00 73 01 3/5 item 10 for instructions.

(END OF SECTION)

SECTION 00 65 36

CONDITIONS OF THE CONTRACT - GUARANTEES & WARRANTIES

1. Except as otherwise specified, all work shall be guaranteed by the Contractor, and through him each Subcontractor, against defects resulting from the use of inferior materials, equipment or workmanship for a period of one (1) year from the date of substantial completion. NOTE: See Section 00 73 03, 2017 Supplementary Conditions, Paragraph 9.8 for conditions of Substantial Completion, Partial Occupancy or Use and Final Inspection. A year end warranty inspection will be conducted prior to the one-year end time frame. If any items need correcting, they will be corrected in a timely manner. Once completed, we will send in writing a completion letter of year end warranty items.

2. If, within any guarantee period, repairs or changes are required in connection with guaranteed work which, in the Owner's opinion, are rendered necessary as the result of the use of materials, equipment or workmanship which is inferior, defective or not in accordance with terms of the contract, the Contractor shall promptly, upon receipt of owner's notice in writing, and without expense to the owner, perform the following:

a. Place in satisfactory condition, in every particular, all such guaranteed work and correct all defects therein.

b. Make good all damage to the buildings, site, equipment or building contents which, in the owner's opinion, is the result of the use of materials, equipment or workmanship which is inferior, defective or not in accordance with the terms of the contract.

c. Make good any work or materials, or the equipment and contents of building or site disturbed in fulfilling such guarantee.

3. In any case where fulfilling the requirements of the contract, or any guarantee embraced in or required thereby, the Contractor disturbs any work guaranteed under another's contract, he/she shall restore such disturbed work to a condition satisfactory to the Owner and guarantee such restored work to the same extent as if it was guaranteed under such other contract.

4. If the Contractor, after notice, fails to proceed promptly to comply with terms of the guarantee, the owner may have the defects corrected and the Contractor and his/her surety shall be liable for all expense incurred thereby.

5. All special guarantees applicable to definite parts of the work that may be stipulated in the Specifications, and/or the Contract Documents, shall be subject to the terms herein during the first year of the life of such special guarantees.

6. All guarantees and warranties shall be obtained in the owner's name and evidence thereof shall be promptly delivered to the Director, State Purchasing and Contracting and/or Contracting Officer for transfer to the Owner.

(END OF SECTION)

SECTION 00 70 00

CONDITIONS OF THE CONTRACT - GENERAL CONDITIONS

1. The General Conditions of the contract for the construction of buildings, The American Institute Document, A201 - 2017, Articles 1 through 15, Section 00 73 03 is a part of these contract documents, copy of which can be obtained by the A&E. In the case of a conflict, the Special Conditions, General Conditions, and the owner-Contractor Agreement, as contained herein, shall take precedence over aforementioned AIA Document.

2. INSPECTION

All work will be conducted under the general direction of the Director, State Purchasing and Contracting and/or Contracting Officer and is subject to inspection by his/her appointed inspectors to ensure strict compliance with the terms of the contract. No inspector is authorized to change any provisions of the specifications without written authorization of the Director, State Purchasing and Contracting and/or Contracting Officer, nor shall the presence or absence of an inspector relieve the Contractor from any requirements of the contract. (See GC Section 00 70 00 - 17/33 – 18/33, Paragraph 17 for additional inspection conditions).

3. ACCIDENT PREVENTION

In order to provide safety controls for protection to the life and health of employees and other persons, for prevention of damage of property, materials, supplies and equipment, and for avoidance of work interruptions in the performance of this contract, the Contractor shall comply with all pertinent provisions of Corp of Engineers Manual EM 385-1-1, dated 3 November 2003, entitled General Safety Requirements, as amended and will also take or cause to be taken, such additional measures as the Director, State Purchasing and Contracting and/or Contracting Officer may determine to be reasonably necessary for the purpose. The Contractor will maintain an accurate record of, and will report to the Director, State Purchasing and Contracting and/or Contracting Officer in the manner and on the forms prescribed by the Director, State Purchasing and Contracting and/or Contracting Officer, exposed data and all accidents resulting in death, traumatic injury, occupational disease, and damage to property, materials, supplies and equipment incident to work performed under this contract.

4. USE AND POSSESSION PRIOR TO COMPLETION

The State shall have the right to take possession of or use any completed or partially completed part of the work. Such possession or use shall not be deemed an acceptance of any work not completed in accordance with the contract. While the State is in such possession, the contractor, notwithstanding

the provision of the clause of this contract entitled PERMITS AND RESPONSIBILITY FOR WORK, SHALL BE RELIEVED OF THE RESPONSIBILITY FOR LOSS OR DAMAGES TO THE WORK OTHER THAN THAT RESULTING FROM THE CONTRACTOR'S FAULT OR NEGLIGENCE.

If such prior possession or use by the State delays the progress of the work or causes additional expense to the contractor, an equitable adjustment in the contract price or the time of completion will be made, and the contract shall be modified in writing.

5. PROGRESS CHARTS AND REQUIREMENTS FOR OVERTIME WORK

a. The Contractor shall, within such time as determined by the Director, State Purchasing and Contracting and/or Contracting Officer after the date of the commencement of work, prepare and submit to the Director, State Purchasing and Contracting and/or Contracting Officer for approval, a practicable schedule, showing the order in which the Contractor proposes to carry on the work, the date on which he/she will start the several salient features, and the contemplated dates for completing the same. The schedule shall be in the form of a progress chart, of suitable scale, to indicate proportionally, the percentages of work scheduled for completion at any time. The Contractor shall enter on the chart the actual progress at such intervals as directed by the Director, State Purchasing and Contracting and/or Contracting Officer and shall immediately deliver to the Director, State Purchasing and Contracting and/or Contracting Officer such copies as directed. If the Contractor fails to submit a progress schedule within the time prescribed by the Director, State Purchasing and Contracting and/or Contracting Officer, the Director, State Purchasing and Contracting and/or Contracting Officer may withhold approval of progress payment estimates until such time as the Contractor submits the required progress schedule.

b. If, in the opinion of the Director, State Purchasing and Contracting and/or Contracting Officer, the Contractor falls behind in the progress schedule, the Contractor shall take such steps as may be necessary to improve his/her progress and the Director, State Purchasing and Contracting and/or Contracting Officer may require him/her to increase the number of shifts, or overtime operations, days of work, or the amount of construction plant, or all of them, and to submit for approval such supplementary schedule or schedules as may be deemed necessary to demonstrate the manner in which the agreed rate of progress will be regained, all without additional cost to the State.

c. Failure of the Contractor to comply with the requirements of the Director, State Purchasing and Contracting and/or Contracting Officer under this provision shall be grounds for determination of the Director, State Purchasing and Contracting and/or Contracting Officer that the Contractor is not prosecuting the work with such diligence as will ensure the completion within the time specified. Upon such determination, the Director, State Purchasing and Contracting and/or Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part thereof.

6. DEFINITIONS

a. Wherever in the specifications or upon drawings, the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation" or "prescription" of the Director, State Purchasing and Contracting

and/or Contracting Officer is intended and similarly the words "approved by", "acceptable", "satisfactory" or like words, mean "approved by", "acceptable to" or "satisfactory to" the Director, State Purchasing and Contracting and/or Contracting Officer, unless otherwise stated.

b. Where "as shown", "as indicated", "as detailed" or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided", as used herein, shall be understood to mean "Provided complete in place", that is "furnished and installed".

c. The term "State" shall mean the Mississippi Military Department, the State of Mississippi, Commonwealth, or Territory, which is the party to this Contract.

d. The term "Owner" shall mean the Mississippi Military Department, MSARNG, on behalf of the State of Mississippi.

7. TIME EXTENSIONS

The construction completion number of days required for this Contract as stated on the bid form includes normal anticipated inclement weather as computed from historical weather records for this area, approved holidays and Mississippi Military Department non-workdays. No time extensions will be granted for weather unless it can be documented as exceeding normal/mean weather delays as calculated for the local construction area. Additional time other than normal anticipated weather, materials delays, and any unusual conditions that may delay the completion of this contract will be considered for a time extension on a case by case basis. Contractors must submit their time extension request meeting the criteria for review and recommendation, in writing through the Architect/Engineer or Project Manager and Director, State Purchasing and Contracting and/or Contracting Officer with each pay request submitted.

8. CONSTRUCTION AND DEMOLITION DEBRIS REPORT

The Mississippi Military Department is required to submit to National Guard Bureau a report of offsite removal of solid waste, recyclable materials, etc. for each job site. The Contractor must complete this report and submit with your pay application at the monthly construction meeting. See General Conditions, Section 00 70 00 - 4/33 for an example of the form to be used.

9. ENVIRONMENTAL ISSUES-EROSION CONTROL REMEDIATION

Failure to comply with Erosion Control measures specified by the plans and specifications or in the event of an accident or incident caused by an act of nature, equipment failure, or human negligence that allows silt or contaminants to enter waters of the United States will be contained immediately and repaired within 48 hours. Failure to comply will result in the Mississippi Military Department mobilizing a third-party Contractor to mitigate the non-compliance and back charging the Contractor for actual expenses. In the event the Contractor chooses to forego payment, for the failure to comply, the appropriate bonding company will be notified. There will be no exceptions to this remediation.

C&D Debris Report

PROJECT NAME/NUMBER: _____

PAY APP NUMBER: _____

LOCATION: _____

DATE: _____

(choose only "1" unit of measure and enter NUMERIC value) TONS	LBS	YARDS	* % LANDFILL DISPOSAL (0%-100%)	* % RECYCLED/ REUSED (0%-100%)	
					ASPHALT
					BRICK
					CONCRETE
					STONE
					CRUSHED STONE/BASE
					LAND SOIL, LEAD-TAINTED
					LAND SOIL, PETROLEUM TAINTED
					SUBSOIL
					TOPSOIL
					VEGETATION/TIMBER
					ALUMINUM
					COPPER
					MIXED METAL
					STEEL
					BRASS
					CEILING TILE
					COMPOSITION ROOF

(choose only "1" unit of measure and enter NUMERIC value) TONS	LBS	YARDS	* % LANDFILL DISPOSAL (0%-100%)	* % RECYCLED/ REUSED (0%-100%)	
					DOORS/WINDOWS/STAIRS/CABINETS
					GLASS
					GYPSUM/PLASTER
					INSULATION
					PAPER
					PLASTIC
					SIDING
					FINISHED WOOD
					STRUCTURAL WOOD
					TREATED WOOD
					SOLID WASTE (trash)
					OTHER: _____
					OTHER: _____
					OTHER: _____
					OTHER: _____
					OTHER: _____

* Scrap disposal method may be partially by **LANDFILL DISPOSAL** and partially **RECYCLED/REUSED**. Please indicate by **%**.

_____
Project Manager

C&D Debris Report

PROJECT NAME/NUMBER: REPAIR ROOF / PN: 12345678

PAY APP NUMBER: 6

LOCATION: CAMP SHELBY BLDG 300

DATE: 10/10/20

(choose only "1" unit of measure and enter NUMERIC value)			* % LANDFILL DISPOSAL (0%-100%)	* % RECYCLED/ REUSED (0%-100%)	
TONS	LBS	YARDS			
					ASPHALT
					BRICK
		3	60 %	40%	CONCRETE
					STONE
					CRUSHED STONE/BASE
					LAND SOIL, LEAD-TAINTED
					LAND SOIL, PETROLEUM TAINTED
					SUBSOIL
					TOPSOIL
					VEGETATION/TIMBER
3				100%	ALUMINUM
					COPPER
					MIXED METAL
					STEEL
					BRASS
	600		100%		CEILING TILE
					COMPOSITION ROOF

(choose only "1" unit of measure and enter NUMERIC value)			* % LANDFILL DISPOSAL (0%-100%)	* % RECYCLED/ REUSED (0%-100%)	
TONS	LBS	YARDS			
					DOORS/WINDOWS/STAIRS/CABINETS
					GLASS
2.5			100%		GYPSUM/PLASTER
					INSULATION
					PAPER
					PLASTIC
					SIDING
					FINISHED WOOD
					STRUCTURAL WOOD
					TREATED WOOD
					SOLID WASTE (trash)
	1,000		75%	25%	OTHER: HVAC Duct & Units
	150		100%		OTHER: Ceramic Tile
		84sf	100%		OTHER: Asbestos VCT
					OTHER:
					OTHER:

* Scrap disposal method may be partially by **LANDFILL DISPOSAL** and partially **RECYCLED/REUSED**. Please indicate by **%**.

G. Mathenger
Project Manager

CONTRACT NUMBER **XXXXXXXXXX**

STATE OF MISSISSIPPI MILITARY DEPARTMENT
CONSTRUCTION CONTRACT
WITH
FEDERAL AND STATE CLAUSES

CONTRACTOR AND ADDRESS:

CONTRACT FOR:

AMOUNT:

PLACE:

OWNER: Mississippi Military Department
Bobby M. Ginn, Jr.
Major General, Mississippi National Guard
The Adjutant General of Mississippi

APPROPRIATION DATA: Fund XXXXXX

AGO USE ONLY
REVISED JULY 2025

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CONTRACT FOR CONSTRUCTION

I. THIS CONTRACT, entered into this _____ day of _____, 20 ___, by THE STATE OF MISSISSIPPI (hereinafter called the State), represented by The Adjutant General or designee thereof, executing this contract, with (name of contractor, address and phone no):

*a corporation organized and existing under the laws of the STATE OF MISSISSIPPI

*a professional limited liability company

*a professional limited liability corporation

*a limited liability (company or corporation)

*a partnership consisting of

*an individual trading as

of the city of XXXXXX in the state of XXXXXXXXX, hereinafter called the Contractor, provides that the parties hereto do mutually agree as follows:

II. STATEMENT OF WORK: All labor, materials, services and equipment necessary to
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

in strict accordance with all contract provisions, bid form, plans, specifications, schedules and drawings, all of which are made a part hereof for the consideration of: _____ **Dollars and Cents, ($)**. (Payment of this sum is in accordance with General Provision, para 10, Payments to Contractor.)

III. COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK - The Contractor will be required to commence work under this contract within **10** days after the date of receipt of written notice to proceed, to prosecute work diligently, and to complete the entire work no later than _____ calendar days after notice to proceed. The time stated for completion shall include final cleanup of the premises and submission of all Close Out Documents as required in the specifications, section 00 65 00. The number of days for completion as stated above includes normal holidays and normal anticipated inclement weather as computed from historical weather records for this area. No time extensions will be granted for weather unless they can be documented as exceeding normal/mean weather delays as calculated for the local construction area. Additional time other than normal anticipated weather, material delays, and any unusual conditions that may delay the completion of this contract will be considered for a time extension on a case by case basis.

*Delete all lines which do not apply

GENERAL PROVISIONS

1. RELATIONSHIP OF THE FEDERAL GOVERNMENT - This contract is funded in part by the Federal Government. The Federal Government is not a party to this contract. As a condition to receiving and expending Federal funds, there are certain rights of Federal inspection, Federal approval of contract changes and modifications, and Federal approval of settlements or dispute actions that the Federal Government will exercise prior to authorization of Federal funds. Therefore, no inspection or acceptance, change, modification, settlement, dispute claim payment, or dispute action will be considered binding until the required Federal approval is obtained. The Chief, National Guard Bureau, or his/her designated representative, is the approval authority. This paragraph does not abrogate any rights conferred on the Federal Government by law or other clause required due to the use of Federal funding.

2. SPECIFICATIONS AND DRAWINGS - The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Director, State Purchasing and Contracting and/or Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In the case of differences between drawings and specifications, the specifications shall govern. In any case of difference in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Director, State Purchasing and Contracting and/or Contracting Officer who shall promptly make a determination in writing. Any adjustment by the Contractor without this determination shall be at his/her own risk and expense. The Director, State Purchasing and Contracting and/or Contracting Officer shall furnish from time to time such detail drawings and other information, as he/she may consider necessary, unless otherwise provided.

3. SITE INVESTIGATION - The Contractor acknowledges that he/she has investigated and satisfied himself/herself as to the conditions affecting the work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, river stages, tides or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. The Contractor further acknowledges that he/she has satisfied himself/herself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the State, as well as from information presented by the drawings and specifications made a part of this contract. Any failure by the Contractor to acquaint himself/herself with the available information will not relieve him/her from responsibility for estimating properly the difficulty or cost of successfully performing the work. The State assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the State.

4. CHANGES AND EXTRAS - The Director, State Purchasing and Contracting and/or Contracting Officer may at any time, in writing, and without notice to the sureties, order extras or make changes in the drawings and/or specifications of this Contract, providing such extras or changes are within the general scope hereof. If any such extra or change causes an increase or decrease in the amount due under this contract, or in the time required for its performance, an equitable adjustment shall be made, and the contract shall be modified in writing. Federal funding support for any change or extra is subject to prior approval by the Chief, National Guard Bureau, or his duly authorized representative. Any claim of the Contractor for adjustment under this Clause must be asserted in writing, within 30 days after the date of receipt by the Contractor of the notification of extra or change: Provided, however, that the Director, State Purchasing and Contracting and/or Contracting Officer, if he/she decides that the facts justify such action, may receive and act upon any such claim asserted at any time prior to the date of final settlement of the contract. If the parties fail to agree upon the adjustment to be made, the dispute shall be determined as provided in Clause 9 hereof entitled DISPUTES. Nothing provided in this Clause, however, shall excuse the Contractor from proceeding with the prosecution of the work as changed. Except as otherwise herein provided, no charge for any extra work or material will be allowed.

5. CHANGED CONDITIONS – The Contractor shall promptly, and before such conditions are disturbed, notify the Director, State Purchasing and Contracting and/or Contracting Officer in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this contract. The Director, State Purchasing and Contracting and/or Contracting Officer shall promptly investigate the conditions, and if he/she finds that such conditions do so materially differ and cause an increase or decrease in the cost of (or the time required for), performance of this contract, an equitable adjustment shall be made, and the contract modified in writing. Federal funding support to any change or extra is subject to prior approval by the Chief, National Guard Bureau, or his duly authorized representative. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he/she has given notice as above required: Provided, that the Director, State Purchasing and Contracting and/or Contracting Officer may, if he/she determines the facts so justify, consider and adjust any such claim asserted before the date of final settlement of the contract. If the parties fail to agree upon the adjustment to be made, the dispute shall be determined as provided in Clause 9 hereof entitled DISPUTES.

6. MODIFICATION PROPOSALS-PRICE BREAKDOWN - The Contractor, in connection with any proposal he/she makes for a contract modification, shall furnish an itemized price breakdown, as required by the Director, State Purchasing and Contracting and/or Contracting Officer. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, subcontract, and overhead costs, as well as profit, and shall cover all work involved in the modification, whether such work was deleted, added or changed. Any amount claimed for subcontracts shall be supported by a similar price breakdown. In addition, if the proposal includes a time extension, a justification therefore shall also be furnished. The proposal, together with the price breakdown and time extension justification, shall be furnished by the date specified by the Director, State Purchasing and Contracting and/or Contracting Officer.

7. TERMINATION FOR DEFAULT-DAMAGES OR DELAY-TIME EXTENSIONS

a. If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within such time, the State may, by written notice to the Contractor, notify the Contractor of delay or non-performance and if not cured in 10 calendar days or any longer time specified in writing by the State, terminate his/her right to proceed with the work or such part of the work as to which there has been delay. In such event the State may take over the work and prosecute the same
to completion, by contract or otherwise, and the Contractor and his/her sureties shall be liable to the State for any excess cost occasioned the State thereby, and for liquidated damages for delay, as fixed in the contract documents or accompanying papers, until such reasonable time as may be required for the final by such delay. If the Contractor's right to proceed is so terminated, the State may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefore.

b. If the State does not terminate the right of the Contractor to proceed, as provided in subparagraph (a) hereof, the Contractor shall continue the work, in which event he/she and his/her sureties shall be liable to the State, in the amount set forth in the contract documents or accompanying papers, for the fixed, agreed, liquidated damages for each calendar day of delay until the work is completed or accepted; or if liquidated damages are not so fixed, any actual damages occasioned by such delay.

c. The right of the Contractor to proceed shall not be terminated, as provided in subparagraph (a) hereof, nor the Contractor charged with liquidated or actual damages, as provided in subparagraph (b), because of any delays in the completion of the work due to causes beyond his/her control which could not reasonably have been anticipated and were without his/her fault or negligence, including, but not restricted to, acts of God, acts of the public enemy, acts of the Government or of the State (either in its sovereign or contractual capacity), acts of another Contractor in the performance of a contract with the State, quarantine restrictions, strikes, freight embargoes, or unusually severe weather; or, delays of Subcontractors or suppliers due to such unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and such Subcontractors or suppliers at any tier: Provided, that the Contractor shall, within 10 days after the beginning of any such delay, unless the Director, State Purchasing and Contracting and/or Contracting Officer shall grant a further period of time prior to the date of final settlement of the contract, notify the Director, State Purchasing and Contracting and/or Contracting Officer in writing of the causes of delay. The Director, State Purchasing and Contracting and/or Contracting Officer shall ascertain the facts and the extent of the delay and extend the time for completing the work when in his/her judgment the findings of fact justify such an extension, and his/her findings of fact thereon shall be final and conclusive on the parties hereto, subject only to appeal as provided in the DISPUTES Clause hereon.

8. TERMINATION FOR CONVENIENCE OF THE GOVERNMENT

a. The State may terminate this Contract at any time and for any cause by a notice in writing from the Director, State Purchasing and Contracting and/or Contracting Officer to the Contractor. Upon receipt of such notice, the Contractor shall, unless the notice directs otherwise, immediately discontinue all work. The Contractor shall also terminate outstanding orders and Subcontractor as they relate to the terminated
work. The Contractor shall settle the liabilities and claims arising out of the termination of Subcontractors and orders connected with the terminated work.

b. If the contract is terminated for the convenience of the State, the Architect-Engineer will be paid promptly for services rendered and expenses incurred up to the date of termination, less any previous payments. Payment is limited to work accepted by the State.

9. DISPUTES - Except as otherwise specifically provided in this contract, and except as otherwise specifically provided by the State procedure for arbitration or other State procedure established by State law, any dispute concerning a question of fact arising under this contract which is not disposed of by mutual agreement shall be decided, within 30 calendar days, by the Director, State Purchasing and Contracting and/or Contracting Officer, who shall reduce his/her decision to writing and send by registered mail, return receipt requested, a copy thereof to the Contractor at his/her address shown herein. Within seven (7) days after the date of receipt of such copy, the Contractor may appeal in writing to The Adjutant General, whose written decision thereon, or that of his/her designated representative or representatives, shall, unless determined by a court of competent jurisdiction to have been fraudulent or capricious or arbitrary or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence, be final and conclusive: Provided, that if no such appeal is taken the decision of the Director, State Purchasing and Contracting and/or Contracting Officer shall be final and conclusive. The Adjutant General may designate an individual or individuals other than the Director, State Purchasing and Contracting and/or Contracting Officer, or a board, as his/her authorized representative to determine appeals under this clause. In connection with any appeal proceeding under this Clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of his/her appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Director, State Purchasing and Contracting and/or Contracting Officer's decision. Any sum or sums allowed to the Contractor under the provisions of this clause or under the State arbitration proceedings or under other State procedure shall be paid subject to approval by the Chief, National Guard Bureau, for the Government's share of the cost of the articles or work herein disputed as deemed to be within the contemplation of this contract.

10. PAYMENTS TO CONTRACTORS

a. Unless otherwise provided in the Contract Documents, partial payments will be made, no more than on a monthly basis, upon estimated percentage of work completed and approved by the Director, State Purchasing and Contracting and/or Contracting Officer. Materials delivered on the site and preparatory work done may be taken in consideration. Payment for stored materials will not be paid unless it is stored properly and Director, State Purchasing and Contracting and/or Contracting Officer

has received inspection report of said materials stored.

b. In making such partial payments there shall be retained 5 percent on the estimated amount of work completed and approved until final completion and acceptance of all work covered by the contract. In accordance with MS Code of 1972 annotated, Section 31-5-33, contracts that total an amount of $250,000.00 or greater, at any time after 50 percent of the work has been completed, and the Director, State Purchasing and Contracting and/or Contracting Officer finds that satisfactory progress is being made and project is on schdule, may return to the Contractor 50 percent of the retainage held to date. However, future retainage shall be withheld at a rate of two and one half (2 ½ %) percent until final completion and acceptance of all work covered by the contract, to include the receipt of all Close-Out Documents as indicated in Section 00 65 00 of the contract documents.

c. Payment shall be made and remittance information provided electronically as directed by the State of Mississippi Department of Finance and Administration (DFA). These payments shall be deposited in the bank account of the Contractor's choice. The State of Mississippi DFA may, at its sole discretion, require the Contractor to submit invoices and supporting documentation electronically at any time during the term of this contract. Contractor understands and agrees that the State is exempt from the payment of taxes. All payments shall be in the United Stated currency.

d. Invoices will be submitted in accordance with instructions given at the Pre-Construction Conference.

e. The Contractor shall be advised that in accordance with the Mississippi Code, the Mississippi Military Department has 30 calendar days to deliver a warrant to the vendor from the date the invoice is due and payable. Due and payable shall mean, when the Director, State Purchasing and Contracting and/or Contracting Officer received invoice certified by A&E and/or Project Manager that the work has been accomplished.

f. All material and work covered by partial payments made shall thereupon become the sole property of the State, but this provision shall not be construed as relieving the Contractor from the sole responsibility for all materials and work upon which payments have been made or the restoration of any damaged work, nor as a waiver of the right of the State to require the fulfillment of all of the terms of the contract.

g. Upon completion and acceptance of all work required hereunder, and after the Contractor has furnished the State with all Close-Out Documents, to include, a release of all claims against the State arising under and by virtue of this contract, other than such claims, if any, as may be specifically excepted by the Contractor from the operation of the release, in stated amounts to be set forth therin, the amount due the Contractor under this contract will be paid as stated above in para 10-e. If the Contractor's claim to amounts payable under the contract has been assigned under the Assignment of Claims Act of 1940, as amended (41 U.S.C. § 15), a release may also be required of the assignee at the option of the Director, State Purchasing and Contracting and/or Contracting Officer.

11. MATERIAL AND WORKMANSHIP - Unless otherwise specifically provided for in the Contract Documents, all equipment, materials, and articles incorporated in the work covered by this contract are to be new and of the most suitable grade of their respective kinds for the purpose intended, and all workmanship shall be first class. Where equipment, materials, or articles are referred to in the Contract Documents as "equal to" any particular standard, the Director, State Purchasing and Contracting and/or Contracting Officer shall decide the question of equality. The Contractor shall furnish to the Director, State Purchasing and Contracting and/or Contracting Officer for approval the name of the manufacturer of machinery, mechanical and other equipment which he/she contemplates incorporating in the work, together with their performance capacities and other pertinent information. When required by the Contract Documents, or when called for by the Director, State Purchasing and Contracting and/or Contracting Officer, the Contractor shall furnish to the Director, State Purchasing and Contracting and/or Contracting Officer for approval full information concerning the materials or articles which he/she contemplates incorporating in the work. Samples of materials shall be submitted for approval when so directed. Machinery, equipment, materials, and articles installed or used without such approval shall be at the risk of subsequent rejection. The Director, State Purchasing and Contracting and/or Contracting Officer may in writing require the Contractor to remove from the work site such employee as the Director, State Purchasing and Contracting and/or Contracting Officer deems incompetent, careless, insubordinate, or otherwise objectionable, or whose continued employment on the work site is deemed by the Director, State Purchasing and Contracting and/or Contracting Officer to be contrary to the public interest.

12. HAZARDOUS WASTE MATERIALS – The Contractor is responsible for the removal and disposal of any hazardous waste materials encountered in the performance of the Contract requirements. Hazardous Containing Materials [HCM] include, but are not limited to, Asbestos and Lead Paint and should be identified and removed as a part of the Contract. The absence of details does not relieve the Contractor from the responsibility of removal and disposal; but, a Change Order could be executed in the absence of identified HCM in the documents.

13. CONTRACT DRAWINGS AND SPECIFICATIONS

a. Omissions from the drawings or specifications or the miss-description of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or miss-described details of the work but they shall be performed as if fully correctly set forth and described in the drawings and specifications.

b. The Contractor shall check all drawings furnished him/her immediately upon their receipt and shall promptly notify the Director, State Purchasing and Contracting and/or Contracting Officer of any discrepancies. Figures marked on drawings shall in general be followed in preference to scale measurements. Large scale drawings shall in general govern small scale drawings. The Contractor shall compare all drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.

14. RIGHTS IN SHOP DRAWINGS - Shop drawings for construction means drawings, submitted to the State by the Construction Contractor, Subcontractor of any lower tier subcontractor pursuant to a Construction Contract, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation i.e., form, fit, and attachment details of materials or equipment. The State may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

15. OPERATIONS AND STORAGE AREAS

a. All operations of the Contractor (including storage of materials) upon state premises shall be confined to areas authorized or approved by the Director, State Purchasing and Contracting and/or Contracting Officer. The Contractor shall hold and save the State, its officers and agents, free and harmless from liability of any nature occasioned by his/her operations.

b. Temporary building (s) (storage sheds, offices, etc.) may be erected by the Contractor only with the approval of the Director, State Purchasing and Contracting and/or Contracting Officer, and shall be built with labor and materials furnished by the Contractor without expense to the State. Such temporary buildings and utilities shall remain the property of the Contractor and shall be removed by him/her at his/her expense upon the completion of the work. With the written consent of the Director, State Purchasing and Contracting and/or Contracting Officer, such buildings and utilities may be abandoned and need not be removed.

c. The Contractor shall, under regulations prescribed by the Director, State Purchasing and Contracting and/or Contracting Officer, use only established roadways or construct and use such temporary roadways as may be authorized by the Director, State Purchasing and Contracting and/or Contracting Officer. Where materials are transported in the prosecution of the manufacturer of the vehicle or prescribed by any federal, state or local law or regulation. When it is necessary to cross curbings or sidewalks, protection against damage shall be provided by the Contractor and any damaged roads, curbings, or sidewalks shall be repaired by, or at the expense of, the Contractor.

16. ENVIRONMENTAL ISSUES-EROSION CONTROL REMEDIATION - Failure to comply with erosion control measures specified by the Contract Documents or in the event of an accident or incident caused by an act of nature, equipment failure, or human negligence that allows silt or contaminants to enter waters of the United States will be contained immediately and repaired within 48 hours. Failure to comply will result in the Mississippi Military Department mobilizing a third-party Contractor to mitigate the non-compliance and back charging the Contractor for actual expenses. In the event the Contractor chooses to forego payment, for the failure to comply, the appropriate bonding company will be notified. There will be no exceptions to this remediation.

17. INSPECTION

a. Except as otherwise provided in subparagraph (d) hereof, all material and workmanship (if not otherwise designated by the Contract Documents) shall be subject to inspection, examination, and testing by representatives of the Director, State Purchasing and Contracting and/or Contracting Officer at any and all times during manufacture and/or construction (and at any and all places where such manufacture and/or construction are carried on). The State shall have the right to reject defective material and workmanship or require its correction. Rejected workmanship shall be satisfactorily corrected and rejected material shall be satisfactorily replaced with proper material without charge therefore, and the Contractor shall
promptly segregate and remove the rejected material from the premises. If the Contractor fails to proceed at once with the replacement of rejected material and/or the correction of defective workmanship, the State may, by contract or otherwise, replace such material and/or correct such workmanship and charge the cost thereof to the Contractor; or the State may terminate the right of the Contractor to proceed as provided in Clause 7 of this contract, the Contractor and surety being liable for any damage to the same extent as provided in said Clause 7 for terminations thereunder.

b. The Contractor shall furnish promptly, without additional charge, all reasonable facilities, labor and materials necessary for the safe and convenient inspections and tests that may be required by the Director, State Purchasing and Contracting and/or Contracting Officer. All inspections and tests by the State shall be performed in such manner as not unnecessarily to delay the work, special, full size, and performance tests shall be as described in the Contract Documents. The Contractor shall be charged with any additional cost associated with the inspection, request by the Director, State Purchasing and Contracting and/or Contracting Officer, when material and workmanship is not ready at the time of inspection.

c. Should it be considered necessary or advisable by the State, or by the representatives of the Chief, National Guard Bureau, at any time before final acceptance of entire work to make an examination of work already completed, by removing or tearing out same, the Contractor shall on request promptly furnish all necessary facilities, labor and material. If such work is found to be defective or nonconforming in any material respect due to fault of the Contractor or his/her Subcontractors, he/she shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, an equitable adjustment shall be made in the contract price to compensate the Contractor for the additional reconstruction; and, if completion of work has been delayed thereby, he/she shall, in addition, be granted a suitable extension of time. Federal funding support of the cost for examination and replacement of satisfactorily completed work that requires removal or that is damaged due to inspection requirements is subject to prior approval by the Chief, National Guard Bureau, or his/her duly authorized representative.

d. Inspection of material and finished articles to be incorporated in the work site shall be made at the place of production, manufacture, or shipment, whenever the quantity justifies it, unless otherwise stated in the Contract Documents; and such inspection and acceptance shall be in writing, and unless otherwise stated in the Contract Documents, shall be final, except as regards latent defects, departures

from specific requirements of the contract and the specifications and drawings made a part thereof, damage or loss in transit, fraud, or such gross mistakes as amount to fraud. Subject to the requirement contained
in the preceding sentence, the inspection of material and workmanship for final acceptance as a whole or in part, shall be made at the site. Nothing contained in this paragraph (d) shall in any way restrict the State's rights under any warranty or guarantee.

18. INSPECTORS - The work will be conducted under the general direction of the Director, State Purchasing and Contracting and/or Contracting Officer and is subject to inspection by his/her appointed inspectors to insure strict compliance with the terms of the contract. No inspector is authorized to change any provision of the Contract Documents without written authorization of the Director, State Purchasing and Contracting and/or Contracting Officer, nor shall the presence or absence of an inspector relieve the Contractor from any requirements of the contract.

19. CLEANING UP - The Contractor shall at all times keep the construction area, including storage areas used by him/her free from accumulations of waste material or rubbish and prior to completion of the work remove any rubbish from the premises and all tools, scaffolding, equipment and materials not the property of the State. Upon completion of the construction, the Contractor shall leave the work and premises in a clean, neat and workmanlike condition satisfactory to the Director, State Purchasing and Contracting and/or Contracting Officer.

20. SUPERINTENDENCE BY CONTRACTOR - The Contractor shall have a competent superintendent, satisfactory to the Director, State Purchasing and Contracting and/or Contracting Officer, on the work site at all times while work is underway, with authority to act for him/her.

21. PERMITS AND RESPONSIBILITY FOR WORK - The Contractor shall, without additional expense to the State, obtain any and all licenses and permits required for the prosecution of the work. The Contractor will pay all charges related to the connection of utility services to existing systems. He/She shall be responsible for all damages to persons or properties that occur as a result of his/her fault or negligence in connection with the prosecution of the work. He/She shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. He/She shall also be responsible for all materials delivered and work performed until completion and final acceptance, except for any completed unit thereof which theretofore may have been finally accepted.

22. OTHER CONTRACTS - The State may undertake or award other contracts for additional work, and the Contractor shall fully cooperate with such other Contractors and State Employees and carefully fit his/her own work to such additional work as may be directed by the Director, State Purchasing and Contracting and/or Contracting Officer. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other Contractor or by State employees.

23. E-VERIFY PROGRAM - Contractor shall be advised that prior to Execution of the contract, Contractor will be required to issue a certification letter to the MMD certifying E-Verify has been completed and provide the 6-digit Company ID# issued by the Department of Homeland Security to

include any Subcontractors Company IDS#'s. The Contractor agrees to comply with the Mississippi Employment Protection Act, Miss, Code Ann. § 8 71-1-57, and will register and participate in the status verification system for all newly hired employees, effective for all public contracts executed after 1 Jul 08. The term "employee" as used herein means any person or entity that is hired to perform work within the State of Mississippi and to whom the Contractor is required by Federal or Mississippi law to issue a United States Internal Revenue Service Form W-2 or Form 1099. As used herein, "status verification system" means the electronic verification of work authorization program of the Illegal Immigration Reform and Immigration Responsibility Act of 1996 that is operated by the United States Department of Homeland Security, also known as the E-Verify Program or any other successor verification system replacing the E-Verify Program. The Contractor agrees to maintain records of such compliance, and upon request of the State, to provide a copy of each such verification to the State. The Contractor agrees that any person assigned to perform services hereunder meets the employment eligibility requirements of all immigration laws of the United States and the State of Mississippi. The Contractor understands and agrees that any breach of these warranties may subject the Contractor to the following: (a) termination of this
contract and ineligibility for any state of public contract in Mississippi for up to three years, with notice of such cancellation/termination being made public, or (b) the loss of any license, permit, certification or other document granted to the Contractor by an agency, department or government entity for the right to do business in Mississippi for up to one year, or (c) both, as well as any other penalties authorized by law. In the event of such cancellation/termination, the Contractor will also be liable for any additional cost incurred by the State due to the contract cancellation or loss of license or permit.

24. ADDITIONAL BOND SECURITY - If any surety upon any bond furnished in connection with this contract becomes unacceptable to the State, or if any such surety shall fail to furnish reports as to his/her financial condition from time to time as requested by the State, the Contractor shall promptly furnish such additional security as may be required from time to time to protect the interests of the State or of persons supplying labor or materials in the prosecution of the work contemplated by the contract.

25. COVENANT AGAINST CONTINGENT FEES - The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty the State shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration the full amount of such commission, percentage, brokerage, or contingent fee.

26. OFFICIALS TO BENEFIT - No member of or delegate to Congress, or resident commissioner or State official or employee shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

27. CONVICT LABOR - In connection with the performance of work under this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment, as provided by Public Law 89-176, September 10, 1965 (18 USC § 4082 (c) (2)) and executive order 11755, December 29, 1973.

28. NONDISCRIMINATION IN EMPLOYMENT - In connection with the performance of work under this contract, the Contractor agrees not to discriminate as follows; and further agrees to insert the foregoing provision in all subcontracts hereunder except subcontracts for standard commercial supplies or for raw materials.

a. On the basis of race, color, or national origin, as provided in Clause 34-Equal Opportunity (Federally Assisted Construction).

b. On the basis of handicap, in Section 504 of the Rehabilitation Act of 1973 (29 U.S.C.§ 794) as implemented by Department of Justice Regulations at 28 CFR part 41 and DOD Regulations at 32 CFR Par 56; and,

c. On the basis of Age, in the Age Discrimination Act of 1975 (42 U.S.C. § 6101 et seq.) as implemented by Department of Health and Human Services Regulations at 45 CFR Part 90.

29. GRATUITIES

a. The State may, by written notice to the Contractor, terminate the right of the Contractor to proceed under this contract if it is found, after notice and hearing, by the Secretary or Governor or the duly authorized representative of either, that gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by the Contractor, or any agent or representative of the Contractor, to any officer or employee of the State with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performance, of such contract: Provided, that the existence of the facts upon which the Secretary or Governor or the duly authorized representative of either makes such findings shall be in issue and may be reviewed in any competent court.

b. In the event this contract is terminated as provided in paragraph (a) hereof, the State shall be entitled (1) to pursue the same remedies against the Contractor as it could pursue in the event of a breach of contract by the Contractor, and (2) as a penalty in addition to any other damages to which it may be entitled by law, to exemplary damages in an amount (as determined by the Secretary or Governor or the duly authorized representative of either) which shall not be less than 3 nor more than 10 times the costs incurred by the Contractor in providing any such gratuities to any such officer or employee.

c. The rights and remedies of the State provided in the Clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

30. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT-OVERTIME COMPENSATION (40 U.S.C. § 327-333) - This contract is subject to the Contract Work Hours and Safety Standards Act and to the applicable rules, regulations, and interpretations of the Secretary of Labor.

a. The Contractor shall not require or permit any laborer or mechanics including apprentices, trainees, watchmen, and guards in any workweek in which he/she is employed on any work site under this contract to work in excess of forty (40) hours in such workweek on work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer or mechanic, including apprentices, trainees, watchmen, and guards, receives compensation at a rate not less than one and one-half times
(1 ½) his basic rate of pay for all such hours worked in excess of forty (40) hours in such workweek.

b. In the event of any violation of the provisions of paragraph (a), the Contractor shall be liable to any affected employee for any amounts due, and to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including an apprentice, trainee, watchmen, or guard, employed in violation of the provisions of paragraph (a) in the sum of **$10** for each calendar day on which such employee was required or permitted to be employed on such work in excess of the standard workweek of forty (40) hours without payment of the overtime wages required by paragraph (a).

31. COPELAND ("ANTI-KICKBACK") ACT-NONREBATE OF WAGES - The regulations of the Secretary of Labor applicable to Contractors and Subcontractors (29 CFR, Part 3), made pursuant to the Copeland Act, as amended (40 U.S.C. § 276c) and to aide in the enforcement of the Anti-Kickback Act (18 U.S.C. § 874) are made a part of this contract by reference. The Contractor will comply with these regulations and any amendments or modifications thereof and the Prime Contractor will be responsible for the submission of affidavits required of Subcontractors thereunder. The foregoing shall apply except as the Secretary of Labor may specifically provide for reasonable limitations, variations, tolerances and exemptions.

32. WITHHOLDINGS OF FUNDS

a. The Director, State Purchasing and Contracting and/or Contracting Officer may withhold or cause to be withheld from the State Prime Contractor so much of the accrued payments or advances as may be considered necessary (i) to pay laborers and mechanics, including apprentices, trainees, watchmen, and guards, employed by the Contractor or any Subcontractor on the work the full amount of wages required by the contract, and (ii) to satisfy any liability of the Contractor and any Subcontractor for liquidated damages under paragraph (b) of the Clause entitled CONTRACT WORK HOURS AND SAFETY STANDARDS ACT-OVERTIME COMPENSATION.

b. If the Contractor or any Subcontractor fails to pay any laborer, mechanic, apprentice, trainee, watchman, or guard employed or working on the site of the work, all or part of the wages required by the contract, the Director, State Purchasing and Contracting and/or Contracting Officer may, after written notice to the State Prime Contractor, take such action as may be necessary to cause suspension of any further payments or advances until such violations have ceased.

33. DEBARMENT AND SUSPENSION

a. The Contractor shall not make any award or permit any award (sub-grant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in federal assistance programs under Executive Order 12549 “Debarment and Suspension”.

b. The Final Rule, Government-Wide Debarment and Suspension (Non-procurement), issued by the Office of Management Budget and the Department of Defense (32 CFR Part 25) to implement provisions of Executive Order 12549 “Debarment and Suspension”, is incorporated by reference and the Contractor covenants and agrees to comply with provisions thereof, including amendments to the Final Rule that may hereafter be issued.

34. LOBBYING

a. The Contractor covenants and agrees that it will not expend any funds appropriated by Congress to pay any person for influencing or attempting to influence an officer or employee of any agency or a member of Congress in connection with any of the following covered Federal actions: The awarding of any Federal Contract; the making of any Federal Grant; the making of any Federal Loan; the entering into of any cooperative agreement; and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. The Final Rule, New Restrictions on Lobbying, issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 28) to implement provisions of Section 319 of Public law 101-121 (31 U.S.C. § 1352) is incorporated by reference and the Contractor agrees to comply with provisions thereof, including amendments to the Interim Final Rule that may hereafter be issued.

35. EOUAL OPPORTUNITY (FEDERALLY ASSISTED CONSTRUCTION) -

The Contractor shall actively promote a workplace free from unlawful discrimination and harassment, and shall take all reasonable steps to ensure equal opportunity in all aspects of employment. This includes, but is not limited to, regularly reviewing its employment practices and policies to identify and address any systemic disparities based on race, ethnicity, gender, sexual orientation, or disability, as directed by Executive Order 14173. The Contractor shall cooperate fully with any agency investigation related to compliance with Executive Order 14173, and shall provide all requested data and documentation in a timely manner. The Contractor acknowledges its obligation to comply with all applicable laws and regulations prohibiting discrimination and promoting equal opportunity.

36. PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS

a. The Contractor will preserve and protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site of work which is not to be removed and which does not unreasonably interfere with construction work. Care will be taken in removing trees authorized for removal to avoid damage to vegetation to remain in place. Any limbs or branches of trees broken during such operations or by the careless operation of equipment, or by workmen, shall be trimmed with a clean cut and painted with an approved tree pruning compound as directed by the Director, State Purchasing and Contracting and/or Contracting Officer.

b. The Contractor will protect from damage all existing improvements or utilities at or near the site of the work, the location of which is made known to him, and will repair or restore any damage to such facilities resulting from failure to comply with the requirements of this contract or the failure to exercise reasonable care in the performance of the work. If the Contractor fails or refuses to repair any such damage promptly, the Director, State Purchasing and Contracting and/or Contracting Officer may have the necessary work performed and charge the cost thereof to the Contractor.

37. CERTIFICATION OF NONSEGREGATED FACILITIES - Applicable to contracts, subcontracts, and to agreements with applicants who are themselves performing Federally assisted construction contracts, exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause. By the submission of this bid, the bidder, offeror, applicant or subcontractor certifies that he/she does not maintain or provide for his/her employees any segregated facilities at any of his/her establishments, and that he/she does not permit his/her employees to perform their services at any location, under his/her control, where segregated facilities are maintained. He/She certifies further that he/she will not maintain or provide for his/her employees any segregated facilities at any of his/her establishments, and that he/she will not permit his/her employees to perform their services at any location, under his/her control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion or national origin, because of habit, local custom or otherwise. He/She further agrees that (except where he/she has obtained identical certifications from proposed subcontractors for specific time periods) he/she will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause; that he/she will retain such certifications in his/her files; and that he/she will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES. A Certification of Non-segregated Facilities must be submitted prior to award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. § 1001.

38. CLEAN AIR AND WATER - (Applicable only if the contract exceeds $100,000, or the Director, State Purchasing and Contracting and/or Contracting Officer has determined that orders under an indefinite quantity contract in any one year will exceed $100,000, or facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S. C. § 1857c-8 (c) (1)) or the Federal Water Pollution Control Act (33 U.S.C. § 1319(c)) and is listed by EPA, or the contract is not otherwise exempt).

a. The Contractor agrees as follows:

(i) to comply with all the requirements of section 114 of the Clean Air Act, as amended (42 U.S.C. § 1857, et seq., as amended by Public Law 91-604) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. § 1251, as amended by Public Law 92-500), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and
section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this contract;

(ii) that no portion of the work required by this prime contract will be performed in a facility listed on the Environmental Protection Agency List of Violating Facilities on the date this contract was awarded unless and until the EPA eliminates the name of such facility or facilities from such listing;

(iii) to use his/her best efforts to comply with clean air standards and clean water standards at the facilities in which the contract is being performed; and

(iv) to insert the substance of the provisions of this Clause in any nonexempt subcontract, including this paragraph (iv).

b. The terms used in this Clause have the following meanings.

(i) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. § 1857 et seq., as amended by Public Law 91-604).

(ii) The term "Water Act" means the Federal Water Pollution Control Act, as amended (33 U.S.C. § 1251 et seq., as amended by Public Law 92-500).

(iii) The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110(d) of the Clean Air Act (42) U.S.C. § 1857c-5(d), an approved implementation procedure or plan under section 111(c) or section 111(d), respectively, of the Air Act (42 U.S.C. § 1857c-6) (c) or (d), or an approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. § 1857c-7(d)).

(iv) The term "Clean Water Standards" means any enforceable limitation, control, requirement which is contained in a permit Protection Agency or authorized by section a local government condition, prohibition, standard or other promulgated pursuant to the Water Act or issued to a discharger by the Environmental by a state under an approved program, as 402 of the Water Act (33 U.S.C. § 1342), or by to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. § 1317).

(v) The term "Compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency or an Air Water Pollution Control Agency in accordance with the requirement of the Air Act or Water Act and regulations issued pursuant thereto.

(vi) The term "Facility" means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a Contractor, Subcontractor, to be utilized in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

(vii) The term "Nonexempt Contract or Subcontract" means a contract or subcontract of more than $100,000 which is not otherwise exempted pursuant to the EPA regulations implementing the Air Act and Water Act (40 CFR 15.5), as further implemented in ASPR 1-2302.4 or in FPR 1-1.2302.4 (whichever is applicable) and the procedures of the Department awarding the contract.

39. AUDIT BY DEPARTMENT OF DEFENSE - Insert the following clause in all contracts (except those entered into by formal advertising which are not expected to exceed $100,000).

a . General. The Director, State Purchasing and Contracting and/or Contracting Officer or his representatives shall have the audit and inspection rights described in the applicable paragraphs (b), (c) and (d) below.

b. Examination of Costs. If this is a cost reimbursement type, incentive, time and materials, labor hour, or price re-determinable contract, or any combination thereof, the Contractor shall maintain,

and the Director, State Purchasing and Contracting and/or Contracting Officer or his/her representatives shall have the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly all direct and indirect costs of whatever nature claim to have been incurred and anticipated to be incurred for the performance of this contract. Such right of examination shall include inspection at all reasonable times of the Contractor's plants, or such parts, thereof as may be engaged in the performance of this contract.

c. Cost or Pricing Data. If the Contractor submitted cost or pricing data in connection with the pricing of this contract or any change or modification thereto, unless such pricing was based on adequate price completion, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation, the Director, State Purchasing and Contracting and/or Contracting Officer or his/her representatives who are employees of the State shall have the right to examine all books, records, documents and other data of the Contractor related to the negotiation, pricing or performance of such contract, change or modification, for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data submitted. Additionally, in the case of pricing any change or modification exceeding $100,000 to formally advertised contracts, the Comptroller General of the United States or his/her representatives who are employees of the State shall have such rights. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

d. Reports. If the Contractor is required to furnish Contractor Cost Data Reports (CCDR), Contract Fund Status Reports (CFSR), or Cost Performance Reports (CPR) the Director, State Purchasing and Contracting and/or Contracting Officer or his/her representatives shall have the right to examine books, records, other documents, and supporting materials, for the purpose of evaluating (i) the effectiveness of the Contractor's policies and procedures to produce data compatible with the objectives of these reports, and (ii) the data reported.

e. Availability. The materials described in (b), (c) and (d) above shall be made available at the office of the Contractor, at all reasonable times, for inspection, audit, or reproduction, until the expiration of three (3) years from the date of final payment under this contract or such lesser time specified in Appendix M Of the Defense Acquisition Regulation and for such longer period, if any, as is required by applicable statute, or by other clauses of this contract, or by (1) and (2) below:

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for a period of three (3) years from the date of any resulting final settlement.

(2) Records which relate to appeals under the DISPUTES Clause of this contract, or litigation, or the settlement of claims arising out of the performance of this contract, shall be made available until such appeals, litigation, or claims have been disposed of.

f. The Contractor shall insert a clause containing all the provisions of this clause, including this paragraph (f), in all subcontracts exceeding $10,000 hereunder, except altered as necessary for proper identifications of the contracting parties and the Director, State Purchasing and Contracting and/or Contracting Officer under the State prime contract.

40. SUBCONTRACTS-TERMINATION – The Contractor agrees to insert the following clauses of this contract physically in all subcontracts:

Paragraph: 14, 16, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 42 and 46. The term "Contractor" as used in such clauses in any subcontract shall be deemed to refer to the Subcontractor except in the phrase "Prime Contractor".
Subcontracts are between the Contractor and the Sub. It is the sole responsibility of the Contractor to meet the terms of each subcontract and to settle any dispute that may arise.

The Contractor further agrees that a breach of any of the requirements of the aforementioned clauses for the subcontract may be grounds for termination.

41. SUBCONTRACTOR COST OR PRICING DATA-PRICE ADJUSTMENTS - Insert the following clause in all contracts, both formally advertised and negotiated, which exceed $100,000:

a. Paragraphs (b) and (c) of this Clause shall become operative with respect to any modification made pursuant to one or more provisions of this contract which involves aggregate increases and/or decreases in costs plus applicable profits expected to exceed $100,000. The requirements of this Clause shall be limited to such modifications.

b. The Contractor shall require Subcontractors hereunder to submit cost or pricing data under the following circumstances: (i) prior to the award of any subcontract the amount of which is expected to exceed $100,000 when entered into; (ii) prior to the pricing of any subcontract modification which involves aggregate increases and/or decreases in costs plus applicable profits expected to exceed $100,000; except where the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

c. The Contractor shall require Subcontractors to certify that to the best of their knowledge and belief the cost and pricing data submitted under (b) above is accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract change or modification.

d. The Contractor shall insert the substance of this Clause including this paragraph (d) in each subcontract which exceeds $100,000.

42. BUY AMERICAN ACT

a. Agreement. In accordance with the Buy American Act (41 U.S.C. § lOa-10d), the Contractor agrees that only domestic construction material will be used (by the Contractor, Subcontractors, materialmen, and supplies) in the performance of this contract, except for nondomestic construction material listed in the "Nondomestic Construction Materials" Clause, if any, of this contract.

b. Domestic Construction Material. "Construction Material" means any article, material, or supply brought to the construction site for incorporation in the building or work. An unmanufactured construction
material is a "Domestic Construction Material" if it has been mined or produced in the United States. A manufactured construction material is a "Domestic Construction Material" if it has been manufactured in the United States and if the cost of its components which have been mined, produced, or manufactured in the United States exceed 50 percent of the cost of all its components. "Component" means any article, material, or supply directly incorporated in a construction material.

c. Domestic Component. A component shall be considered to have been "mined, produced, or manufactured in the United States" (regardless of its source in fact) if the article, material, or supply in which it is incorporated was manufactured in the United States and the component is of a class or kind determined by the Government to be not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality.

43. SUBJECT TO MILITARY CONSTRUCTION COOPERATIVE AGREEMENT
This contract is subject to all terms and conditions in agreement number DAHA N/A dated N/A between the United States of America and the State of Mississippi.

44. DEFINITIONS - As used throughout this contract, the following terms shall have the meaning set forth below:

a. Except for the original signing of this contract, and except as otherwise stated herein, the term “Director, State Purchasing and Contracting and/or Contracting Officer” as used herein, shall mean The Adjutant General of Mississippi duly authorized representative.

b. The term "Government" means the United States and any Department head thereof.

c. The term "State" means the Mississippi Military Department, the State of Mississippi, Commonwealth, or Territory, which is the party to this contract.

d. The term "Governor" means the Governor of the state or his/her duly appointed representative (other than the Director, State Purchasing and Contracting and/or Contracting Officer).

e. The term "USPFO" means the United States Property and Fiscal Officer assigned to the State.

f. The "Contract Documents" means plans, specifications, bid form, contract, schedules, drawings and any other contract documents approved during the term of this contract.

45. APPROVAL - This contract and any subsequent terminations, modifications, or change orders (including those resulting from disputes and settlements of disputes) shall be subject to the written approval of The Adjutant General and/or Chief, National Guard Bureau, or his/her duly authorized representative, and shall not be binding until so approved.

46. DRUG-FREE WORK PLACE

a. The Contractor covenants and agrees that it will comply with provisions of the Drug-Free Work Place Act of 1988 (Public Law 100-690, Title V, Subtitle D; 41 U.S.C. § 701 et. seq.) and will maintain a drug-free work place.

b. The Final Rule, Government-Wide Requirements for Drug-Free Work Place (Grants), issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 28, subpart f) to implement provisions of the Drug-Free Work Place Act of 1988, is incorporated by reference and the Contractor covenants and agrees to comply with provisions thereof , including amendments to the Final Rule that may hereafter be issued.

47. OTHER COMPLIANCES – The Contractor shall comply with all applicable Federal, State and local laws, executive orders, rules and regulations applicable to its performance under this contract.

48. LIQUIDATED DAMAGES - In case of failure on the part of the Contractor to complete the work within the time fixed in the contract or any extensions thereof, the Contractor shall pay to the State as liquidated damages, pursuant to the Clause of this contract entitled TERMINATION FOR DEFAULT-DAMAGES OR DELAY-TIME EXTENSIONS, the sum of **$** _____ for each day of delay.

IV. SIGNATURES:

_____
(Contractor)

WITNESSES:

BY: _____
(Signature)

_____

_____
(Date)

_____
(Name, typed)

Note: If the Contractor is a corporation,
Witnesses are not required, but the annexed
Certificate must be completed

_____
(Title)

Type or print names under all signatures

_____
(Address)

_____
(Phone No.)

_____
(Email Address)

STATE OF MISSISSIPPI

BY: _____
Bobby M. Ginn, Jr.
Major General, Mississippi National Guard
The Adjutant General of Mississippi

_____
(Date)

IN WITNESS WHEREOF, the parties hereto have executed this contract on the Notice to Proceed date of _____ day of _____ , 20 ___.

CERTIFICATE OF CORPORATE AUTHORITY

I, _____ certify that I am the _____ of the Corporation named as Contractor herein; that _____ who signed this contract on behalf of the Contractor, was then the _____ of said Corporation; that said contract duly signed for and in behalf of said Corporation by authority of its governing body, and is within the scope of its corporate powers.

_____
(Signature)
(Corporate Seal)

Note: The Contractor, if a corporation, should cause the above certificate to be executed under its corporate seal, provided that the same officer shall not execute both the contract and the certificate.

Note: In the event that the Contractor is not a corporation, this certificate may be omitted from the contract.

SECTION 00 73 01

CONDITIONS OF THE CONTRACT - SPECIAL CONDITIONS

1. CONFLICTS

In case of conflict these Special Conditions and the Owner Contractor Agreement contained herein, shall take precedence, and prevail over the General Conditions and 2017 SUPPLEMENTARY CONDITIONS SECTION 00 73 03.

2. MEASUREMENTS AND DIMENSIONS

Before ordering any materials or performing any work, the Contractor shall check and verify all dimensions of shop drawings and be responsible for their correctness. Any materials ordered without the prior approval of the Director, State Purchasing and Contracting and/or Contracting Officer shall be at the risk of the Contractor and subject to rejection and replacement at no expense to the owner.

3. PERMITS, TAXES AND ORDINANCES

The Contractor shall be responsible for obtaining all required permits, give legal notices, pay any and all taxes and/or assessments levied in connection with this contract. Building regulations and ordinances of the local municipality or county shall be strictly adhered to and the Contractor shall be responsible for all knowledge thereof.

4. UTILITIES

The Director, State Purchasing and Contracting and/or Contracting Officer shall make all possible arrangements to allow the use of government facilities in connection with water and electrical power used during the construction period. The Contractor will be required to make all connections to existing service lines made available by the Director, State Purchasing and Contracting and/or Contracting Officer. The Contractor is expected to practice all applicable conservation measures and restrict utility usage to that associated with completion of the contract. Should, in the opinion of the Director, State Purchasing and Contracting and/or Contracting Officer, utility usage become excessive, the Director, State Purchasing and Contracting and/or Contracting Officer may terminate any previous arrangements for same.

5. FABRICATION YARD

The Owner shall make available to the Contractor, a site adjacent to the construction project for use as a fabrication yard. The interior arrangement, preparation for work, security and returning the area to its original state, is the responsibility of the Contractor.

6. SANITARY FACILITIES

The Director, State Purchasing and Contracting and/or Contracting Officer will make all possible arrangements for the use of government facilities, where available.

7. TAXPAYER IDENTIFICATION NUMBER

Form W-9, Payer's Request for Tax Identification Number and Certification, shall be completed by any Non-Incorporated Contractors. This document indicates the taxpayer Identification Number, which is the nine (9) digit number (000-00-0000) for individuals or the nine (9) digit (00-0000000) employer identification number. A completed Form W-9 must be furnished to the Director, State Purchasing and Contracting and/or Contracting Officer prior to issuance of the Notice-to Proceed.

MAGIC Supplier Self-Service Reference Guide

Supplier Registration

All suppliers/vendor/contractor must be registered to do business with the State of Mississippi. As a supplier/vendor/contractor, you may register at any point in time. To determine whether you are a registered supplier (converted vendor) in MAGIC, go to the MAGIC Vendor Information page and follow the steps below:

- Enter the first five characters of your Vendor Name or your 11 digit SAAS Vendor Number.
- Click Submit.

If you are a converted vendor, you will see your MAGIC Vendor Number, SAAS Vendor Number, Vendor Name, City, State, and Zip displayed. If your vendor information does not exist in MAGIC, you will see "The query you submitted returned no records."

Converted vendors need to submit an email via mash@dfa.ms.gov to request a MAGIC User ID and Password. Enter "Vendor ID Request" as the email Subject, and include the following information in your email:

- MAGIC Vendor Number
- Vendor Name
- Contact Name
- Contact Email Address
- Contact Phone Number

If you are not a registered supplier/vendor/contractor and you wish to do business with the State of Mississippi, click here to register State of Mississippi Supplier Registration. If you attempt to complete the registration process and you are already a converted vendor in MAGIC, you will receive a duplicate error message. Please call the MMRS Call Center at 601-359-1343, Option 2 for assistance in locating your vendor information.

Please see or call Contracting Officer for new Supplier Registration sheet if you are not already registered in MAGIC. This process should be done if you are submitting a bid through the MAGIC system.

The Supplier Registration link is also located on the Mississippi Management & Reporting System website at http://www.mmrs.state.ms.us/vendors/index.shtml. It is important that the supplier must submit W-9 Form after registering.

8. Progress Payments to Contractor

Partial progress payment will be processed by the state on a monthly basis and payment made within Thirty (30) calendar days after approved by the Director, State Purchasing and Contracting and/or Contracting Officer as prescribed in Title §31-7-303 of the Mississippi Code.

Contractors shall submit monthly certification through the project Architect/Engineer/Project Manager to the Director, State Purchasing and Contracting and/or Contracting Officer indicating payments to Subcontractors have been made in accordance with Title 31-5-27 of the Mississippi Code.

9. Asbestos Containing Products/Materials

Products and materials containing asbestos will not be used or incorporated into any phase, process, finished or installed product covered by the work specifications. To ensure compliance with this requirement, a Material Safety Data Sheet (MSDS) must be attached to all Material Submittals disclosing the content of ingredients.

10. Department of Defense (DD) Form 1354 & Installed Building Equipment List (IBE) Special Records & Submission

At the time of pre-construction conference, the Contractor shall furnish the Director, State Purchasing and Contracting and/or Contracting Officer a copy of the Department of Defense Form 1354 with the preliminary cost for each item filled in. These costs will be based on the Contractor's bid (SEE FORM behind SC Section 00 73 01 -4/5). This Form and assistance with this form will be available from the Facilities Management Office Project Manager. Additionally, prior to Substantial Completion, the Contractor will furnish the Project Manager assigned by the Facilities Management Office and the Director, State Purchasing and Contracting and/or Contracting Officer a copy of Form 1354, and the attached Installed Building Equipment (IBE) list with actual costs to date filled in and any changes of measurement noted, (i.e. building square footage is 1200 on the original DD 1354, but was changed during construction; you should mark through 1200 and add correct measurement). If there are no changes to costs or measurements, this is the final 1354 necessary. However, if there are any changes to costs or measurements prior to contract completion, the Contractor will provide an additional copy with changes noted.

TRANSFER AND ACCEPTANCE OF DoD REAL PROPERTY

Form Approved
OMB No. 0704-0188

PAGE OF PAGES

The public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Washington Headquarters Services, Executive Services Directorate, Information Management Division, 4800 Mark Center Drive, Alexandria, VA 22350-3100 (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE ABOVE ORGANIZATION.

1. FROM *(Organization Name)*	2. DATE PREPARED *(YYYYMMDD)*	3. PROJECT/JOB NUMBER	4. SERIAL NUMBER	8. TRANSACTION DETAILS
5. TO *(Organization - Installation Code and Name)*	6. RPSUID/SITENAME/ INSTCODE/INSTNAME	7. CONTRACT NUMBER(S)	7a. PLACED-IN-SERVICE DATE *(YYYYMMDD)*	a. METHOD *(X all that apply)*: ☐ ACQUISITION BY CONSTRUCTION ☐ TRANSFER BETWEEN SERVICES ☐ CAPITAL IMPROVEMENT ☐ INVENTORY ADJUSTMENT b. WHEN/EVENT *(X one)*: ☒ TOTAL ASSET PLACED-IN-SERVICE ☐ PARTIAL ASSET PLACED-IN-SERVICE c. TYPE *(X one)*: ☐ DRAFT ☒ FINAL ☐ INTERIM

9. ITEM NO.	10a. FACILITY NO.	10b. RPUID	11. CATEGORY CODE	12. CATCODE DESCRIPTION	13. TYPE CODE	14. SUST. CODE	AREA 15. PRIMARY UM	AREA 16. PRIMARY UM QUANTITY	OTHER 17. SECONDARY UM	OTHER 18. SECONDARY UM QUANTITY	19. COST	20. FUND SOURCE	21. FUND ORG	22. INTER-EST CODE	23. ITEM REMARKS

24. STATEMENT OF COMPLETION. The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.

a. TRANSFERRED BY *(Typed Name and Signature)*	b. DATE SIGNED *(YYYYMMDD)*	25a. ACCEPTED BY *(Typed Name and Signature)*	b. DATE SIGNED *(YYYYMMDD)*
c. TITLE *(Area Engr./Base Engr./DPW/Construction Agent)*		c. TITLE *(DPW/RPAO)*	26. PROPERTY VOUCHER NUMBER

DD FORM 1354, AUG 2013 PREVIOUS EDITION MAY BE USED. Adobe Designer 9.0

27. CONSTRUCTION DEFICIENCIES *(Attach blank sheet for continuations)*	28. PROJECT REMARKS *(Attach blank sheet for continuations)*

INSTRUCTIONS

GENERAL. This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B (formerly used by the Army and Air Force) and NAVDOCKS Form 2317 (formerly used by the Navy).

Existing instructions issued by the military departments relative to the preparation of DD Form 1354 are applicable to this revised form to the extent that the various items and columns on the superseded forms have been retained. The military departments may promulgate additional instructions, as appropriate.

For detailed instructions on how to fill out this form, please refer to Unified Facilities Criteria (UFC) 1-300-08, dated 16 April 2009 or later.

SPECIFIC DATA ITEMS.

1. From. Name of the transferring agency.

2. Date Prepared. Date of actual preparation. Enter all dates in YYYYMMDD format (Example: March 31, 2010 = 20100331).

3. Project/Job Number. Project number on a DD Form 1391 or Individual Job Order Number.

4. Serial Number. Sequential serial number assigned by the preparing organization (e.g., 2010-0001).

5. To. Name and address of the receiving installation, activity, and Service of the Real Property Accountable Officer (RPAO).

6. RPSUID/SITENAME/INSTCODE/INSTNAME. Site Unique Identifier and name or installation code and name where the constructed facility is located.

7. Contract Number(s). Contract number(s) for this project.

7a. Placed-In-Service Date. RPA Placed In Service Date. This is the date the asset is actually placed-in-service.

8. Transaction Details.
a. Method of Transaction. Mark (X) as many boxes as apply.
b. When/Event. When or event causing preparation of DD Form 1354. X only one box.
c. Type. Draft, interim, or final DD Form 1354. X only one box.

9. Item Number. Use a separate item number for each facility, no item number for additional usages.

10a. Facility Number. Assigned in accordance with the Installation/Base Master Numbering Plan.

10b. RPUID. Identified in Real Property Inventory.

11. Category Code. The category code describes the facility usage.

12. Catcode Description. The category code name which describes the facility usage.

13. Type. Type of construction: P for Permanent; S for Semi- permanent; T for Temporary.

14. Sustainability Code. Reports whether or not an asset meets the sustainability guidelines set forth in Section 2(g) of Executive Order 13514. Valid values are: 1 (asset meets the guidelines); 2 (asset does not meet the guidelines); 3 (asset not evaluated); 4 (asset not subject to guidelines).

15. Area: UM 1. Area unit of measure; use the unit of measure associated with the category code selected in 11.

16. Total Quantity UM 1. The total area for the measure identified in Item 15. Use negative numbers for demolition.

17. Other: UM 2. Unit of Measure 2 is the capacity or other measurement unit (e.g., LF, MB, EA, etc.).

18. Total Quantity UM 2. The total capacity/other for the measure identified in Item 17.

19. Cost. Cost for each facility; for capital improvements to existing facilities, show amount of increase only. If there is no increase for the capital improvement, enter N/A.

20. Fund Source. Enter the Fund Source Code for this item.

21. Funding Organization. Enter the code for the organization responsible for acquiring this facility.

22. Interest Code. Enter the code that reflects government interest or ownership in the facility.

23. Item Remarks. Remarks pertaining only to the item number identified in Item 9; show cost sharing.

24. Statement of Completion. Typed name, signature, title, and date of signature by the responsible transferring individual or agent.

25. Accepted By. Typed name, signature, title, and date of signature by the RPAO or accepting official.

26. Property Voucher Number. Next sequential number assigned by the RPAO in voucher register.

27. Construction Deficiencies. List construction deficiencies in project during contractor turnover inspection.

28. Project Remarks. Project level remarks and continuation of blocks.

DD FORM 1354 (BACK), AUG 2013

SECTION 00 73 02

CONDITIONS OF THE CONTRACT - SPECIAL INSTRUCTIONS

1. SUBCONTRACTORS

The Prime Contractor, on or before the date of being awarded Prime Contract, will submit to the Director, State Purchasing and Contracting and/or Contracting Officer a list of all subcontracts which sets forth the amount, name, address, and scope of work contemplated for each subcontract. For any subcontract that exceeds $75,000.00, the Subcontractor is required to have a current Certification of Responsibility Number, as issued, and licensed by the Mississippi State Board of Contractors, and the number will also be furnished on the list, as applicable.

2. LIMITATIONS

Any and all types of alcoholic beverages and controlled substances are strictly forbidden from the job site. The Contractor shall be responsible for the knowledge of, and adherence to, any and all Federal, State and local laws and regulations pertaining to the same.

3. PRE-CONSTRUCTION CONFERENCE

The Director, State Purchasing and Contracting and/or Contracting Officer, will conduct a meeting at a time and place designated by the Director, State Purchasing and Contracting and/or Contracting Officer, prior to the Contractor starting work on the project. It is desirable that in addition to the Contractor, the foreman/supervisor and any prime subcontractors for the project attend this meeting. The exact time, date and place of the meeting will be arranged after the issuance of the contract.

4. PRODUCTS AND/OR MATERIAL SUBSTITUTION

Prior to the Pre-Construction Conference the Contractor will submit, for approval, any anticipated changes to the products or materials specified. All submittals must address all specification data, company name and supplier of the product or material that the Contractor wishes to substitute. At the Pre-Construction Conference the Contractor will be given approval/disapproval for the use of alternate items as submitted. Substitutions submitted after the Pre-Construction Conference may not be taken into consideration at the discretion of the Director, State Purchasing and Contracting and/or Contracting Officer.

5. AS BUILT DRAWINGS

Occasionally, during construction, modifications and changes may occur due to site conditions, unforeseen circumstances or problems encountered. This may result in a modification of the construction as originally depicted on the drawings. Upon completion of the project, the Contractor will

furnish the Director, State Purchasing and Contracting and/or Contracting Officer two (2) complete sets of "As Built Drawings", signed by the Contractor, depicting the actual construction and all changes incorporated therein. Contractor shall also provide one (1) set to A&E for conversion to electronic As Built's.

6. INSURANCE

SEE 2017 SUPPLEMENTARY CONDITIONS SECTION 00 73 03, Article 11

7. ARCHITECT/ENGINEER/CONSULTANT

If Project does not specify an A&E/Consultant the Contracting Officer Representative will perform the duties thereof, along with the Director, State Purchasing and Contracting and/or Contracting Officer.

8. MINORITY TRACKING/PARTICIPATION OF SUBCONTRACTORS

The document on next page (SI Section 00 73 02 – 3/4 and 4/4) will serve as a tracking instrument for minority participation in publicly funded construction projects managed by the Owner. This document will aid the Owner in its commitment to encourage minority participation during the bidding process. Your conscientious effort and commitment to help establish good business relations with minority subcontractors, is greatly appreciated.

Contractor will be required to submit to the Owner within seven days from the Notice to Proceed, a completed form, if none, put NONE on the form.

(BLANK)

MISSISSIPPI MILITARY DEPARTMENT

Minority Tracking or Participation Form

Any responses will be deemed public information and may be incorporated into reporting information compiled by the Owner in the following manner: Contractors that listed minority participation, Contractors that did not list minority participation and Contractors that submitted an incomplete (partially filled-out or blank) form.

Section 00 43 00: SCOPE OF WORK

1.01 General Description of work covered by Contract Documents

Section 00 73 02, paragraph 8, page, SI Section 00 73 02 – 2/3

The Prime General Contractor will submit to the Owner within seven (7) days from the Notice to Proceed, a completed *Minority Tracking Form* outlining the use of minority subcontractors that will be used on the project.

Minority - A person who is a citizen or lawful permanent resident of the United States and who is the following: **African American, Hispanic American, Asian American, American Indian or Female**

Project Name, Location and Number: _____

General Contractor: (Name) _____

Check the Following Appropriate Box

☐ **There are NO minority participants included in this bid proposal.**

☐ **There are minority participants included in this bid proposal.** The minority participants may be defined as: Subcontractor(s) or Supplier(s).

List minority participants and their discipline/responsibility per the above or per Construction Specification Institution (CSI) sixteen (16) divisions.

Name: _____

Division: _____

Amount $ _____

Name: _____

Division: _____

Amount $ _____

Page 2 of 2 (Submit if necessary)
Minority Participation Form

Name: _____

Division: _____

Amount $ _____

Name: _____

Division: _____

Amount $ _____

Name: _____

Division: _____

Amount $ _____

Name: _____

Division: _____

Amount $ _____

Name: _____

Division: _____

Amount $ _____

Name: _____

Division: _____

Amount $ _____

Name: _____

Division: _____

Amount $ _____

Name: _____

Division: _____

Amount $ _____

2017 SUPPLEMENTARY CONDITIONS
AIA Document A201 - 2017
SECTION 00 73 03

PART 1 – GENERAL

1.01 **DESCRIPTION**

A. **Owner:** These supplements are necessary because the Owner is an agency, of the State of Mississippi and occupies a different position from that of the usual Owner.

B. **Document:** The following supplements modify, change, delete from, or add to the General Conditions of the Contract, AIA Document A201-2017. When any portion of the General Conditions is modified, changed, deleted from, or added to, by these Supplementary Conditions, the unaltered portions of that Article, Paragraph, Subparagraph, or Clause shall remain in full force and effect.

C. **Architect/Engineer/Consultant:** If Project does not specify an A&E/Consultant, the Contracting Officer Representative (COR) will perform the duties thereof, along with the Director, State Purchasing and Contracting and/or the Contracting Officer (DPC/CO).

Article 1
GENERAL PROVISIONS

1.1 **BASIC DEFINITIONS**

1.1.1 **The Contract Documents**: Delete the last sentence of this Subparagraph and substitute the following sentence:

The Contract Documents include the Advertisement for Bids, Instructions to Bidders, Proposal Form, sample forms, schedules and all portions of addenda issued prior to execution of the Contract.

1.1.9 Add a new Subparagraph as follows:

COMMISSIONING AUTHORITY PROFESSIONAL
A professional independent of the project engineer or architect retained by the owner who manages a quality focused process for enhancing the delivery of the project. The process focuses upon verifying and documenting that the facility and all its systems are planned, designed, installed, tested, operated, and maintained to meet the Owner's project requirements.

1.5 **OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE**

1.5.1 Add a new sentence at the end of this Subparagraph:

This Paragraph in no way supersedes the Owner's document rights set forth in the Agreement Between the Owner and the Professional.

1.5.3 Add a new Subparagraph as follows:

Transparency. In accordance with the Mississippi Accountability and Transparency Act of 2008, §27-104-151, et seq., of the Mississippi Code of 1972, as Amended, the American Accountability and Transparency Act of 200 (P.L.111-5), where applicable, and §31-13 of the Mississippi Code of 1972, as amended, where applicable, a fully Executed copy of the Contract shall be posted by the MS Military Department in the State Accounting System (MAGIC) to meet requirements. This will allow the contract to be posted to the following website: https://www.transparency.mississippi.gov

Article 2

OWNER

2.1 **GENERAL**

2.1.1 Change this Subparagraph to read as follows:

The Owner, as used in these Documents, refers to the Mississippi Military Department, acting for and on behalf of the State of Mississippi and for the benefit of the Agency for which the Work under this Contract is being performed. The Owner's representative, who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, is the Director, State Purchasing and Contracting and/or the Contracting Officer (DPC/CO) who is the designee of the individual who signed the Construction Contract. Except as otherwise provided in Subparagraph 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized designee. The Construction Manager as referred in the AIA documents shall mean the Contracting Officer's Representative (COR) to the Owner's representative who shall have authority to take any or all action with respect to verify that the contractor perform the technical requirements of the contract in accordance with the contract terms of the contract; Perform or cause to be performed, inspections necessary to ensure performance meets the contract specifications and verify that contractor corrects all deficiencies; Maintains liaison and direct communications with the contractor but is not empowered to award, agree to, or sign any contract or modifications thereto, or in any way obligate the payment of money by the State or U.S. Government.

Article 3
CONTRACTOR

3.3 **SUPERVISION AND CONSTRUCTION PROCEDURES**

3.3.1 Add a new sentence at the end of this Subparagraph:

If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner and Architect shall be responsible for any resulting loss or damage.

3.4 **LABOR AND MATERIALS**

3.4.4 Add the Subparagraph as follows:

Employee Status Verification System *If applicable, the Contractor represents and warrants that it will ensure its compliance with the Mississippi Employment Protection Act, Section 71-11-1, et seq. of the Mississippi Code Annotated (Supp 2008) and will register and participate in the status verification system for all newly hired employees. The term "employee" as used herein means any person that is hired to perform work within the State of Mississippi. As used herein, "status verification system" means the Illegal Immigration Reform and Immigration Responsibility Act of 1996 that is operated by the United States Department of Homeland Security, also known as the E-Verify Program, or any other successor electronic verification system replacing the E-Verify Program. The Contractor agrees to maintain records of such compliance and, upon request of the State and approval of the Social Security Administration or Department of Homeland Security, where required, to provide a copy of each such verification to the State. The Contractor further represents and warrants that any person assigned to perform services hereunder meets the employment eligibility requirements of all immigration laws of the State of Mississippi. The Contractor understands and agrees that any breach of these warranties may subject the Contractor to the following: (a) termination of this Agreement and ineligibility for any state or public contract in Mississippi for up to three (3) years, with notice of such cancellation/termination being made public, or (b) the loss of any license, permit, certification or other document granted to the Contractor by an agency, department or governmental entity for the right to do business in Mississippi for up to one (1) year, or (c) both. In the event of such cancellation/termination, the Contractor would also be liable for any additional costs incurred by the State due to the contract cancellation or loss of license or permit.*

3.4.5 Add a new Subparagraph as follows:

In providing labor for the proper execution and completion of the Work, the Contractor shall comply with the provisions of Section 31-5-17 and Section 31-5-19 of the Mississippi Code of 1972, Annotated.

3.4.6 Add a new Subparagraph as follows:

In providing materials for the proper execution and completion of the Work, the Contractor shall comply with the provisions of Section 31-5-23 of the Mississippi Code of 1972, Annotated.

3.9 **SUPERINTENDENT**

3.9.2 Change the second line in this Subparagraph to read as follows:

The DPC/CO shall, within a reasonable time, notify the Contractor in writing of any objection to the proposed superintendent.

3.15 **CLEANING UP**

3.15.2 Change this Subparagraph to read as follows:

If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.16 **ACCESS TO WORK**

Change this Paragraph to read as follows:

The Contractor shall provide the Owner, Contracting Officer Representative, Architect, Commissioning Authority Professional, and their authorized representatives access to the Work in preparation and progress wherever located.

3.18 **INDEMNIFICATION**

3.18.3 Modify the Subparagraph as follows:

Indemnification *To the fullest extent allowed by law, Contractor shall indemnify, defend, save and hold harmless, protect, and exonerate the State of Mississippi Military Department, its officers, employees, and representatives from and against all claims, demands, liabilities, suits, actions, damages, losses, and costs of every kind and nature whatsoever, including, without limitation, court costs, investigative fees and expenses, and attorneys' fees, arising out of or caused by Contractor's and/or its partners, principals, agents, employees, and/or subcontractors in the performance of or failure to perform this Agreement. In the State's sole discretion, Contractor may be allowed to control the defense of any such claim, suit, etc. In the event Contractor defends said claim, suit, etc., Contractor shall use legal counsel acceptable to the State; Contractor shall be solely liable for all reasonable costs and/or expenses associated with such defense and the State shall be entitled to participate in said defense. Contractor shall not settle any claim, suit, etc., without the State's concurrence, which the State shall not unreasonably withhold.*

Article 4
ARCHITECT

4.1 **GENERAL**

4.1.2 Change this Paragraph to read as follows:

The Owner shall have a Contracting Officer's Representative (COR) whom is an employee of the Mississippi Military Department. See Article 2, paragraph 2.1.1 for a definition of COR

4.2 **ADMINISTRATION OF THE CONTRACT**

4.2.1 Change the first line of this Subparagraph to read as follows:

The Architect will provide administration of the Contract as directed by the DPC/CO, and will be the Owner's representative, along with the COR, (1) during construction, (2) until the final payment is due and (3) with the Owner's concurrence, during the one-year period for correction of Work described in Section 12.2.

4.2.3 Change this Paragraph to read as follows:

The Contracting Officer Representative (COR) shall visit the work site at any time during the construction period. He/She will determine in general, if the work observed is being performed in accordance with the Contract Documents. COR will work with the Architect/Engineer to keep Contracting Officer informed and to provide reports to the Contracting Officer.

4.2.4 Delete this Subparagraph in its entirety.

4.2.15 Add a new Subparagraph as follows:

The COR will work with the Architect and the DPC/CO in conducting inspections to determine the dates of Substantial Completion and the date of final completion. The DPC/CO will issue Certificates of Substantial Completion once approved pursuant to Section 9.8. Architect in conjunction with the COR will receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Architect will forward to the COR a final application and Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

Article 5
SUBCONTRACTORS

5.2 **AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK**

5.2.1 Change the first sentence of this Subparagraph to read as follows:

Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, prior to award of the Contract by the Owner, shall furnish in writing to the Owner through the Professional, the names, disciplines, and COR #'s of Sub-Contractors over Fifty Thousand Dollars ($75,000.00) (as well as entities who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. Such list shall also include any Mechanical, Plumbing, or Electrical Sub-Contractor listed on Proposal Form regardless of amount.

Article 6
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

No supplementary conditions.

Article 7
CHANGES IN THE WORK

7.1.2 Delete This Subparagraph in its entirety.

7.2 **CHANGE ORDERS**

7.2.2 Add a new Subparagraph as follows:

The maximum cost included in a Change Order for profit and overhead is limited to twenty percent (20%) of the total of the actual cost for materials, labor and subcontracts. Profit and overhead include: all taxes, fees, permits, insurance, bond, job superintendent, job and home office expense. All Subcontractors shall acquiesce to the same requirements when participating in a Change Order.

7.3 **CONSTRUCTION CHANGE DIRECTIVES**

7.3.1 Change the first sentence of this Subparagraph to read as follows:

A Construction Change Directive is a written order prepared by the DPC/CO after coordination with the Contracting Officers Representative and/or Architect, then is signed by the Owner, directing a change in the work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both.

7.3.9 Delete this Subparagraph in its entirety.

7.3.10 Change this Subparagraph to read as follows:

When the Owner and the Contractor agree with a determination made by the DPC/CO, Contracting Officers Representative and/or the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach an agreement upon the adjustments, such agreement shall be effective immediately and the DPC/CO, with the assistance of the Contracting Officers Representative and/or the Architect shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

7.4 **Minor Changes in the Work**

Change This Subparagraph as follows:

Replace the word "Architect" with the words "COR and/or Architect".

Article 8
TIME

8.1 **DEFINITIONS**

8.1.1 Change This Subparagraph to read as follows;

Unless otherwise provided, Contract Time has been calculated to include calendar days for the receipt of Final Application of Payment and all Close Out Documents. Additional calendar days may be added based on authorized adjustments allotted in the Contract Documents to complete all terms of the contract.

8.1.2 Change this Subparagraph to read as follows:

The date of commencement of the Work is the date established in the Notice to Proceed.

8.1.3 Change this Subparagraph to read as follows;

The date of Substantial Completion is the date certified by the DPC/CO, along with the COR and the Architect in accordance with Section 9.8.

8.2 **PROGRESS AND COMPLETION**

8.2.3 Change this Subparagraph to read as follows;

The Contractor shall proceed expeditiously with adequate forces and shall achieve Completion within the Contract Time

8.3 **DELAYS AND EXTENSIONS OF TIME**

8.3.1 Change this Subparagraph to read as follows:

If the Contractor is delayed at any time in the commencement or progress of the Work by any act of neglect of the Owner or the Architect, or by any employee of either, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or any causes beyond the Contractor's control, or by any other causes which the DPC/CO along with the COR and the Architect determines may justify the delay, then the Contract Time may be extended by Change Order for such reasonable time as the DPC/CO may determine. Any claim for loss or any delay occasioned by any separate Contractor, or Subcontractor, shall be settled between the Contractor and such other separate Contractor, or Subcontractors.

Article 9
PAYMENTS AND COMPLETION

9.2 **SCHEDULE OF VALUES**

Change this Paragraph to read as follows:

Where the Contract is based on a stipulated sum, the Contractor shall submit through the Architect, the COR to the DPC/CO, at least 10 days before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the work and prepared in such form and supported by such data to substantiate its accuracy as the DPC/CO may require. This schedule, unless objected to by the Architect or Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment.

9.3 **APPLICATIONS FOR PAYMENT**

9.3.1 Add a new sentence to the end of this Subparagraph:

The form of Application for Payment will be AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet, or a computer-generated form containing similar data will be used for all Pay Requests submissions. The date established for each progress payment to be submitted will be at the Monthly Construction meeting determined at the Pre-Construction Conference.

9.3.1.1 Delete this Subparagraph in its entirety.

9.3.1.3 Add a new Clause to Subparagraph 9.3.1 as follows:

On any contract as described herein, of which the total amount is Two Hundred Fifty Thousand Dollars ($250,000.00) or greater, or on any contract with a subcontractor, regardless of amount, five percent (5%) shall be retained until the work is at least fifty percent (50%) complete, on schedule and satisfactory in the Owner's, COR and architect's/engineer's opinion, at which time fifty percent (50%) of the retainage held to date shall be returned, subject to consent of surety, to the prime contractor for distribution to the appropriate subcontractors and suppliers; provided, however, that future retainage shall be withheld at the rate of two and one-half percent (2 1/2%). When submitting request for reduction in retainage, the Contractor will include, with the application, a Consent of Surety to Reduction which is AIA Form G707A, and a Power of Attorney.

9.3.1.4 Add a new Clause to Subparagraph 9.3.1 as follows:

The Contractor must submit each month with this Application for Payment a separate letter stating that he is

requesting an extension of time or that he had no need for an extension for that period of time. No payment on a monthly application will be considered due and payable until the letter is received. Complete justification such as weather reports or other pertinent correspondence must be included for each day's request for extension. A Contractor's letter, or statement, will not be considered as adequate justification. The receipt of this request and data by the Owner will not be considered as Owner approval in any way.

9.3.2.1 Add a new Clause to Subparagraph 9.3.2 as follows:

Payment on materials stored at some location other than the building site, may be approved by the Architect and the Owner after the Contractor has submitted the following items:

- *.1 An acceptable Lease Agreement between the General Contractor and the owner of the land, or building, where the materials are stored covering the specific area where the materials are located.*
- *.2 Consent of Surety, or other acceptable Bond, to cover the materials stored off-site.*
- *.3 All Perils Insurance coverage for the full value of the materials stored off-site.*
- *.4 A Bill of Sale from the Manufacturer to the General Contractor for the stored materials.*
- *.5 A complete list and inventory of materials manufactured, stored and delivered to the storage site and of materials removed from the storage site and delivered to the job site.*
- *.6 A review by the Architect of the materials stored off-site prior to release of payment.*
- *.7 Guarantee no storage costs, additional delivery fees, or subsequent costs to the Owner.*

9.4 **CERTIFICATES FOR PAYMENT**

9.4.1 Change this Subparagraph to read as follows:

The A&E will have 5 calendar days from receipt of the Certificate for Payment from the Contractor to review/certify the amount the A&E determines is due the Contractor and submit to the COR. If the Amount due certified by the A&E is different from the amount the Contractor requested or is determined to be withheld in whole, the A&E will provide, in writing, the reasons for withholding the certification in whole or in part and submit to the COR. The COR will have 3 calendar days to review/approve and attach an inspection report to and submit to the DPC/CO. If the request is certified by A&E to be withheld in whole, the COR will forward A&E's documentation for withholding in whole, along with COR concurrence and submit to the DPC/CO. In the aforementioned timeframe.

9.5 **DECISIONS TO WITHHOLD CERTIFICATION**

9.5.1 Change this Subparagraph to read as follows:

The A&E, COR and the DPC/CO may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner as required by Section 9.4.1. If in the A&E, and COR cannot agree on a revised amount or withholding in whole all documentation will be submitted to the DPC/CO for final determination. The A&E or the DPC/CO may also withhold a Certificate for Payment because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment for Payment previously issued, to such extent as may be necessary in the COR, Architect's or the DPC/CO's opinion to protect the Owner from loss for which theContractor is responsible, including loss resulting from the acts and omissions because of the following:

- ***.1** defective Work not remedied;*
- ***.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;*
- ***.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;*
- ***.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;*
- ***.5** damage to the Owner or a separate contractor;*

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

.7 repeated failure to carry out the Work in accordance with the Contract Documents.

9.6 **PROGRESS PAYMENTS**

9.6.1 Change the first line of this Subparagraph to read as follows:

After the Architect and COR have reviewed the Certificate for Payment and has certified that payment should be made will forward to the DPC/CO for the processing of Payment. This will be the Date that is considered due and payable. The DPC/CO will process in the manner and within the time provided in the Contract Documents.

9.6.2 Change the first line of this Subparagraph to read as follows:

The Contractor shall pay each Subcontractor, in accordance with Section 31-5-27 of the Mississippi Code 1972, Annotated, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work.

9.6.3 Change this Subparagraph to read as follows:

The DPC/CO will, on request, in writing, furnish to the Subcontractor, a copy of the Payment and Performance Bond if there is a dispute between payments. The Contractor is responsible to the Subcontractor for payment not the Owner as the contract is between the Contractor and the Subcontractor. The DPC/CO may, if practical, give the Subcontractor information regarding percentages of completion or amounts applied for by the Contractor.

9.6.9 Add a new Subparagraph as follows:

The amount retained by the Contractor from each payment to each Subcontractor and material supplier will not exceed the percentage retained by the Owner from the Contractor.

9.6.9.1 Add a new Clause to Subparagraph 9.6.8 as follows:

The Contractors shall submit monthly certification, in accordance with Section 31-5-25 of the Mississippi Code 1972, Annotated, on Owner's "Affidavit Certifying Payment to All Subcontractors" form, to the project engineer or architect indicating payments to subcontractors on prior payment request. (Attached as Exhibit "A" at the end of this Section 00 73 03, herein)

9.7 **FAILURE OF PAYMENT**

Change this Paragraph to read as follows:

The Contractor and the Owner shall be subject to the remedies as prescribed in Section 31-5-25 of the Mississippi Code 1972, Annotated.

9.8 **SUBSTANTIAL COMPLETION**

9.8.1 Add the following sentence to the end this Subparagraph to read as follows:

Commissioning requirements must be complete except for thermographs of electrical systems, trend log monitoring, seasonal testing, near-warranty end activities and verification of training sessions.

9.8.3 Change the first Sentence of this Subparagraph to read as follows;

Upon receipt of the list, the Architect, assisted by the COR and the DPC/CO, will make an inspection to determine whether the Work or designated portion thereof is substantially complete.

Change the last Sentence of this Subparagraph to read as follows;

In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the COR and the DPC/CO, to determine Substantial Completion.

9.8.4 Change the first line this Subparagraph to read as follows:

When the Work or designated portion thereof is substantially complete and affirmed by the Owner, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate and forward through the COR to the DPC/CO for execution thereof.

9.9 **PARTIAL OCCUPANCY OR USE**

9.9.1 Delete first sentence of this Subparagraph

Change third sentence of this Subparagraph to read as follows:

When the Contractor considers a portion substantially complete, the Contractor, Architect and the COR shall jointly prepare a list to the DPC/CO for agreement/non-agreement. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Contractor and the DPC/CO.

9.10 **FINAL COMPLETION AND FINAL PAYMENT**

9.10.1 Change this Subparagraph to read as follows:

When, in the opinion of the Contractor, the Work is ready for final inspection and acceptance by the Owner, the Contractor shall make such notice to the Architect in writing and copy the COR and DPC/CO.

1. *Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance by the Owner, the Architect along with the COR and the DPPC/CO will promptly inspect the Work. The Architect will compile a list of deficiencies. If, in the Architect, COR and DPC/CO's judgment, the Work is not ready for inspection, the inspection will cease and another inspection will be scheduled.*

2. *Once the Architect along with the COR has made inspection and all deficiencies listed by the Architect have been corrected and the Architect along with the COR determines the Work is ready for final inspection, the Architect along with the COR will call for final inspection of the Project with the DPC/CO for the purpose of determining whether the Work is acceptable the Contract Documents.*

3. *The final inspection shall be conducted in the presence of the Owner and a list of defects or discrepancies, if any, will be compiled into a punch list furnished to all parties.*

4. *Once corrections of all punch list items have been confirmed by the Architect and/or COR, the Architect will provide a letter recommending final acceptance of the Work to the Owner.*

9.10.2 Change this Subparagraph to read as follows:

Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the

DPC/CO, through the Architect and COR all documents as called for in the specifications, Section 00 65 00, CONDITIONS OF THE CONTRACT-CLOSE-OUT DOCUMENTS.

9.11 **LIQUIDATED DAMAGES**

9.11.1 Add a new Paragraph as follows:

Time being of the essence and a matter of material consideration thereof, a reasonable estimate in advance is established to cover losses incurred by the Owner if the project is not 100% completed on the date set forth in the Contract Documents. The Contractor and his Surety will be liable for and will pay the Owner the sums stipulated in Paragraph 46 of the Contract Agreement Between the Owner and the Contractor as fixed and agreed as liquidated damages for each calendar day of delay until the work is 100% completed unless circumstances dictate otherwise in the discretion of the Owner.

Article 10
PROTECTION OF PERSONS AND PROPERTY

10.2 **SAFETY OF PERSONS AND PROPERTY**

10.2.5 Change this Subparagraph to read as follows:

The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible for Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.

Article 11
INSURANCE AND BONDS

11.1 **CONTRACTOR'S LIABILITY INSURANCE**

11.1.1 Add this sentence to the end of this Subparagraph:

Certificate of insurance acceptable to the Owner shall be submitted to the DPC/CO prior to issuance of the Notice-To-Proceed and thereafter upon renewal or replacement of each required policy of insurance.

11.1.5 Add a new Subparagraph as follows:

The Contractor's limits of liability shall be written for not less than the following:

.1 GENERAL LIABILITY:
Commercial General Liability
(Including XCU if project is over $500,000.00)
General Aggregate ..... *$1,000,000.00 Aggregate*
Products & Completed Operations ..... *$1,000,000.00 Aggregate*
Personal & Advertising Injury ..... *$ 500,000.00 Per Occurrence*
Bodily Injury & Property Damage ..... *$1,000,000.00 Per Occurrence*

Fire Damage Liability ..... *$ 50,000.00 Per Occurrence*
Medical Expense ..... *$ 5,000.00 Per Person*

.2 *OWNERS & CONTRACTORS PROTECTIVE LIABILITY:*
Bodily Injury & Property Damage ..... *$1,000,000.00 Aggregate*
Bodily Injury & Property Damage ..... *$ 500,000.00 Per Occurrence*

.3 *AUTOMOBILE LIABILITY:*
(Owned, Non-owned & Hired Vehicles)
Contractor Insurance Option Number 1:
Bodily Injury & Property Damage ..... *$ 500,000.00 Per Occurrence*
(Combined Single Limit)
Contractor Insurance Option Number 2:
Bodily Injury ..... *$ 250,000.00 Per Person*
Bodily Injury ..... *$ 500,000.00 Per Accident*
Property Damage ..... *$ 100,000.00 Per Occurrence*

.4 *EXCESS LIABILITY:*
(Umbrella on projects over $500,000)
Bodily Injury & Property Damage ..... *$ 1,000,000.00 Aggregate*
(Combined Single Limit)

.5 *WORKERS' COMPENSATION:*
(As required by Statute)
EMPLOYERS' LIABILITY:
Accident ..... *$ 100,000.00 Per Occurrence*
Disease ..... *$ 500,000.00 Policy Limit*
Disease ..... *$ 100,000.00 Per Employee*

.6 *PROPERTY INSURANCE:*
Builder's Risk ..... *$Equal to Value of Work*
or
Installation Floater ..... *$Equal to Value of Work*

***NOTE**: Builder's Risk Insurance will NOT be required when project is demolition ONLY. It will be required for all other projects including paving…*

11.1.6 Add a new Subparagraph as follows:

If the coverages are provided on a claims-made basis, the policy date or retroactive date shall predate the Contract; the termination date, or the policy, or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment.

11.2 **OWNER'S LIABILITY INSURANCE**

Delete this Paragraph in its entirety and substitute the following:

*The Contractor shall purchase and maintain such insurance as will protect the Owner from his contingent liability to others for damages because of bodily injury, including death, and property damage, which may arise from operations under this Contract and other liability for damages which the Contractor is required to insure under any provision of this Contract. Certificate of this insurance will be filed with the Owner and will be the same limits set forth in 11.1.*5.*

Article 12
UNCOVERING AND CORRECTION OF WORK

12.1.1 Change the first line in this Subparagraph to read as follows:

……contrary to *the Architect, COR and the DPC/CO ……*

12.1.2 Change this Subparagraph to read as follows:

If a portion of the Work has been covered which the Architect, COR and DPC/CO has not specifically requested to observe prior to its being covered, the Architect, COR and DPC/CO may request to see such Work and it shall be uncovered by the Contractor. If such work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's and/or Architects expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense.

12.2 **CORRECTION OF WORK**

12.2.1 **BEFORE OR AFTER SUBSTANTIAL COMPLETION**

Revise the names in this Subparagraph to read as follows:

After Architect, add "COR and DPC and/or CO".

Article 13
MISCELLANEOUS PROVISIONS

13.1 **GOVERNING LAW**

Change this Paragraph to read as follows:

The Contract shall be governed by the laws of the State of Mississippi.

13.3 **RIGHTS AND REMEDIES**

13.3.2 Revise the names in this Subparagraph to read as follows:

"*Architect, COR and DPC and/or CO or Contractor"*

13.4 **TESTS AND INSPECTIONS**

13.4.1 Change the third line of this Subparagraph by adding "*and Commissioning Authority Professional*" after each instance of the word "*Architect*".

13.4.3 Change this Subparagraph by inserting "*and the Commissioning Authority Professional's*" after the word "*Architect*".

13.4.4 Change the last line of this Subparagraph to read as follows:

Documents, be secured by the Contractor and promptly delivered to the Architect or COR for review.

13.4.5 Change this Subparagraph by adding "*and/or the Commissioning Authority Professional*" after each instance of the word "*Architect*".

13.5 **INTEREST**

Delete this Paragraph in its entirety.

13.6 Add this Paragraph title and contents to read as follows:

13.6 **COMMENCEMENT OF STATUTORY LIMITATION PERIOD**

13.6.1 *The Owner and Contractor shall commence all claims and causes of action within the time period specified by applicable state law.*

Article 14
TERMINATION OR SUSPENSION OF THE CONTRACT

Delete this Article in its entirety.

Article 15
CLAIMS AND DISPUTES

Delete this Article in its entirety.

(BLANK)

AFFIDAVIT CERTIFYING PAYMENT TO ALL SUBCONTRACTORS

I acknowledge that, pursuant to Miss. Code Ann. §31-5-25 and H.B. 1562, Laws of 2002, that I am required to submit monthly certification indicating payments to subcontractors on prior payment requests. I, the undersigned Contractor, do hereby certify that I have paid the following amounts to subcontractors for Work which has been performed and incorporated into previous Applications for Payment which were issued, and payment received from the Owner on the project listed below. I understand that this document must be submitted on a monthly basis after the submittal, approval and payment of Application for Payment #1. I understand that the Owner reserves the right to require me, the undersigned, to provide verification of payment and/or additional information.

Section 00 73 03 SUPPLEMENTARY CONDITIONS
Article 9.6 Progress Payments
Article 9.6.8.1
Pursuant to Code §31-5-25 and HB1562, Laws of 2002
. . .Contractors shall submit monthly certification to the project engineer or architect indicating payments to subcontractors on prior payment request. . . .

Project Name and Number: _____

Using Agency: _____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Affidavit Certifying Payment Form

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

Subcontractor: _____Amount: $_____

(Attach additional list of subcontractors and amounts, if necessary)

Contractor Name and Title: _____

Contractor Certificate of Responsibility Number: _____

Contractor Signature: _____Date: _____

STATE OF MISSISSIPPI

COUNTY OF _____

SWORN TO AND SUBSCRIBED BEFORE ME, the undersigned notary public, this the _____ day of _____, 20_____.

_____

NOTARY PUBLIC

My Commission Expires:

_____

BID BOND *(See instructions on reverse)*	DATE BOND EXECUTED *(Must not be later than bid opening date)*	OMB NO.:9000-0045

Public reporting burden for this collection of information is estimated to average 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (MVR), Federal Acquisition Policy Division, GSA, Washington, DC 20405.

PRINCIPAL *(Legal name and business address)*	TYPE OF ORGANIZATION *("X" one)* ☐ INDIVIDUAL ☐ PARTNERSHIP ☐ JOINT VENTURE ☐ CORPORATION STATE OF INCORPORATION

SURETY(IES) *(Name and business address)*

PENAL SUM OF BOND					BID IDENTIFICATION	
PERCENT OF BID PRICE	AMOUNT NOT TO EXCEED				BID DATE	INVITATION NO.
	MILLION(S)	THOUSAND(S)	HUNDRED(S)	CENTS	FOR *(Construction, Supplies, or Services)*	

OBLIGATION:

We, the Principal and Surety(ies) are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit of liability is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The Principal has submitted the bid identified above.

THEREFORE:

The above obligation is void if the Principal - (a) upon acceptance by the Government of the bid identified above, within the period specified therein for acceptance (sixty (60) days if no period is specified), executes the further contractual documents and gives the bond(s) required by the terms of the bid as accepted within the time specified (ten (1 0) days if no period is specified) after receipt of the forms by the principal; or (b) in the event of failure to execute such further contractual documents and give such bonds, pays the Government for any cost of procuring the work which exceeds the amount of the bid.

Each Surety executing this instrument agrees that its obligation is not impaired by any extension(s) of the time for acceptance of the bid that the Principal may grant to the Government. Notice to the surety(ies) of extension(s) are waived. However, waiver of the notice applies only to extensions aggregating not more than sixty (60) calendar days in addition to the period originally allowed for acceptance of the bid.

WITNESS:

The Principal and Surety(ies) executed this bond and affixed their seals on the above date.

PRINCIPAL

SIGNATURE(S)	1. (Seal)	2. (Seal)	3. (Seal)	Corporate Seal
NAME(S) & TITLE(S) (Typed)	1.	2.	3.	

INDIVIDUAL SURETY(IES)

SIGNATURE(S)	1. (Seal)	2. (Seal)
NAME(S) (Typed)	1.	2.

CORPORATE SURETY (IES)

SURETY A	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATURE	1.	2.		
	NAME(S) & TITLE(S) (Typed)	1.	2.		

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USAPA V1.00

STANDARD FORM 24 (REV. 10-98)
Prescribed by GSA - FAR (48 CFR) 53.228(a)

SURETY B	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATUR	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY C	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT M	Corporate Seal
	SIGNATURE	1.	2.		
	NAME(S) & TITLE(S) *(Typ9d)*	1.	2.		
SURETY D	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATUR	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY E	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATURE	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY F	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATUR	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY G	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATURE	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		

INSTRUCTIONS

1. This form is authorized for use when a bid guaranty is required. Any deviation from this form will require the written approval of the Administrator of General Services.

2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.

3. The bond may express penal sum as a percentage of the bid price. In these cases, the bond may state a maximum dollar limitation (e.g., 20% of the bid price but the amount not to exceed _____ dollars).

4. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. Where more than one corporate surety is involved, their names and addresses shall appear in the spaces (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)." In the space designed "SURETY(IES)" on the face of the form, insert only the letter identification of the sureties.

(b) Where individual sureties are involved, a completed Affidavit of Individual surety (Standard Form 28), for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning its financial capability.

5. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Corporate Seal"; and shall affix an adhesive seal if executed in Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.

6. Type the name and title of each person signing this bond in the space provided.

7. In its application to negotiated contracts, the terms "bid" and "bidder" shall include "proposal". and " offeror."

PERFORMANCE BOND (See instructions on reverse)	DATE BOND EXECUTED *(Must be same or later than date of contract)*	OMB No.: 9000-0045

Public reporting burden for this collection of information is estimated to average 25 minutes per response, including the time for reviewing nstructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimateor any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (MVR), Federal Acquisition Policy Division, GSA, Washington, DC 20405

PRINCIPAL *(Legal name and business address)*	TYPE OF ORGANIZATION *('X' one)* ☐ INDIVIDUAL ☐ PARTNERSHIP ☐ JOINT VENTURE ☐ CORPORATION STATE OF INCORPORATION
SURETY(IES) *(Name(s) and business address(es))*	PENAL SUM OF BOND MILLION(S) | THOUSAND(S) | HUNDRED(S) | CENTS CONTRACT DATE | CONTRACT NO.

OBLIGATION:

We, the Principal and Surety(ies), are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit of liability is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The Principal has entered into the contract identified above.

THEREFORE:

The above obligation is void if the Principal -

(a)(1) Performs and fulfills all the undertakings, covenants, terms, conditions, and agreements of the contract during the original term of the contract and any extensions thereof that are granted by the Government, with or without notice to the Surety(ies), and during the life of any guaranty required under the contract, and (2) performs and fulfills all the undertakings, covenants, terms conditions, and agreements of any and all duly authorized modifications of the contract that hereafter are made. Notice of those modifications to the Suretyfles) are waived.

(b) Pays to the Government the full amount of the taxes imposed by the Government, if the said contract is subject to the Miller Act, (40 U.S.C. 270a-270e), which are collected, deducted, or withheld from wages paid by the Principal in carrying out the construction contract with respect to which bond is furnished.

WITNESS:

The Principal and Surety(ies) executed this performance bond and affixed their seals on the above date.

PRINCIPAL

SIGNATURE(S)	1 (Seal)	2. (Seal)	3. (Seal)	Corporate Seal
NAME(S) & TITLE(S) *(Typed)*	1.	2.	3.	

INDIVIDUAL SURETY(IES)

SIGNATURE(S)	1. (Seal)	2. (Seal)
NAME(S) *(Typed)*	1.	2.

CORPORATE SURETY(IES)

SURETY A	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		

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Previous edition not usable

STANDARD FORM 25 (REV. 5-96)
Presrribed by GSA - FAR (48 CFR) 53.228(b)
USAPA V1.00

CORPORATE SURETY(IES) *(Continued)*

NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	
SIGNATURE	1.	2.		Corporate Seal
NAME(S) & TITLE(S) (Typed)	1.	2.		
NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	
SIGNATURE	1.	2.		Corporate Seal
NAME(S) & TITLE(S) (Typed)	1.	2.		
NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	
SIGNATURE	1.	2.		Corporate Seal
NAME(S) & TITLE(S) (Typed)	1.	2.		
NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	
SIGNATURE	1.	2.		Corporate Seal
NAME(S) & TITLEiS) (Typed)	1.	2.		
NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	
SIGNATURE	1.	2.		Corporate Seal
NAME(S) & TITLE(S) (Typed)	1.	2.		
NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	
SIGNATURE	1.	2.		Corporate Seal
NAME(S) & TITLE(S) (Typed)	1.	2.		

BOND PREMIUM	RATE PER THOUSAND ($)	TOTAL ($)

INSTRUCTIONS

1. This form is authorized for use in connection with Government contracts. Any deviation from this form will require the written approval of the Administrator of General Services.

2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.

3. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. Where more than one corporate surety is involved, their names and addresses shall appear in the spaces (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)." In the space designated "SURETY(IES)" on the face of the form, insert only the letter identification of the sureties.

(b) Where individual sureties are involved, a completed Affidavit of Individual Surety (Standard Form 28) for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning their financial capability.

4. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Corporate Seal", and shall affix an adhesive seal if executed in Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.

5. Type the name and title of each person signing this bond in the space provided.

PAYMENT BOND *(See* **instructions on** *reverse)*	Date Bond Executed *(Must be same or later than date of contract)*	**OMB NO.:9000-0045**

Public reporting burden for this collection of information is estimated to average 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (MVR), Federal Acquisition Policy Division, GSA, Washington, DC 20405

PRINCIPAL *(Legal name and business* address)	TYPE OF ORGANIZATION (*'X' one)* ☐ INDIVIDUAL ☐ PARTNERSHIP ☐ JOINT VENTURE ☐ CORPORATION STATE OF INCORPORATION
SURETY(IES) *(Name(s) and business address(es)*	PENAL SUM OF BOND MILLION(S) | THOUSAND(S) | HUNDRED(S) | CENTS CONTRACT DATE | CONTRACT NO.

OBLIGATION:

We, the Principal and Surety(ies), are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit of liability is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The above obligation is void if the Principal promptly makes payment to all persons having a direct relationship with the Principal or a subcontractor of the Principal for furnishing labor, material or both in the prosecution of the work provided for in the contract identified above, and any authorized modifications of the contract that subsequently are made. Notice of those modifications to the Surety(ies) are waived.

WITNESS:

The Principal and Surety(ies) executed this payment bond and affixed their seals on the above date.

PRINCIPAL

SIGNATURE(S)	1 (Seal)	2. (Seal	3. (Seal	Corporate Seal
NAME(S) & TITLE(S) *(Typed)*	1.	2.	3.	

INDIVIDUAL SURETY(IES)

SIGNATURE(S)	1. (Seal	2. (Seal)
NAME(S) *(Typed)*	1.	2.

CORPORATE SURETY(IES)

SURETY A	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $
	SIGNATURE	1.	2.	Corporate Seal
	NAME(S) & TITLE(S) *(Typed)*	1.	2.	

Corporate Surety(IES) *(Continued)*					
SURETY B	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY C	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATUR	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY D	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATUR	1.	2.		
	NAME(S) & TITLE(S) *fTyped)*	1.	2.		
SURETY E	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY IF	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY G	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		

INSTRUCTIONS

1. This form, for the protection of persons supplying labor and material, is used when a payment bond is required under the Act of August 24, 1935, 49 Stat. 793 (40 U.S.C. 270a-270e). Any deviation from this form will require the written approval of the Administrator of General Services.

2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.

3. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. Where more than one corporate surety is involved, their names and addresses shall appear in the spaces (Surety A, Surety B, etc.) headed **"CORPORATE SURETY(IES)."** In the space designated "SURETWES)" on the face of the form, insert only the letter identification of the sureties.

(b) Where individual sureties are involved, a completed Affidavit of Individual Surety (Standard Form 28) for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning their financial capability.

4. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Corporate Seal", and shall affix an adhesive seal if executed in Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.

5. Type the name and title of each person signing this bond in the space provided.

DIVISON 01
PROCUREMENT, CONTRACTING AND GENERAL REQUIREMENTS

Any modifications other than minor, shall be subject to approval by the Director, State Purchasing and Contracting and/or the Contracting Officer, and be included by addendum only. The technical specification shall be written so as not to exclude comparable equipment of domestic manufacture. Products shall generally be specified in one of five (5) methods.

1. Specification by reference standards or technical performance requirements only. Contractor shall have the option to select any product meeting product standards by any Manufacture. The Owner along with the Project Manager and A&E shall identify critical performance and/or technical details necessary to meet project requirements, but shall not do so in a hyper-technical manner so as to place unnecessary or inconsequential restrictions on providers of otherwise comparable equipment, Further, when utilizing specifications of this nature, The Owner along with the Project Manager and A&E are expected to be certain that such specifications can reasonably be met by more than one product.

2. Specifications by naming a minimum of two (2) or three (3) products or manufactures or equal to. Contractor shall have the option to select any product and Manufacture named. Additionally, Contractor may always submit any product and Manufacturer meeting all product standards as an equal.

3. Specifications by "basis of design". Contractor may select any equivalent product meeting specified reference standards or technical performance requirements as represented by the named products and/or manufactures. The Owner along with the Project Manager and A&E shall identify critical performance and/or technical details necessary to meet project requirements, but shall not do so in a hyper-technical manner so as to place unnecessary to inconsequential restrictions on providers of otherwise comparable equipment, Further, when utilizing specifications of this nature, The Owner along with the Project Manager and A&E are expected to be certain that such specifications can reasonably be met by more than one product.

4. Specification as "brand specific**". Must be approved prior to bidding project by the Director, State Purchasing and Contracting Division**. Project Manager along with A&E will furnish justification to the Director, State Purchasing and Contracting and/or the Contracting Officer, including the following:

a. Description of the product for which approval is being sought
b. Explanation of why the product is the only one that can meet project requirements
c. Estimate of cost for such product
d. Estimate of cost for overall procurement
e. Availability of the product to bidders and/or subcontractors

5. Specification as "sole source". **Must be approved prior to bidding project by the Director, State Purchasing and Contracting Division**. The Project Manager along with the A&E shall furnish written justification for review and approval from the Director, State Purchasing and Contracting and/or the Contract Officer, including the following:

a. Description of the product for which approval is being sought
b. Explanation of why the product is the only one that can meet project requirements
c. Explanation of why the source is the only person or entity that can provide the required product
d. Explanation of why the amount to be expended for the product is reasonable
e. The efforts expended to obtain the best possible price for the product

6. Products proposed to be procured via sole source shall be advertised in the same manner provided in Section 31-7-13(c), Mississippi Code, Annotated. Such advertisement shall be directed to the Director, State Purchasing and Contracting and/or Contracting Officer who shall publish for a minimum of fourteen

(14) days the terms of the proposed sole source procurement including the above items as well as procedures for any person or entity that objects and proposes that the product published is not sole source and can be provided by another person or entity. If no objection is received, the Owner will obtain approval from the Department of Finance and Administration, Office of Purchasing and Travel, Bureau of Buildings (DFA/OPT/BOB).

7. Where sole source procurement is objected to, the DFA/OPT/BOB will follow the following steps:

a. If DFA/OPT/BOB determines after review that the product in the proposed sole source request can be provided by another person or entity, the sole source request will be terminated, and such product be procured in a competitive procurement process.

b. If DFA/OPT/BOB determines after review that there is only one (1) source for the required product, then the Owner may appeal to the DFA/OPT/BOB. The Owner shall have the burden of proving that the product is only provided by one (1) source. If appeal is successful, the Owner will proceed with procurement and document compliance.

c. If DFA/OPT/BOB has any reasonable doubt as to whether the product can only be provided by one (1) source, the Owner will procure the product in a competitive procurement process.

SUBSTITUTIONS AND PRODUCT OPTIONS
SECTION 01630

1.01 **DESCRIPTION**

A. Scope: To set forth the procedure and conditions for substitutions and to give the product options available to the Contractor.

1.02 **PRODUCTS LIST**

A. Within thirty (30) days after the Contract has been signed, the Contractor will submit to the Professional two (2) copies of a complete list of all product proposed for installation.

B. Tabulate the list by Specification sections.

C. For products specified under reference standards, include with listing of each product:

1. Name and address of Manufacturer
2. Trade name
3. Model or catalog designation
4. Manufacturer's data
5. Performance and test data
6. Reference standards

1.03 **CONTRACTOR'S OPTIONS**

A. For products specified by reference standards, technical performance requirements and named consequential respects:

1. Contractor shall select any product that meets all the specified reference standards, technical performance requirements and named consequential respects by any manufacture.

B. For products specified by naming only one (1) product and/or Manufacturer as a "basis of design", an equivalent product will always be accepted if it is equal in all consequential respects.

C. For products specified by naming only one (1) product and Manufacturer and stating no substitution will be accepted:

1. There is no option and no substitutions will be allowed.

2. This option for substitution must have written approval by the Owner **before bidding** to be considered.

1.04 **SUBSTITUTIONS**

A. A product or construction method that varies from a product or construction method specified in one or more consequential characteristics, reference standards, or technical performance requirements shall be considered a substitution.

B. Owner will not consider request for substitutions during bidding.

C. Within thirty (30) days after the contract has been signed, the Owner will consider formal request from the Contractor thru the professional and/or project manager for substitution of products or construction methods in place of those specified. Contractor will submit two (2) copies of the request for the substitutions to the professional and/or project manager and owner for review. Contractor will include in the request:

1. Narrative summarizing characteristics, reference standards or technical performance requirements that product varies from how the proposed product or construction method will meet or exceed project requirements.

2. Substitution Product Information:

a. Product identification including manufacturer's name and address

b. Manufacturer's literature, product description, performance and test data and reference standards.

c. Samples

d. Name and address of similar projects on which products was used and date of installation.

3. For construction methods:

a. Detailed description of proposed method.

b. Drawings illustrating methods.

4. Data relating to any delays to the construction schedule if any will result from proposed substitution.

5. Accurate cost data on proposed substitution if any project cost increases are anticipated or any cost savings are being offered for proposed substitution.

D. In making a request for substitution, the contractor represents:

1. Proposed product or method, has been investigated and determined that it is equal or superior in all respects to that specified.

2. The same or better guarantee and/or warranty will be provided for substitutions product or method specified.

3. Installation of accepted substitutions will be coordinated into the work, making such changes required of work to be complete in all respects at no additional cost to the Owner.

4. All claims for additional cost related to substitution, including any delays to the construction schedule, which consequently become apparent will be waived.

5. Unless specifically identified on substitution submittal and such delay is specifically agreed to by Change Order to the Contact, substitution will not cause any delay to the construction schedule.

E. Substitutions will not be considered if:

1. Indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with this section.

2. Acceptance will require substantial revision of contract documents unless compensation for such additional professional cost are paid by Contractor at no additional cost to the Owner.

3. In the Owner's opinion, the product or material is not equal.

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PART 1 - GENERAL

1.1 DESCRIPTION

A. Soil Investigation: A report has been prepared. This report was obtained only for use by the Architect in design and is included hereafter as a part of the contract documents.

B. Examination: A copy of this report has been included herein and is available for contractor's information only and is not a warranty of subsurface conditions.

C. Additional Investigation: Contractor should visit the site and acquaint himself with conditions. Prior to bidding, the contractor may make his own investigations to satisfy himself with site and subsurface conditions.

END OF SECTION 003132

BURNS COOLEY DENNIS, INC.

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May 9, 2025

Charles Bourland
Landry Lewis Germany Architects
5211 Old Highway 11
Hattiesburg, Mississippi 39402

Report No. 250190

Geotechnical Exploration
Building 1471
Camp Shelby, Mississippi

Dear Mr. Bourland:

Submitted here is the report of our geotechnical exploration for the above-captioned project. This exploration was authorized on March 27, 2025, by acceptance of our Proposal No. 25001P-064 dated March 17, 2025. Draft recommendations provided in an e-mail on May 8, 2025, are superseded by the recommendations provided in this report. Our investigation indicates that shallow foundations are appropriate for support of the building renovations, providing the foundations are designed and constructed in accordance with the recommendations contained within this report. Some apparent burn pit debris and expansive clays (CH) were encountered in the borings which will need to be addressed during design and construction.

We appreciate the opportunity to be of service. If you should have any questions concerning this report, please do not hesitate to call us.

Very truly yours,

BURNS COOLEY DENNIS, INC.

G. Thomas Dunlap, P.E.

Jeffrey W. Williams, P.E.

JEFFREY WAYNE WILLIAMS
REGISTERED PROFESSIONAL ENGINEER
16392
STATE OF MISSISSIPPI

JWW/GTD/khb
Copy Submitted: (via e-mail)

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1.0 INTRODUCTION

1.1 Project Description

Burns Cooley Dennis, Inc. (BCD) understands that Building 1471 at Camp Shelby near Hattiesburg, Mississippi, will be renovated. Building 1471 is located about 200 ft southeast of the intersection of 14th Street and 9th Street.

As part of the renovation, new walls and canopies will be constructed for the building. The building slabs and exterior walls will remain. A new structure will be constructed on the outside of the building and a new roof will be constructed over the building. Canopies and new walkways may also be constructed adjacent to the building. The building has nominal dimensions of about 90 ft wide and 190 ft long. We understand that the building will be lightly loaded with maximum column loads of 100 kips in compression and 20 kips in uplift, and maximum wall loads of 4 kips per ft. The existing building is supported on shallow foundations.

We anticipate that no cut or fill will be required to achieve finish grades. Based on our previous experience with similar projects at Camp Shelby, we anticipate that new floor slabs may also be constructed. The ground surface adjacent to the existing building is relatively level and covered with grass. The ground surface appears to be at about the same elevation as the existing building slab.

During the course of this investigation, we encountered apparent burn pit debris in one of the borings. We are not aware of the extent of the apparent debris, including whether it extends under the existing building. A BCD representative made a brief trip to the site. No indications that the building foundation is performing poorly were noted during our brief visit. We are not aware if the building has had poor foundation performance or not.

1.2 Purposes

The specific purposes of this exploration were:

1) to explore the subsurface soil conditions for the planned renovations to Building 1471;

2) to verify field classifications and to evaluate pertinent physical properties of the soils encountered in the borings by means of visual examination of the soil samples in the laboratory and routine tests performed on the samples; and

3) after analysis of the soil boring and laboratory test data, to provide recommendations for site preparation, earthwork construction, and foundation design and construction.

Environmental study, detailed slope and trench stability, groundwater dewatering, structure foundation design, and construction phase services are not a part of the current scope of study.

2.0 FIELD EXPLORATION

2.1 General

Subsurface soil conditions within the planned construction area of the building renovations were explored by means of three borings made to an exploration depth of 15 ft. The approximate locations of the borings are shown on Figure 1. The borings were located by our drilling crew prior to our field exploration. We made the soil borings with our drill rig as close as practical to the existing building.

All soils were classified in general accordance with the Unified Soil Classification System. A synopsis of the Unified Soil Classification System is presented on Figure 2 along with symbols and terminology typically utilized on graphical soil boring logs. Logs of the soil borings, which are identified as Borings 1, 2, and 3, are presented on Figures 3, 4, and 5. The graphical logs illustrate the types of soil and stratification encountered with depth below the existing ground surface at the boring locations. Approximate GPS coordinates for each boring location as determined by our drilling personnel using a hand-held device are shown at the bottom of each graphical boring log within the “Comments” section.

2.2 Drilling Methods and Groundwater Observations

The boreholes were advanced full depth by dry augering using a truck-mounted drill rig. Observations were made continuously during auger drilling to detect free water entering the open boreholes. Notes pertaining to groundwater observations are included at the bottom right corner of the graphic boring logs.

2.3 Sampling Methods

Disturbed split-spoon and auger samples and relatively undisturbed Shelby tube samples were obtained from the borings. Split-spoon samples of the soils were obtained by driving a

standard 2-in. OD split-spoon sampler 18 in. into the soil with a 140-lb hammer falling freely a distance of 30 inches. The N_{60} value is plotted as a small circled "x" in the data section of the logs. The number of blows required to penetrate the last foot (sum of the second and third blow count values) is considered the N_{60} value and is plotted as a small circled "x" in the data section of the logs.

Samples were obtained directly from the auger at selected depths. Relatively undisturbed samples were obtained from selected depths by pushing a 3-in. OD thin-wall Shelby tube sampler approximately 2 ft into the soil. The actual depths at which the split-spoon, auger, and Shelby tube samples were obtained are indicated by the crossed rectangular, small I-shaped, and shaded rectangular symbols, respectively, under the "Samples" column of the graphic boring logs.

2.4 Field Classification, Sample Preservation, and Borehole Abandonment

All soils encountered during drilling were carefully examined and classified by a geotechnical engineering technician. A representative portion of the auger and split-spoon samples and additional portions of the Shelby tube samples were placed in jars to provide material for later visual examination, classification, and testing in the laboratory. Each Shelby tube sample was extruded from the sampling tube in the field. An approximate 6-in. long portion of each Shelby tube sample was sealed with melted paraffin in a cylindrical cardboard container to reduce the potential for moisture loss and structural disturbance. Unless other disposition is requested, we routinely discard soil samples after about six months of storage. The boreholes were plugged with soil cuttings upon completion of drilling and sampling.

3.0 LABORATORY TESTING

3.1 General

An evaluation of the strength, compressibility, classification, and expansive properties of the subsurface soils encountered in the borings was considered to be of primary importance for this investigation. These properties were evaluated by visual examination and from results of the routine laboratory tests described in the following paragraphs. The strength and compressibility characteristics of the soils encountered in the borings were estimated by means of field

classifications of consistency, standard penetration tests (SPT), and also from results of the laboratory compressive strength tests.

3.2 Strength Properties

The strength characteristics of the fine-grained soils encountered in the borings was investigated by means of unconfined compression tests performed on selected Shelby tube samples. The results of unconfined compression tests are plotted as small open circles in the data section of the graphic logs. The water content and dry density were also determined for each compression test specimen. The actual consistency assigned on the boring logs also considers other data including physical examination of the samples. The water contents are plotted as small shaded circles in the data section of the logs. The dry densities are tabulated to the nearest lb per cu ft under the "Dry Density" column of the logs.

3.3 Classification Tests

The classifications and volume change properties of the fine-grained soils encountered in the borings were investigated by means of Atterberg liquid and plastic limit tests performed on selected representative samples. The results of the liquid and plastic limit tests are plotted as small crosses interconnected by dashed lines in the data section of the graphic boring logs. In accordance with the Unified Soil Classification System, fine-grained soils are classified as either clays or silts of low or high plasticity based on the results of Atterberg limit tests. The numerical difference between the liquid limit and plastic limit is defined as the plasticity index (PI). The magnitudes of the liquid limit and plasticity index and the proximity of the natural water content to the plastic limit are indicators of the potential for a fine-grained soil to shrink or swell upon changes in moisture content or to consolidate under loading. The proximity of the natural water content to the plastic limit is also an indicator of soil strength. In one instance for Boring 1, the sample being tested was found to be nonplastic and "NP" was recorded in the data section of the graphic log.

To aid in classifying soils containing sand, tests were performed on selected samples to determine the percent fines passing the No. 200 sieve. The percentages of fines resulting from those tests are tabulated at the appropriate depths under the far-right column of the graphic boring logs.

3.4 Water Content Tests

Water content tests were performed on samples to corroborate field classifications and to extend the usefulness of the strength and plasticity data. The results of the water content tests are plotted as small shaded circles in the data section of the graphic boring logs. The water content data have been interconnected on the logs to illustrate a continuous profile with depth.

4.0 GENERAL SUBSURFACE CONDITIONS

4.1 General

A general description of subsurface soil and groundwater conditions revealed by the borings made for this exploration is provided in the following paragraphs. The graphical logs shown on Figures 3, 4, and 5 should be referred to for specific soil and groundwater conditions encountered at the boring locations.

4.2 Soil Stratification

In Boring 1, approximately 4 ft of fill material was encountered directly beneath the ground surface. The fill material was found to consist of about 1.5 ft of silt (ML) underlain by about 2.5 ft of sandy clay (CL). The sandy clay (CL) fill material appears to contain burn pile debris. The fill material may be thicker under the existing slab since the borings were made adjacent to the existing building because they could not be made through the existing slab.

The soils encountered in Boring 1 below the fill materials and in Borings 2 and 3 below the ground surface were found to consist of silty clays (CL) and sandy clays (CL) underlain at a depth of 4 ft to 8 ft by clayey sands (SC), silts (ML) and clays (CH). Clays (CH) were encountered in Boring 2 at a depth of 4 ft and in Boring 3 at a depth of about 12 ft. The clays (CH) were found to extend to the 15 ft termination depth of both Borings 2 and 3.

The natural silty clays (CL) and sandy clays (CL) are classified as stiff to very stiff. The natural silts (ML) and sands (SC) are classified as medium dense. The clays (CH) are classified as stiff to very stiff. The natural soils are considered to be relatively strong with moderate to high strength and moderate to very low compressibility.

The silty clays (CL and sandy clays (CL) have low shrink/swell potential. The silts (ML) and sands (SC) have no shrink/swell potential. The clays (CH) have moderate shrink/swell potential.

4.3 Groundwater

As indicated previously, observations were made continuously during auger drilling to detect groundwater seepage entering the open boreholes. Free water was initially encountered in Borings 1 and 3 at depths of 4.5 ft and 14 ft, respectively, during auger drilling. After a period of 15 minutes, free water was observed in Borings 1 and 3 at depths of 3 ft and 12.8 ft, respectively. The free water encountered in Boring 1 may be water perched within the surficial silts (ML) upon the underlying less permeable sandy clays (CL) and silty clays (CL). Free water was not encountered during drilling in Boring 2.

In our opinion, groundwater conditions at the site will primarily be influenced by rainfall, surface drainage, and by the rise and fall of water levels in nearby ditches, creeks, ponds or other bodies of water. Groundwater conditions at the site can also be influenced by man-made changes. Surficial soils can become saturated and weak to relatively shallow depths during periods of prolonged and heavy rainfall. Water may become perched within the surficial silts (ML) upon the underlying less permeable sandy clays (CL) and silty clays (CL),

5.0 DISCUSSION

5.1 General Soil Conditions

The soils encountered in the borings were generally found to be relatively stable and strong at the time of our field investigation. However, the presence of the silt (ML) and the sandy clay (CL) fill materials that contain apparent burn pile debris encountered from the ground surface to a depth of 4 ft in Boring 1 are not suitable for foundation support and will need to be addressed during site preparation.

The sandy clays (CL), silty clays (CL), silts (ML), and clayey sands (SC) are considered to have low to no shrink/swell potential. The clays (CH) encountered at a depth of 4 ft in Boring 2 and at a depth of 12 ft in Boring 3 have moderate shrink/swell potential.

The presence of the fill materials encountered in Boring 1 and the presence of the expansive clays (CH) encountered in Boring 2 can adversely affect foundation performance if not properly addressed during site preparation. The clays (CH) encountered at a depth of 12 ft in Boring 3 should have no adverse effects on foundation performance.

5.2 Existing Fill Material

As mentioned previously, it appears that the soils encountered in the upper 4 ft in Boring 1 may be fill materials associated with previous activities at the site. It is difficult to distinguish fill materials from the natural soils. The soils appear to contain debris from a burn pile and there is a possibility of worse fill conditions not discovered by the borings. Buried construction debris from other past activities may also be present. Efforts should be made to identify possible fill materials and buried debris prior to and/or during construction. Any unstable soils and existing debris should be addressed as discussed later in this report. The risk of unforeseen conditions cannot be eliminated without completely removing the existing unsuitable fill material or using ground improvement efforts.

5.3 Expansive Soils

Expansive clays (CH) tend to shrink during dry periods and swell during wet periods. The expansive clay (CH) soils can experience shrink/swell movements associated with seasonal moisture content fluctuations. Cover materials overlying expansive clay (CH) soils act as a buffer against seasonal moisture content changes caused by rainy weather, droughts, and evapotranspiration. Thus, the potential magnitude of moisture content changes and associated shrink/swell movements within expansive clay (CH) soils is proportionate to the thickness of overlying cover materials. Seasonal moisture content changes and shrink/swell movements within expansive clay (CH) soils decrease as the thickness of cover materials increases. There is a general trend for expansive clay (CH) soils under structures to swell due to an increase in water content caused by capillary and vapor phase movement of moisture within the clays (CH). Expansive clay (CH) soils will also experience considerable swelling if directly supplied with water from rainfall, sprinkler systems, broken underground water and sewer pipes, or any other source. Trees growing adjacent to a structure can extract a considerable amount of moisture from the ground resulting in localized shrinkage of expansive clay (CH) soils accompanied by vertical and lateral

movements. These shrink/swell movements can be detrimental to the performance of slabs and shallow foundations supported on the soils.

The expansive clays were encountered at a depth of at least 4 ft beneath the ground surface. We consider a 4-ft buffer of nonexpansive soils to be suitable for reducing future movements associated with shrink/swell of the clays. Providing the site grade is not reduced below current elevations, the buffer will be provided by the existing site soils (or the compacted fill used to replace the existing soils),

5.4 Loading Conditions

A foundation should be utilized which will accommodate the anticipated fill and structural loads and also minimize future differential vertical movements resulting from settlement due to soil consolidation/compression under fill and structural loads and movement associated with shrink/swell of the expansive clays (CH). For the soil conditions revealed by the borings, it is our opinion that a shallow foundations system could be used for support of the structure provided: 1) column loads are less than 150 kips and wall loads do not exceed 6 kips per ft; and 2) a minimum 4-ft thick buffer of low permeability and low shrink/swell potential soils is provided over the expansive clays (CH) in the building area, and 3) our recommendations for site preparation and earthwork construction are implemented. The buffer should be measured from either the bottom of the slab or finished outside grades, whichever results in the lower elevation. The shallow foundation in combination with the recommended soil buffer should **minimize, not eliminate**, future differential vertical movements within the structure caused by shrinking and swelling of the expansive clays (CH) due to moisture content fluctuations.

Details of our recommendations for site preparation, earthwork construction, and for the design and construction of the recommended foundation systems for the building are included in the following subsections.

6.0 RECOMMENDATIONS

6.1 Site Preparation and Earthwork Construction

6.1.1 General. Site preparation will be minimal if no grade-supported elements are planned. New walls and canopies will be constructed. The existing slabs and exterior walls will

remain. The ground surface adjacent to the existing building is relatively level and appears to be at about the same elevation as the existing building slab. Based on our brief observations during our time at the site, we did not notice any signs that the building foundation was performing poorly. However, we did not do a detailed survey of the existing building.

As an initial step of site preparation, any existing footings or slabs, sidewalks, underground piping or other subsurface obstruction that may interfere with earthwork and foundation construction should be removed and/or relocated.

As previously mentioned, the soils encountered to a depth of about 4 ft in Boring 1 appear to be fill materials. The lateral extent and depth of the fill materials should be verified during construction. The existing fill materials should be removed to expose stable, natural soils. We recommend the owner be advised to consider a unit pay item for undercut and backfill of unstable or poor-quality soil, and include a contingency for unstable soils when determining site preparation and earthwork costs.

If slabs or other grade-supported elements are planned, stripping should initially be performed throughout the construction areas to remove organic-laden surficial soils, vegetation, debris, brush and roots and the stability of the exposed soils should be evaluated by proofrolling the building area where practical. Providing the site grade is not reduced from current grades, the recommended minimum 4-ft thick buffer of low permeability and low shrink/swell potential soils will be provided between the bottom of the slab and the expansive clays (CH). This buffer will be provided naturally by the existing soils if the evaluation during construction determines that the soils are stable, the deleterious fill materials and the buried debris encountered in Boring 1 and any other unsuitable sols are removed and replaced with properly compacted select fill, or a combination of the two.

In general, excavation to remove unstable soils should extend to a sufficient depth to expose soils that will support compaction with stability. The actual vertical and lateral extent of excavation required to remove weak or unstable soils must be determined in the field during earthwork construction. Excavation of any weak soils should extend laterally not less than 4 ft beyond the edges of the building or a distance equal to the depth of undercut. In order to minimize the amount of excavation, we recommend that a representative of Burns Cooley Dennis, Inc. be present to observe excavation operations and assist in evaluating the depth and lateral extent of excavation required.

Excavations made to remove the existing unsuitable fill materials and any unstable soils should be backfilled with select fill materials in accordance with recommendations provided in a subsequent paragraph. Excavated soils that meet the requirements of select fill may be stockpiled for later use as backfill.

The actual moisture content conditions at the time of construction will be influenced by the rainfall preceding and during construction and also by the drying conditions during construction. Therefore, we recommend that the work be performed during a dry season of the year if the schedule permits.

6.1.2 Groundwater Seepage Control. Since groundwater (or perched water) was encountered as shallow as 3 ft in Boring 1, groundwater levels may need to be lowered prior to construction and/or adequately controlled during construction. We recommend that the specifications require the contractor to maintain the excavations in a relatively dry condition. Adequate surface drainage will also be required to minimize the amount of surface water entering the excavations.

6.1.3 Subgrade Preparation beneath Slab Areas. After excavation to remove the existing fill materials and debris and prior to the placement of any fill materials, the soils exposed below any planned slabs after stripping and excavation should be scarified to a minimum depth of 6 in. and compacted to not less than **95 percent** of standard Proctor maximum dry density (ASTM D 698) with stability present. Alternatively, the exposed soils beneath any planned slabs could be proofrolled with loaded dump trucks to demonstrate stability. Stability is defined as the absence of significant pumping, rutting, or yielding of soils during compaction or proofrolling.

If stability is not evident in some areas, either additional excavation or treatment of the in-situ soils with an admixture, or a combination of these approaches, might be required to achieve stable conditions.

The effort required to mitigate unstable soils will be influenced by the season of the year when earthwork is performed. The subsurface soils would likely be drier during the hot late summer and could weaken during heavy rainfall events. We recommend that earthwork be performed during a dry summer or fall season, if the schedule permits. It should be recognized that

soils which are demonstrated to be adequately stable during stripping and excavation can become unstable if they are disturbed by construction traffic or if they are exposed to rainfall prior to filling.

The construction techniques, types of equipment utilized and site drainage provided during construction will have a great effect on the performance of the exposed soils. The routing of heavy, rubber-tired equipment should be controlled to minimize, as much as possible, traffic in the construction areas. All traffic should be discouraged during periods of inclement weather. If pumping is initiated in the soils, as a construction expedient the pumping can be counteracted by treating these materials with lime. It is estimated that about 4 to 6 percent lime by dry weight of soil could be required.

6.1.4 Delays. If there is some delay between completion of earthwork operations and placement of the new fill, deterioration of subgrade conditions may occur. Thus, we recommend that the density and stability of the subgrade soils be confirmed or re-established immediately prior to construction of structure footings and slab.

6.2 Fill Materials and Placement

6.2.1 Select Fill. After stripping, undercutting, and visual evaluation or compaction/ densification have been performed as recommended in the preceding paragraphs, fill materials can be placed to achieve planned grades. Imported fill materials should consist of select nonorganic and debris-free silty clays (CL) or sandy clays (CL) having a liquid limit less than 45 and a plasticity index (PI) within the range of 10 to 24. Existing sandy clays (CL) and silty clays (CL) excavated during site preparation can be used as select fill, provided they are free of organic matter and other deleterious materials, they meet the classification requirements for imported select fill, and they are not too wet or dry and can be processed to achieve a moisture content within 3 percentage points of the optimum water content. Soils containing organic matter and other deleterious materials should be placed outside the limits of the proposed building areas.

6.2.2 Fill Placement. The fill materials should be compacted from lifts not exceeding 9 in. in loose thickness to not less than **95 percent** of standard Proctor (ASTM D 698) maximum dry density with stability present. Fill materials should be placed in horizontal lifts at moisture contents within 3 percentage points of the optimum water content. Stability must be evident during

compaction of each lift before any subsequent lifts of fill material are added. All backfill over utilities, storm drains, etc., should be placed in accordance with the preceding recommendations, except the lift thickness should be reduced to about 4 in. where hand-operated compaction equipment is used.

Finished site grades should be sloped to promote quick runoff of storm water and provide positive drainage away from the building on all sides. Fill materials should extend laterally not less than 5 ft beyond the perimeter of the structure and then slope down to natural ground at an inclination not steeper than 3H:1V. Finished site grades should be sloped to promote quick runoff of storm water and provide positive drainage away from the building.

Increased moisture contents resulting from rainfall can substantially reduce the strength of the on-site and proposed fill soils. We recommend that proper surface drainage be provided throughout the site to prevent surface water from percolating into the subsurface soils.

6.2.3 Laboratory and Field Testing. Laboratory classification tests, including Atterberg limit determinations and grain-size analyses, should be performed on the fill soils initially and routinely during earthwork operations to check for compliance with the recommendations provided herein. Field moisture/density tests should be performed frequently in the compacted on-site soils and in each compacted lift of fill material to assist in evaluating whether the recommended moisture contents and dry densities are being achieved. As a guide for earthwork construction, we suggest a minimum of one test per lift per 2,500 sq ft of surface area. We recommend a minimum of two tests per lift.

6.3 Foundation Design Recommendations

6.3.1 General. In conjunction with the recommended earthwork construction, it is our opinion that the planned building renovations can be supported on a shallow foundation system with the slab cast on grade (if needed) provided the structure is not heavily loaded. The allowable bearing pressures provided are for column loads no greater than 150 kips and continuous loads no greater than 6 kips per ft.

6.3.2 Foundation and Slab Design. The foundations for the building renovations can consist of strip footings supporting wall loads and spot footings supporting the roof and canopies. Separate slabs on-grade can be used if needed. Spot footings and exterior strip footings should be brought to bear at a depth of not less than 24 in. below finished outside grades adjacent to the building or the bottom of the floor slab, whichever is lower. Interior grade beams or strip footings should extend to a depth of not less than 18 in. below the bottom of the floor slab. The grade beams or strip footings should be proportioned for critical loading conditions using a net allowable soil bearing pressure of 2,000 lbs per sq ft. We recommend a minimum base width of 18 in. for the grade beams or strip footings. Square or spot footings with widths of 24 in. or greater should be designed assuming a net allowable soil bearing pressure of 2,500 lbs per sq ft when total dead plus live loads are applied. These net allowable bearing pressures include an appropriate factor of safety with respect to soil shear strength.

Spot footings can be connected with grade beams if needed to better accommodate structural loadings. Footings can be designed for lateral loading considering an allowable passive equivalent fluid unit weight of 200 lbs per cu ft per ft and a sliding resistance coefficient against the base of 0.32, where lateral loads against the structure are not accommodated in uplift and compression.

Uplift resistance of spread footings can be developed from the effective unit weight of the footing and the overlying soils. Uplift resistance can be computed by using the effective unit weight of the overlying soil as defined by diagonal planes that extend up from the top of the perimeter of the footings to the ground surface at an angle of 20 degrees from vertical. The maximum allowable uplift capacity should be computed as the sum of the effective unit weight of soil plus the dead weight of the foundation divided by an appropriate factor of safety. A maximum total unit weight of 115 pcf should be used for the soil backfill.

Any floor slabs can be supported by properly compacted subgrade soils or by select fill materials placed and compacted in accordance with the recommendations given previously in this report. The slabs should be adequately reinforced for anticipated loading conditions and deflections and to minimize slab cracking. Stiffening ribs or grade beams cast monolithically with the slab could be utilized to provide rigidity.

6.3.3 Potential Movement. We estimate that total settlements under compressive structural loads will be on the order of 1 in. Differential settlements between adjacent footings may be on the order of 3/4 in. Differential settlements are not expected to be more than 3/4 in. over a horizontal distance of 25 ft or 30 ft. Shrink/swell movements in expansive clays (CH) are difficult to predict. However, we expect shrink/swell movements to be within tolerable limits providing our recommendations for earthwork are utilized. Differential movements associated with settlement or shrink/swell between the existing building and the new construction may be on the order of the total movement.

6.4 Foundation Construction

All foundation excavations should be carefully inspected by a knowledgeable soil technician or engineer to verify bearing on generally strong soils. The bottoms and sides of the footings should be thoroughly inspected and probed by an experienced geotechnical technician or engineer to confirm that the foundation will be supported on undisturbed, stable natural soils and that no fill materials or debris are present.

Foundation elements should be promptly poured after completion of the excavations. Drainage should be maintained away from the foundation excavations during construction. Ponded water in the foundation excavations can weaken the exposed soils. Foundation soils exposed in the bottom of the foundation excavations should be inspected prior to concrete placement. If these materials are found to be weak or loose, overexcavation, and backfilling will be required to provide strong foundation soils immediately beneath the grade beams and footings.

6.5 Other Design and Construction Considerations

The locations, depths, and loads of new foundations need to consider the impact they will have on the existing building foundations. Potential differential movements between the structures should be taken into account to aesthetically hide or transfer loads at the foundation, floor, wall, and roof connections. Care should be taken not to undermine existing foundations when excavating for new foundations, and, if necessary, the existing foundations should be underpinned.

Rainwater falling on the roof of the building should be collected and prevented from reaching the ground immediately adjacent to the building. Downspouts extending from roof gutters should be equipped with extensions at ground level that are sloped to emit collected rainwater not

less than 7 ft away from the building. The downspouts could be connected to solid discharge pipes buried beneath the ground. We caution that these pipes should be flexible enough to accommodate some differential movement and all pipe connections must be leak free.

Final grades around the building should provide rapid and effective drainage of rainwater and downspout water away from the building, with no areas allowed for water to pond. Underground sources of water such as leaking water lines, sewer lines, etc., should be prevented as much as possible in the initial construction, and any leaks that develop should be promptly repaired.

The site of Building 1471 at Camp Shelby in Forrest County, Mississippi lies within a relatively low seismic activity region according to the seismic zone mapping referenced in the International Building Code. Given the site soil profile as revealed by the borings and anticipated for the area based on our experience, a site class D could be used in a seismic load evaluation.

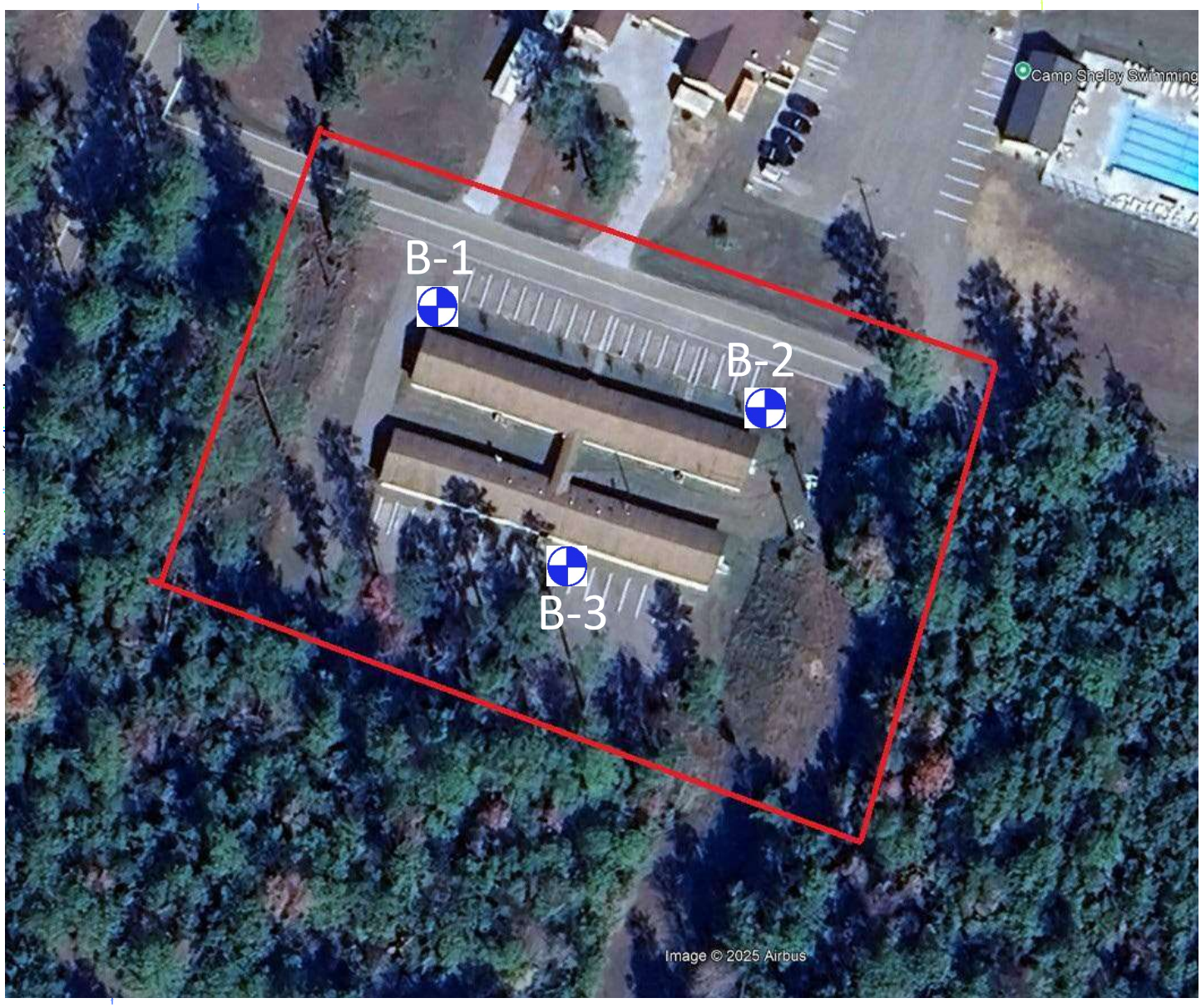
7.0 REPORT LIMITATIONS

The analyses, conclusions, and recommendations discussed in this report are based on conditions as they existed at the time of our field exploration and further on the assumption that the exploratory borings are representative of subsurface conditions throughout the area explored. It should be noted that actual subsurface conditions beyond the borings might differ from those encountered at the boring locations. If subsurface conditions are encountered during construction that vary from those discussed in this report, Burns Cooley Dennis, Inc. should be notified immediately in order that we may evaluate the effects, if any, on earthwork and foundation design and construction.

Burns Cooley Dennis, Inc. should be retained for a general review of final design drawings and specifications. It is advised that we be retained to observe earthwork and foundation construction for the project in order to help confirm that our recommendations are valid or to modify them accordingly. Burns Cooley Dennis, Inc. cannot assume responsibility or liability for the adequacy of recommendations if we do not observe construction.

This report has been prepared for the exclusive use of Landry Lewis Germany Architects for specific application to the geotechnical-related aspects of design and construction for the renovations to Building 1471 at Camp Shelby in Forrest County near Hattiesburg, Mississippi. The only warranty made by us in connection with the services provided is we have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of our profession practicing in the same or similar locality. No other warranty, express or implied, is made or intended.

FIGURES





NOT TO SCALE

Approximate Boring Locations

BUILDING 1471
CAMP SHELBY, MISSISSIPPI

BURNS COOLEY DENNIS, INC.
1402 CORINNE STREET
HATTIESBURG, MISSISSIPPI 39401

JOB NO. 250190	SCALE: AS SHOWN	FIGURE 1

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOL & LETTER	DESCRIPTION
COARSE-GRAINED SOILS More than half of material larger than No. 200 sieve size	GRAVELS More than half of coarse fraction larger than No.4 sieve size	Clean Gravels (Little or no fines)	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURE
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURE
		Gravels with fines (Appreciable amount of fines)	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURE
			GC	CLAYEY GRAVEL, GRAVEL-SAND-CLAY MIXTURE
	SANDS More than half of coarse fraction smaller than No.4 sieve size	Clean Sands (Little or no fines)	SW	WELL GRADED SAND, GRAVELLY SAND
			SP	POORLY GRADED SAND, GRAVELLY SAND
		Sands with fines (Appreciable amount of fines)	SM	SILTY SAND, SAND-SILT MIXTURE
			SP-SM	SLIGHTLY SILTY SAND
			SC	CLAYEY SAND, SAND-CLAY MIXTURE
FINE-GRAINED SOILS More than half of material smaller than No. 200 sieve size	SILTS AND CLAYS	Liquid limit less than 50	ML	SILT WITH LITTLE OR NO PLASTICITY
			ML	CLAYEY SILT, SILT WITH SLIGHT TO MEDIUM PLASTICITY
			ML	SANDY SILT
			CL	SILTY CLAY, LOW TO MEDIUM PLASTICITY
			CL	SANDY CLAY, LOW TO MEDIUM PLASTICITY (30% TO 50% SAND)
	SILTS AND CLAYS	Liquid limit greater than 50	MH	SILT, FINE SANDY OR SILTY SOIL WITH HIGH PLASTICITY
			CH	CLAY, HIGH PLASTICITY
			OH	ORGANIC CLAY OR SILT OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOIL
SEDEMENTARY ROCK TYPES:			LS	LIMESTONE
			MARL	MARL

TERMS CHARACTERIZING SOIL STRUCTURE

Slickensided	- Clays with polished and striated planes created as a result of volume changes related to shrinking, swelling and/or changes in overburden pressure.
Fissured	- Clays with a blocky or jointed structure generally created by seasonal shrinking and swelling.
Laminated	- Composed of thin alternating layers of varying color and texture.
Calcareous	- Containing appreciable quantities of calcium carbonate.
Parting	- Paper thin (less than 1/8 inch).
Seam	- 1/8 inch to 3 inch thickness.
Layer	- Greater than 3 inches in thickness.

DENSITY AND CONSISTENCY

COARSE-GRAINED SOILS

DENSITY	PENETRATION RESISTANCE, N Blows per Foot
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	>50

FINE-GRAINED SOILS

CONSISTENCY	COHESION Kips/Sq. Ft	PENETRATION RESISTANCE, N Blows per Foot
Very Soft	<0.25	0 - 1
Soft	0.25 - 0.50	2 - 4
Medium Stiff	0.50 - 1.00	5 - 8
Stiff	1.00 - 2.00	9 - 15
Very Stiff	2.00 - 4.00	16 - 30
Hard	>4.00	>30

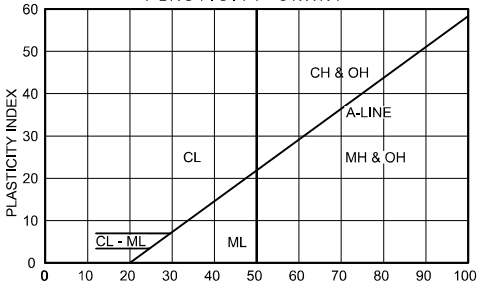
PARTICLE SIZE IDENTIFICATION

Cobbles	- Greater than 3 inches
Gravel	- Coarse - 3/4 inch to 3 inches Fine - 4.76 mm to 3/4 inch
Sand	- Coarse - 2 mm to 4.76 mm Medium - 0.42 mm to 2 mm Fine - 0.074 mm to 0.42 mm
Silt & Clay	- Less than 0.074 mm

RELATIVE COMPOSITION

Slightly	5 - 15%
With	16 - 29%
Sandy	30 - 50%
(or Gravelly)	

PLASTICITY CHART



FOR CLASSIFICATION OF FINE GRAINED SOILS

SAMPLE TYPES
(Shown in Sample Column)



Shelby Tube

Split Spoon

No Recovery

Auger

Dennison Barrel

CLASSIFICATION, SYMBOLS AND TERMS USED ON GRAPHICAL BORING LOGS

LOG OF BORING NO. 1

BUILDING 1471
CAMP SHELBY, MISSISSIPPI

TYPE: 4" Continuous-flight auger

LOCATION: See Figure 1

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	○ - UC, Cohesion, kips/sq ft, △ - UU; SPT (N_{60}), PLASTIC LIMIT, WATER CONTENT %, LIQUID LIMIT	% PASSING NO. 200 SIEVE
			SURFACE EL: NA ±ft			1 2 3 4 / 20 40 60 80	
			Medium dense tan silt (ML) (FILL)			NP; 14.1	
			Stiff tan and light gray sandy clay (CL) (FILL) - with burn pile debris to 4'	3-4-5		9; 21.6	
5			Very stiff tan and light gray sandy clay (CL)	5-7-9		16; 18.3	
			Medium dense tan and light gray clayey fine sand (SC)	4-9-10		19; 18.6	47.1
15				5-9-11		20; 18.4	
20			**Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.**				

BORING DEPTH: 15 ft

DATE: 04/23/25

COMMENTS:
GPS Coordinates
N 31° 11' 40.7"
W 89° 13' 4.1"

GROUNDWATER DATA: Free water encountered at an approximate depth of 4.5' during auger drilling. Water level at an approximate depth of 3' after about 15 minutes.

250190.GPJ

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 3

LOG OF BORING NO. 2

BUILDING 1471
CAMP SHELBY, MISSISSIPPI

TYPE: 4" Continuous-flight auger

LOCATION: See Figure 1

SURFACE EL: NA ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	% PASSING NO. 200 SIEVE
	Medium dense tan and light gray silt (ML)			
	Stiff tan and light gray silty clay (CL)	4-6-9		
5	Stiff tan, light gray and red clay (CH), slightly sandy	4-5-8		
	- very stiff, with sand pockets and seams below 8'		110	
10				
15				
20				

○ - UC Cohesion, kips/sq ft △ - UU

1 2 3 4

SPT (N_{60}) ⊗ PLASTIC LIMIT + WATER CONTENT % ● LIQUID LIMIT +

20 40 60 80

12.3
15 7
19.6
43
13 16
19.2
53
2.10
18.0
17.5

Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 15 ft

DATE: 04/23/25

COMMENTS:
GPS Coordinates
N 31° 11' 40.2"
W 89° 13' 2.1"

GROUNDWATER DATA: No free water encountered during auger drilling.

250190.GPJ

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 4

LOG OF BORING NO. 3

BUILDING 1471
CAMP SHELBY, MISSISSIPPI

TYPE: 4" Continuous-flight auger

LOCATION: See Figure 1

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	% PASSING NO. 200 SIEVE
			SURFACE EL: NA ±ft			
			Very stiff tan and light gray sandy clay (CL)		115	62.7
5			Medium dense red, tan and light gray sandy silt (ML), slightly clayey	5-8-9		
10			Very stiff tan, light gray and red clay (CH), with sand pockets and seams	6-9-11		
15						
20						

○ - UC Cohesion, kips/sq ft △ - UU

1 2 3 4

SPT (N_{60}) ⊗ PLASTIC LIMIT WATER CONTENT % LIQUID LIMIT

20 40 60 80

17.8
16
42
3.62
16.9
17
19.0
20
19.9

Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 15 ft

DATE: 04/23/25

COMMENTS:
GPS Coordinates
N 31° 11' 39.3"
W 89° 13' 3.4"

GROUNDWATER DATA: Free water encountered at an approximate depth of 14' during auger drilling. Water level at an approximate depth of 12.8' after about 15 minutes.

250190.GPJ

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 5

SECTION 010115 - SCHEDULE OF DRAWINGS

PART 1 - GENERAL

The Drawings for this project have been prepared and scheduled by the following:

Architectural

LANDRY KITCHENS GERMANY ARCHITECTS, P.A.
5211 Old Highway 11
Hattiesburg, Mississippi 39402

Structural

SECOND MOMENT STRUCTURAL ENGINEERING, LLC
228 Zelma Lane,
Florence, Mississippi 39073

Fire Protection / Plumbing / Mechanical / Electrical

I. C. THOMASSON ASSOCIATES, INC.
215 North First Street
Brookhaven, MS 39601

T1.1	TITLE SHEET
A0.1	EXISTING SURVEY - BUILDING 1471
A0.2	DEMOLITION SITE PLAN - BUILDING 1471
A0.3	SITE PLAN - BUILDING 1471
A0.4	SITE DETAILS
AD1.1	EXISTING OVERALL DEMOLITION FLOOR PLAN AND ENLARGED DEMOLITION PLAN - EAST
AD1.2	EXISTING ENLARGED DEMOLITION FLOOR PLAN - WEST
AD1.3	EXTERIOR DEMOLITION ELEVATIONS AND DEMOLITION BUILDING SECTION
A1.1	OVERALL FLOOR PLAN
A1.2	ENLARGED FLOORP LAN - EAST
A1.3	ENLARGED FLOOR PLAN - WEST
A1.4	FINISH SCHEDULE, OPENING SCHEDULE, WINDOW SCHEDULE AND OPENING TYPES
A1.5	CODE REVIEW
A1.6	LIFE SAFETY PLAN
A2.1	EXTERIOR ELEVATIONS
A4.1	WALL SECTIONS AND DETAILS
A4.2	WALL SECTIONS AND DETAILS
A4.4	WALL SECTIONS
A4.3	WALL SECTIONS

S0.1	3D VIEWS
S1.1	FRAMING PLANS
S2.1	BUILDING WALL ELEVATIONS
S2.2	BUILDING SECTIONS
FP0.1	LEGENDS - FIRE PROTECTION
FP1.1	OVERALL FLOOR PLAN - FIRE PROTECTION
FP2.1	DETAILS - FIRE PROTECTION
P0.1	LEGENDS - PLUMBING
P0.2	SITE PLAN - DEMO - PLUMBING
P0.3	SITE PLAN - NEW – PLUMBING
PD1.0	OVERALL DEMOLITION FLOOR PLAN – PLUMBING
PD1.1	ENLARGED DEMOLITION FLOOR PLAN - EAST - PLUMBING
PD1.2	ENLARGED DEMOLITION FLOOR PLAN - WEST - PLUMBING
P1.0	OVERALL FLOOR PLAN - PLUMBING
P1.1	ENLARGED FLOOR PLAN - EAST - PLUMBING
P1.2	ENLARGED FLOOR PLAN - WEST - PLUMBING
P2.1	ENLARGED UNDERGROND PLAN - EAST - SANITARY
P2.2	ENLARGED UNDERGROUND PLAN - WEST - SANITARY
P2.3	ENLARGED FLOOR PLAN - EAST - SANITARY
P2.4	ENLARGED FLOOR PLAN - WEST – SANITARY
P3.1	RISERS – PLUMBING
P3.2	RISERS – SANITARY
P3.3	RISERS - GAS
P4.1	DETAILS - PLUMBING
P4.2	DETAILS - PLUMBING
P4.3	DETAILS – PLUMBING
P5.1	SCHEDULES – PLUMBING
M0.1	LEGENDS - MECHANICAL
MD1.0	OVERALL DEMOLITION FLOOR PLAN - HVAC
MD1.1	ENLARGED DEMOLITION FLOOR PLAN - EAST - HVAC
MD1.2	ENLARGED DEMOLITION FLOOR PLAN - WEST - HVAC
M1.0	OVERALL FLOOR PLAN - HVAC
M1.1	ENLARGED FLOOR PLAN - EAST - HVAC
M1.2	ENLARGED FLOOR PLAN - WEST - HVAC
M2.1	ENLARGED FLOOR PLAN - EAST - HVAC PIPING
M2.2	ENLARGED FLOOR PLAN - WEST - HVAC PIPING
M3.1	DETAILS - MECHANICAL
M3.2	DETAILS - MECHANICAL
M4.1	SCHEDULES – MECHANICAL
M5.1	CONTROLS - MECHANICAL

E0.1	LEGENDS - ELECTRICAL
E0.2	EXISTING SURVEY - BUILDING 1471 - ELECTRICAL
E0.3	EXISTING SURVEY - BUILDING 1471 - ELECTRICAL
ED1.0	OVERALL DEMOLITION FLOOR PLAN - ELECTRICAL
E1.0	OVERALL FLOOR PLAN - ELECTRICAL
E1.1	ENLARGED FLOOR PLAN - EAST - LIGHTING
E1.2	ENLARGED FLOOR PLAN - WEST – LIGHTING
E2.1	ENLARGED FLOOR PLAN - EAST - POWER
E2.2	ENLARGED FLOOR PLAN - WEST - POWER
E3.1	ENLARGED FLOOR PLAN - EAST - SYSTEMS
E3.2	ENLARGED FLOOR PLAN - WEST - SYSTEMS
E4.1	DETAILS - ELECTRICAL
E5.1	SCHEDULES - ELECTRICAL

SECTION 013300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

A. The types of submittal requirements specified in this section include shop drawings, product data, samples and miscellaneous work-related submittals. Individual submittal requirements are specified in applicable sections for each unit of work. Refer to other Division-1 sections and other contract documents for requirements of administrative submittals.

B. Definitions: Work-related submittals of this section are categorized as follows:

1. Shop drawings include specially-prepared technical data for this project, including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for general application to a range of similar projects.

2. Product data include standard printed information on materials, products and systems; not specially-prepared for this project, other than the designation of selections from among available choices printed therein.

3. Samples include both fabricated and unfabricated physical examples of materials, products and units of work; both as complete units and as smaller portions of units of work; either for limited visual inspection or (where indicated) for more detailed testing and analysis.

4. Mock-ups are a special form of samples, which are too large or otherwise inconvenient for handling in specified manner for transmittal of sample submittals.

5. Miscellaneous submittals related directly to the work (non-administrative) include warranties, maintenance agreements, workmanship bonds, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, and similar information, devices and materials applicable to the work and not processed as shop drawings, product data or samples.

1.3 SPECIFIC-CATEGORY SUBMITTAL REQUIREMENTS:

A. General: Except as otherwise indicated in individual work sections, comply with requirements specified herein for each indicated category of submittal. Provide and process intermediate submittals, where required between initial and final, similar to initial submittals.

B. Shop Drawings: Provide newly-prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated), with name of preparer indicated (firm name). Show dimensions which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards, and special coordination requirements. Do not allow shop drawing copies without appropriate final "Action" markings by Contracting Officer to be used in connection with the work.

C. Submittal: One correctable translucent reproducible print and one blue-line or black-line print; reproducible will be returned.

D. Product Data: Collect required data into one submittal for each unit of work or system; and mark each copy to show which choices and options are applicable to project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements. Maintain one set of product data (for each submittal) at project site, available for reference by Contracting Officer and others.

E. Submittals: Do not submit product data, or allow its use on the project, until compliance with requirements of contract documents has been confirmed by Contractor. Submittal is for information and record, unless otherwise indicated. Initial submittal is final submittal unless returned promptly by Contracting Officer, marked with an "Action" which indicates an observed non-compliance. Submit 2 copies, plus 2 additional copies (which will be returned) where required for maintenance manuals.

F. Installer's Copy: Do not proceed with installation of materials, products or systems until final copy of applicable product data is in possession of Installer.

G. Samples: Provide units identical with final condition of proposed materials or products for the work. Include "range" samples (not less than 3 units) where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where selection is required. Prepare samples to match sample where so indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations, and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by Contracting Officer. Contracting Officer will not "test" samples (except as otherwise indicated) for compliance with other requirements, which are therefore the exclusive responsibility of Contractor.

H. Submittal: At Contractor's option, provide preliminary submittal of a single set of samples for Contracting Officer's review and "Action". Otherwise, initial submittal is final submittal unless returned with "Action" which requires resubmittal. Submit 2 sets of samples in final submittal; one set will be returned.

I. Quality Control Set: Maintain returned final set of samples at project site, in suitable condition and available for quality control comparisons by Contracting Officer, and by others.

J. Mock-Ups: Mock-ups and similar samples specified in individual work sections recognized as a special type of sample. Comply with requirements for "samples" to greatest extent possible, and process transmittal forms to provide a record of activity.

K. Inspection and Test Reports: Classify each as either "shop drawing" or "product data", depending upon whether report is uniquely prepared for project or a standard publication of workmanship control testing at point of production, and process accordingly.

L. Warranties: Refer to "Products" section for specific general requirements on warranties, product/workmanship bonds, and maintenance agreements. In addition to copies desired for Contractor's use, furnish 2 executed copies.

M. Closeout Submittals: Refer to individual work sections and to "closeout" sections for specific requirements on submittal of closeout information.

N. Record Document Copies: Furnish one set.

O. Maintenance/Operating Manuals: Furnish 3 bound copies.

P. Materials and Tools: Refer to individual work sections for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.

Q. General Distribution: Provide additional distribution of submittals (not included in foregoing copy submittal requirements) to subcontractors, suppliers, fabricators, installers, governing authorities and others as necessary for proper performance of the work. Include such additional copies in transmittal to Contracting Officer where required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

1.4 ACTION ON SUBMITTALS:

A. Architect's Action: Where action and return is required or requested, Contracting Officer will review each submittal, mark with "Action", and where possible return within 2 weeks of receipt. Where submittal must be held for coordination, Contractor will be so advised by Contracting Officer without delay.

B. Final Unrestricted Release: Work may proceed, provided it complies with contract documents, when submittal is returned with the following:

1. Marking: "Approved".

2. Final-But-Restricted Release: Work may proceed, provided it complies with notations and corrections on submittal and with contract documents, when submittal is returned with the following:

a. Marking: "Approved as Noted".

b. Returned for Resubmittal: Do not proceed with work. Revise submittal in accordance with notations thereon, and resubmit without delay to obtain a different action marking. Do not allow submittals with the following marking (or unmarked submittals where a marking is required) to be used in connection with performance of the work:

1. Marking: "Returned for Resubmittal".

2. Other Action: Where submittal is returned for other reasons, with Contracting Officer explanation included, it will be marked as "Action Not Required".

C. Reviewing is only for conformance with the design concept of the project and compliance with the information given in the contract documents. The contractor is responsible for verification of all markings, changes, additions, or notes made on these drawings by the Contracting Officer. The contractor is responsible for dimensions to be confirmed and correlated at the site; for compliance with contract documents for information that pertains solely to fabrication processes or to techniques of construction and for co-ordination of the work of all trades. Approval of the shop drawings is not considered an extension of time nor a change in the contract sum unless stated in separate letter or change order.

PART 2 - PRODUCTS (not applicable).

PART 3 - EXECUTION (not applicable).

END OF SECTION 013300

SECTION 014500 - QUALITY CONTROL SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

A. General: Required inspection and testing services are intended to assist in the determination of probable compliance of the work with requirements specified or indicated. These required services do not relieve the Contractor of responsibility for compliance with these requirements or for compliance with requirements of the contract documents.

B. Definitions: The requirements of this section relate primarily to customized fabrication and installation procedures, not to the production of standard products. Quality control services include inspections and tests and related actions including reports, performed by independent agencies and governing authorities, as well as directly by the Contractor. These services do not include Contract enforcement activities performed directly by the Contracting Officer.

C. Specific quality control requirements for individual units of work are specified in the sections of these specifications that specify the individual element of the work. These requirements, including inspections and tests, cover both production of standard products, and fabrication of customized work. These requirements also cover quality control of the installation procedures.

D. Inspections, tests and related actions specified in this section and elsewhere in the contract documents are not intended to limit the Contractor's own quality control procedures which facilitate overall compliance with requirements of the contract documents.

E. Requirements for the Contractor to provide quality; control services as required by the Contracting Officer, the Owner, governing authorities or other authorized entities are not limited by the provisions of this section.

1.3 RESPONSIBILITIES:

A. Contractor Responsibilities: Except where they are specifically indicated as being the Owner's responsibility, or where they are to be provided by another identified entity, inspections, tests and similar quality control services are the Contractor's responsibility these services also include those specified to be performed by an independent agency and not directly by the Contractor. Costs for these services shall be included in the Contract Sum. The Contractor shall employ and pay an independent agency, testing laboratory or other qualified firm to perform quality control services specified.

B. The Owner will engage and pay for the services of an independent agency to perform inspections and tests that are specified as the Owner's responsibility.

C. Retest Responsibility: Where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance of related work with the requirements of the contract documents, then retests are the responsibility of the Contractor regardless of whether the original test was the Contractor's responsibility. Retesting of work revise or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original work.

D. Responsibility for Associated Services: The Contractor is required to cooperate with the independent agencies performing required inspections, tests and similar services. Provide such auxiliary services as are reasonably requested. Notify the testing agency sufficiently in advance of operations to permit assignment of personnel. These auxiliary services include but are not necessarily limited to the following:

1. Providing access to the work.
2. Taking samples or assistance with taking samples.
3. Delivery of samples to test laboratories.
4. Security and protection of samples and test equipment at the project site.

E. Coordination: The Contractor and each independent agency engaged to perform inspections, tests and similar services for the project shall coordinate the sequence of their activities so as to accommodate required services with a minimum of delay in the progress of the work. In addition, the Contractor and each independent testing agency shall coordinate their work so as to avoid the necessity of removing and replacing work to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections, tests, taking of samples and similar activities. Qualification for Service Agencies: Except as otherwise indicate, engage inspection and test service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which are recognized in the industry as specialized in the types of inspections and tests to be performed.

1.4 SUBMITTALS:

A. General: Refer to Division-1 section on "Submittals" for the general requirements on submittals. Submit a certified written report of each inspection, test or similar service, directly to the Contracting Officer, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

B. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to the following:

1. Name of testing agency or test laboratory.
2. Dates and locations of samples and tests or inspections.
3. Names of individuals making the inspection or test.
4. Designation of the work and test method.
5. Complete inspection or test data.
6. Test results.
7. Interpretations of test results.
8. Notation of significant ambient conditions at the time of sample-taking and testing.
9. Comments or professional opinion as to whether inspected or tested work complies with requirements of the contract documents.

10. Recommendations on retesting, if applicable.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION:

A. General: Upon completion of inspection, testing, sample-taking and similar services performed on the work, repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed finishes. Protect work exposed by or for quality control service activities, and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 014500

SECTION 015713 – TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Monitoring and inspection of erosion and sediment control devices.

D. Restoration of areas eroded due to insufficient preventive measures.

E. Compensation of Government for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.2 REFERENCE STANDARDS

A. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; current edition.

B. Mississippi Department of Environmental Quality (MDEQ) Small Construction General Permit.

C. Mississippi Standard Specifications for Road and Bridge Construction, 2004.

1.3 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of U.S. Environmental Protection Agency for erosion and sedimentation control, as specified for the National Pollutant Discharge Elimination System (NPDES), Phases I and II, under requirements for the 2003 Construction General Permit (CGP).

B. Comply with requirements of State of Mississippi Small Construction General Permit.

C. Follow a Storm Water Pollution Prevention Plan.

D. Submit appropriate monitoring and inspection reports on a monthly basis.

E. Maintain a copy of the Construction General Permit, Storm Water Pollution Prevention Plan, monitoring reports, and other relative information shall be maintained on the construction site and be made available upon request.

F. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.

G. Timing: Put preventive measures in place prior to disturbance of surface cover and before precipitation occurs.

H. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.

1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.

I. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site

due to construction activities for this project.

1. Control movement of sediment and soil from temporary stockpiles of soil.
2. Prevent development of ruts due to equipment and vehicular traffic.
3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Government.

J. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Government.

K. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Government; remove deposited sediments; comply with requirements of authorities having jurisdiction.
   2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

L. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Government; remove deposited sediments; comply with requirements of authorities having jurisdiction.

M. Open Water: Prevent standing water that could become stagnant.

N. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.4 SUBMITTALS

A. See Section 013300 - Administrative Requirements, for submittal procedures.

B. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished. Reports shall be submitted on a monthly basis.

PART 2 PRODUCTS

2.1 MATERIALS

A. Mulch: Use one of the following:
   1. Straw or hay.

B. Grass Seed for Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.

C. Silt Fence Fabric: Silt fence material shall be in accordance with Section 234.02 of the MDOT Specifications.

D. Large Course Aggregate shall consist of No. 4 Railroad Ballast as approved by the Engineer.

PART 3 EXECUTION

3.1 GENERAL

A. Implementation of all storm water management and pollution prevention items of construction will be accomplished prior to any other construction activities which disturb ANY existing ground surface within the project limits.

3.2 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.3 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.4 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Construction entrances/exits shall be constructed of 6" large course aggregate (No. 4 Railroad Ballast) at locations and dimensions shown on the plans and details or as directed by the Engineer.

C. Perimeter Controls: Made of silt fences. Place Perimeter Controls at locations shown on the drawings or as directed by the Engineer. Generally, Perimeters shall be placed along downhill perimeter edge of disturbed areas, including soil stockpiles

D. Storm Drain Inlet Protection: All storm drain structures and piping within the land disturbance area shall be protected by an appropriate Best Management Practice as detailed on the drawings or as directed by the Engineer.

E. Soil Stockpiles: Protect using an appropriate Perimeter Control or as directed by the Engineer.

F. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.

G. Temporary Seeding: Use where temporary vegetated cover is required.

3.5 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches (13 mm) or more rainfall at the project site, and daily during prolonged rainfall.
B. Repair deficiencies immediately.
C. Clean out temporary sediment control structures weekly and relocate soil on site.
D. Place sediment in appropriate locations on site; do not remove from site.

1.5 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.
B. Clean out temporary sediment control structures that are to remain as permanent measures.
C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION 015713

SECTION 016200 - PRODUCTS AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definitions: "Products" is defined to include purchased items for incorporation into the work, regardless of whether specifically purchased for project or taken from Contractor's stock of previously purchased products. "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, installed or applied to form units of work. "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, etc.). Definitions in this paragraph are not intended to negate the meaning of other terms used in contract documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," "special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

B. Substitutions: The requirements for substitutions do not apply to specified Contractor options on products and construction methods. Revisions to contract documents, where requested by Owner, Contracting Officer, are "changes" not "substitutions." Requested substitutions during bidding period, which have been accepted prior to Bid Date, are included in contract document and are not subject to requirements for substitutions as specified herein. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities do not constitute "substitutions;" and do not constitute a basis for change orders, except as provided for in contract documents. Otherwise, Contractor's requests for changes in products, materials and methods of construction required by contract documents are considered requests for "substitutions," and are subject to requirements hereof.

C. Standards: Refer to Division-1 section "Definitions and Standards" for applicability of industry standards to products of project, and for acronyms used in text of specification sections.

1.3 QUALITY ASSURANCE:

A. Source Limitations: To the greatest extent possible for each unit of work, provide products, materials or equipment of a singular generic kind and from a single source.

B. Compatibility of Options: Where more than one choice is available as options for Contractor's selection of a product or material, select an option which is compatible with other products and materials already selected (which may have been from among options for those other products and materials). Total compatibility among options is not assured by limitations within contract documents, but must be provided by Contractor. Compatibility is a basic general requirement of product/material selections.

1.4 SUBMITTALS:

A. Requests for Substitutions: Submit 3 copies, fully identified for product or method being replaced by substitution, including related specification section and drawing number(s), and fully documented to show compliance with requirements for substitutions. Include product data/drawings, description of methods, samples where applicable, Contractor's detailed comparison of significant qualities between specified item and proposed substitution, statement of effect on construction time and coordination with other affected work, cost information or proposal, and Contractor's statement to the effect that proposed substitution will result in overall work equal-to-or-better-than work originally indicated.

1.5 PRODUCT DELIVER-STORAGE-HANDLING:

A. General: Deliver, handle and store products in accordance with manufacturer's recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Control delivery schedules to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss.

1.6 WARRANTIES (GUARANTEES):

A. Categories of Specific Warranties: Warranties on the work are in several categories, including those of General Conditions, and including (but not necessarily limited to) the following specific categories related to individual units of work specified in other sections of these specifications:

B. Special Project Warranty (Guarantee): A warranty specifically written and signed by Contractor for a defined portion of the work; and, where required, countersigned by Subcontractor, installer, manufacturer or other entity engaged by Contractor.

C. Specified Product Warranty: A warranty which is required by contract documents, to be provided for a manufactured product incorporated into the work; regardless of whether manufacturer has published a similar warranty without regard for specific incorporation of product into the work, or has written and executed a special project warranty as a direct result of contract document requirements.

D. Coincidental Product Warranty: A warranty which is not specifically required by contract documents (other than as specified in this Section); but which is available on a product incorporated into the work, by virtue of the fact that manufacturer of product has published warranty in connection with purchases and uses of product without regard for specific applications except as otherwise limited by terms of warranty.

E. Refer to individual sections for the determination of units of work which are required to be specifically or individually warranted, and for the specific requirements and terms of those warranties (or guarantees).

F. General Limitations: It is recognized that specific warranties are intended primarily to protect Owner against failure of the work to perform as required, and against deficient, defective and faulty materials and workmanship, regardless of sources. Except as otherwise indicated, specific warranties do not cover failures in the work which result from:

1. Unusual and abnormal phenomena of the elements.
2. The Owner's misuse, maltreatment or improper maintenance of the work.

3. Vandalism after time of substantial completion.
4. Insurrection or acts of aggression including war.

G. Related Damages and Losses: In connection with Contractor's correction of warranted work which has failed, remove and replace other work of project which has been damaged as a result of such failure, or must be removed and replaced to provide access for correction of warranted work.

H. Consequential Damages: Except as otherwise indicated or required by governing regulation, special project warranties and product warranties are not extended to cover damage to building contents (other than work of Contract) which occurs as a result of failure of warranted work.

I. Reinstatement of Warranty Period: Except as otherwise indicated, when work covered by a special project warranty or product warranty has failed and has been corrected by replacement or restoration, reinstate warranty by written endorsement for the following time period, starting on date of acceptance of replaced or restored work.

J. A period of time ending upon date original warranty would have expired if there had been no failure.

K. Replacement Cost, Obligations: Except as otherwise indicated, costs of replacing or restoring failing warranted units or products is Contractor's obligation, without regard for whether Owner has already benefited from use through a portion of anticipated useful service lives.

L. Rejection of Warranties: Owner reserves the right, at time of substantial completion or thereafter, to reject coincidental product warranties submitted by Contractor, which in opinion of Owner tend to detract from or confuse interpretation of requirements of contract documents.

M. Contractor's Procurement Obligations: Do not purchase, subcontract for, or allow others to purchase or sub-subcontract for materials or units of work for project where a special project warranty, specified product warranty, certification or similar commitment is required, until it has been determined that entities required to countersign such commitments are willing to do so.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT COMPLIANCE:

A. General: The compliance requirements, for individual products as indicated in contract documents, are multiple in nature and may include generic, descriptive, proprietary, performance, prescriptive, compliance with standards, compliance with codes, conformance with graphic details and other similar forms and methods of indicating requirements, all of which must be complied with. Also "allowances" and similar provisions of contract documents will have a bearing on selection process.

B. Procedures for Selecting Products: Contractor's options for selecting products are limited by contract document requirements, and governing regulations, and are not controlled by industry and governing regulations, and are not controlled by industry traditions or procedures experienced by Contractor on previous construction projects. Required procedures

include, but are not necessarily limited to, the following for various indicated methods of specifying:

1. Single Product/Manufacturer Name: Provide product indicated, except advise Contracting Officer before proceeding, where known that named product is not a feasible or acceptable selection.
2. Two or More Product/Manufacturer Names: Provide one of the named products, at Contractor's option; but excluding products which do not comply with requirements. Do not provide or offer to provide an unnamed product, except where none of named products comply with requirements or are a feasible selection; advise Contracting Officer before proceeding.
3. "Or Equal": Where named products in specifications text are accompanied by the term "or equal," or other language of similar effect, comply with those contract document provisions concerning "substitutions" for obtaining Contracting Officer's approval (by change order) to provide an unnamed product.
4. "Named", except as otherwise indicated, is defined to mean manufacturer's name for product, as recorded in published product literature, of latest issue as of date of contract documents. Refer requests to use products of a later (or earlier) model to Contracting Officer for acceptance before proceeding.

C. Standards, Codes and Regulations: Where only compliance with an imposed standard, code or regulation is required, selection from among products which comply with requirements including those standards, codes and regulations, is Contractor's option.

D. Performance Requirements: Provide products which comply with specific performances indicated, and which are recommended by manufacturer (in published product literature or by individual certification) for application indicated. Overall performance of a product is implied where product is specified with only certain specific performance requirements.

E. Prescriptive Requirements: Provide products which have been produced in accordance with prescriptive requirements, using specified ingredients and components, and complying with specified requirements for mixing, fabricating, curing, finishing, testing and similar operations in manufacturing process.

F. Visual Matching: Where matching with an established sample is required, final judgment of whether a product proposed by Contractor matches sample satisfactorily is Architect's judgment. Where no product within specified cost category is available, which matches sample satisfactorily and complies with requirements, comply with contract document provisions concerning, "substitutions" and "change orders" for selection of a matching product outside established cost category or, of a product not complying with requirements.

G. Visual Selection: Except as otherwise indicated, where specified product requirements include "...as selected from manufacturer's standard colors, patterns, textures..." or words of similar effect, the selection of manufacturer and basic product (complying with requirements) is Contractor's option, and subsequent selection of color, pattern and texture is Contracting Officer's selection. Where specified product requirements include "...as selected from standard colors, patterns, textures available within the industry...", or words to that effect, selection of product (complying with requirements, and within established cost category) is Contracting Officer's selection, including designation of manufacturer where necessary to obtain desired color, pattern or texture.

2.2 SUBSTITUTIONS:

A. Conditions: Contractor's request for substitution will be received and considered when extensive revisions to contract documents are not required and changes are in keeping with general intent of contract documents; when timely, fully documented and properly submitted; and when one or more of following conditions is satisfied, all as judged by Contracting Officer. Otherwise, requests will be returned without action except to record non-compliance with these requirements.

B. Where request is directly related to an "or equal" clause or other language of same effect in contract documents.

C. Where required product, material or method cannot be provided within Contract Time, but not as a result of Contractor's failure to pursue the work promptly or to coordinate various activities properly.

D. Where required product, material or method cannot be provided in a manner which is compatible with other materials of the work, or cannot be properly coordinated therewith, or cannot be warranted as required, or cannot be used without adversely affecting Owner's insurance coverage on completed work, or will encounter other substantial non-compliance's which are not possible to otherwise overcome except by making requested substitution, which Contractor thereby certifies to overcome such non-compatibility, non-coordination, non-warranty, non-insurability or other non-compliance as claimed.

E. Where required product, material or method cannot receive required approval by a governing authority, and requested substitution can be so approved.

F. Work-Related Submittals: Contractor's submittal of (and Contracting Officer's acceptance of) shop drawings, product data or samples which relate to work not complying with requirements of contract documents, does not constitute an acceptable or valid request for a substitution, nor approval thereof.

2.3 GENERAL PRODUCT REQUIREMENTS:

A. General: Provide products which comply with requirements, and which are undamaged and unused at time of installation, and which are complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for intended use and effect.

B. Standard Products: Where available, provide standard products of types which have been produced and used previously and successfully on other projects and in similar applications.

C. Continued Availability: Where additional amounts of a product, by nature of its application, are likely to be needed by Owner at a later date for maintenance and repair or replacement work, provide a standard, domestically produced product which is likely to be available to Owner at such later date.

D. Nameplates: Except as otherwise indicated for required approval labels, and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on exterior of the work.

E. Labels: Locate required labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.

F. Equipment Nameplates: Provide permanent nameplate on each item of service-connected or power operated equipment. Indicate manufacturer, product name, model number, serial number, capacity, speed, ratings and similar essential operating data. Locate nameplates on an easily accessed surface which, in occupied spaces, is not conspicuous.

PART 3 - EXECUTION (not applicable)

END OF SECTION 016200

SECTION 017000 - PROJECT CLOSEOUT

PART 1- GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definitions: Closeout is hereby defined to include general requirements near end of Contract Time in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in other sections. Time of closeout is directly related to "Substantial Completion"; and therefore, may be either a single time period for entire work which have been certified as substantially complete at different dates. That time variation (if any) shall be applicable to other provisions of this section.

1.3 SUBSTANTIAL COMPLETION:

A. The contractor shall have completed the following:

1. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.
2. Make final change-over of locks and transmit keys to Owner, and advise Owner's personnel of change-over in security provisions.
3. Complete start-up testing of systems, and instructions of Owner's operating/maintenance personnel. Discontinue (or change over) and remove from project site temporary facilities and services along with construction tools and facilities, mock-ups, and similar elements.
4. Inspection Procedures: Upon receipt of contractor's request, Architect will either proceed with inspection or advise contractor of prerequisites not fulfilled. Following initial inspection, Architect will either prepare certificate of substantial completion, or advise contractor of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been substantially completed. Results of completed inspection will form initial "punch-list" for final acceptance.

1.4 FINAL ACCEPTANCE:

A. General: Prior to requesting Architect's final inspection for certification of final acceptance and final payment as required by General Conditions, complete the following and list known exceptions (if any) in request:

1. Submit final payment request with final releases and supporting documentation not previously submitted and accepted, include certificates of insurance for products and completed operations where required.

1.5 CLOSE-OUT DOCUMENTS:

A. Prior to Final Payment the Contractor shall provide the following closeout documents in **TRIPLICATE:** (Unless otherwise noted)

B. Contractor shall submit all required documents in **one initial complete package**. Partial submittals will be returned to the Contractor.

C. **All closeout documents must be provided in three binders**. (Operation and Maintenance Manuals may be in a separate binder if necessary)

D. Each item shall be **tabbed.**

E. Each item shall be **numbered with the item number listed below**.

F. Package shall include all as-built drawings and specifications, operation manuals, maintenance manuals and all items listed below.

G. **Final payment will not be approved until all close-out documentation have been received.**

H. Required Close-out Documents are listed as follows:

1. Submit copies of original Contract, Bonds, Certificate of Insurance and all Change Orders. (Three required - photo copies acceptable)

2. Final Request for Payment, A.I.A. Document G702. (Three originals required)

3. Consent of Surety for Final Payment, A.I.A. Document G707, completed in full by bonding company with Power of Attorney. (Three originals required- notarized)

4. Release of Liens and Certification All Bills Are Paid, A.I.A. Document G706. (Three originals required - notarized)

5. Contractor's Affidavit of Release of Liens, A.I.A. Document G706A. (Three originals required - notarized)

6. Notarized letter with the following wording: (Three originals required - notarized)

   "We hereby certify that all bills for labor and materials incorporated into the above captioned project under our contract, have been paid and that the Owner is released from any and all claims and/or damages under this contract."

7. Notarized Statement stating that: Project has been constructed in accordance with contract documents. (Three originals required - notarized)

8. Guarantee of Work: Sworn statement that all work is guaranteed against defects in materials and workmanship for one year from date of owner's acceptance, except where specified for longer periods. (Three originals required - notarized) **All guarantees and warranties shall be obtained in the Owner's name.** Word the Guarantee as follows: (All four paragraphs)

   "We hereby guarantee all work performed by us on the above captioned project to be free from defective materials and workmanship for a period of one year or such longer period of time as may be called for in the contract documents for such portions of the work.

Within the guaranty period, if repairs or changes are requested in connection with guaranteed work which, in the opinion of the Owner, are rendered necessary as a result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the contract, the Contractor shall promptly, upon receipt of notice from and without expense to the Owner, place in satisfactory condition in every particular, all such guaranteed work, correct all defects therein and make good all damages to the building, site, equipment or contents thereof which, in the opinion of the Owner, is the result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the contract; and make good any work or materials or the equipment and contents of said buildings or site disturbed in fulfilling any such guaranty.

If after notice, the Contractor fails to proceed promptly to comply with the terms of the guaranty, the Owner may have the defects corrected and the Contractor and his Sureties shall be liable for all expense incurred.

All special guarantees applicable to definite parts of the work stipulated in the project manual or other papers forming part of the contract shall be subject to the terms of this paragraph during the first year of the life of such special guaranty."

9. As Built Record Drawings: Maintain one complete set of contract document drawings for recording substantial deviations from the work originally shown. The mechanical and electrical contractors shall maintain a separate set of documents at all times, throughout the project. If items are discovered which are uncharted or unknown, record such item and location for future referenced by the owner. Locate deviation by dimension and or scale for site and building work from known, visible and obvious point of reference. Note all items changed by addendum and change orders. Contractor shall keep in reserve one complete set of plans for final transfer of data. All deviations shall be "Flagged with a cloud" and noted and dimensioned if necessary. In addition, the Contractor shall have one set of **Xerox Graphic Vellum Reproducibles** made of the marked set of prints. Each sheet shall be marked "As Built Drawings". The **Reproducible marked prints and two copies shall be submitted with the close-out documents.**

10. As Built Record Specifications: Maintain one copy of specifications, including addenda, change orders and similar modifications issued in printed form during construction, and mark-up variations (of substance) in actual work in comparison with text of specifications and modification as issued. Give particular attention to substitutions, selection of options, and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable. Upon completion of mark-up, submit to Architect for Owner's records.

11. Record Product Data (Shop Drawings, Brochures, Submittals, etc.): Maintain three copies of each product data submittal, and mark-up significant variations in actual work in comparison with submitted information, include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-up of record drawings and specifications. Upon completion of mark-up, submit complete three sets to Architect for Owner's records.

12. Maintenance Manuals: Organize maintenance-and-operating manual information into suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumb-tabbed), include emergency instructions, spare parts listing, copies of warranties, wiring diagrams, recommended "turn-around" cycles, inspection procedures, shop drawings, product data, and similar applicable information. Bind each manual of each set in a heavy-duty 2", three-ring vinyl-covered binder, and include pocket folders for folded sheet information. Mark identification on both front and spine of each binder.

13. Roofing Guarantees Manufacturer's guarantees. (Three originals required)

14. Permits, Licenses and Certificates: For the Owner's records, submit copies of building and other permits, licenses, certifications, city/county inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work. (Three required - photo copies acceptable)

15. Termite Treatment Warranty for five (5) years from date of treatment. (Three originals required)

16. Door Guarantee (Three originals required)

17. Warranty on Insulating Glass Units for ten (10) years. (Three originals required)

18. Notarized letter with the following wording: (Three originals required)

    "We hereby certify that all material incorporated in this project are non-asbestos containing materials".

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES:

A. General Operating/Maintenance Instructions: Arrange for each installer of work requiring continuing maintenance or operation to meet with Owner's personnel at project site to provide basic instruction needed for proper operation and maintenance of entire work, include instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and similar procedures and facilities. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, energy effectiveness, and similar operations. Review maintenance and operations in relation with applicable warranties, guarantee from manufacturers and serviced guarantee, agreements to maintain, bonds, and similar continuing commitments.

3.2 FINAL CLEANING:

A. General: Special cleaning for specific units of work is specified in other sections. General cleaning during progress of work is specified in General Conditions and as temporary services in "Temporary Facilities" section of this Division. Provide final cleaning of the work at time indicated consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, of cleaning levels required:

1. Remove labels which are not required as permanent labels.
2. Clean transparent materials, including mirrors and window/door glass to a polished condition removing substances which are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.
3. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
4. Wipe surfaces of mechanical and electrical equipment clean, and similar equipment; remove excess lubrication and other substances.
5. Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, manholes, attics and similar spaces.
6. Clean concrete floors in non-occupied spaces broom clean.
7. Clean plumbing fixtures to a sanitary condition, free of stains including those resulting from water exposure.
8. Clean light fixtures and lamps so as to function with full efficiency.
9. Clean project site (yard and grounds), including landscape development areas of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petro-chemical spills and other foreign deposits.
10. Rake ground which are neither planted nor paved to a smooth, even surface.
11. Pest Control: Engage an experienced exterminator to make a final inspection of project and to rid project of rodents, insects, and other pests.
12. Removal of Protection: Except as otherwise indicated or requested by Architect, remove temporary protection devices and facilities which were installed during course of the work to protect previously completed work during remainder of construction period.

B. Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on Owner's property, or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.

C. Where extra materials of value remaining after completion of associated work have become Owner's property, dispose of these to Owner's best advantage as directed.

END OF SECTION 017000

SECTION 020800 - ASBESTOS ABATEMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENT:

A. Drawings and general provisions of Contract, including General and supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 CONTRACTOR REQUIREMENTS

A. The Asbestos Abatement Contractor (AAC) shall be licensed by the State of Mississippi as an Asbestos Abatement Contractor.

B. The AAC must be covered by asbestos specific liability insurance in the minimum amount of $1,000,000. The Contractor shall present documentation that this coverage as been obtained.

1.3 SCOPE OF WORK

A. This specification covers the abatement of exposure to asbestos hazards from building structures and components listed in the attached report.

B. This project covers the entire removal and appropriate disposition of asbestos containing materials (ACM) in the Buildings as noted in the attached report that are included as part of this project.

C. The bidder must field verify his own quantities prior to bidding.

1.4 SCHEDULE

A. The AAC shall coordinate his work with the demolition contractor. The AAC shall schedule his work in a manner that allows the demolition contractor to meet his deadlines.

1.5 DESCRIPTION OF WORK

A. The work specified herein shall be the removal of asbestos containing materials by competent persons trained, knowledgeable and qualified in the techniques of abatement, handling and disposal of asbestos-containing and asbestos-contaminated materials and the subsequent cleaning of contaminated areas, who comply with applicable Federal, State, and Local regulations and are capable of and willing to perform the work of this Contract.

B. The AAC will be responsible for furnishing proof to the Project Designer and the

Building Owner that the ACM removed as a part of this contract has been in fact disposed of and handled at the disposal site in conformance with 40 CFR 763 Appendix D to Subpart E.

C. The AAC shall supply all labor, materials services, insurance, permits and equipment necessary to carry out the work in accordance with all applicable Federal, State and Local regulations and these specifications.

D. The AAC is responsible for restoring the work area and auxiliary areas utilized during the abatement to conditions equal to or better than original. Any damages caused during the performance of abatement activities shall be repaired by the AAC (e.g. paint peeled off by barrier tape, nail holes, water damage, broken glass, damage to building exterior or grounds) at no additional expense to the Building Owner.

E. The AAC shall start work within 3 days of being given a notice to proceed and shall be completely finished with the asbestos abatement project in conjunction with the General Contractor's Schedule for each building.

1.6 APPLICABLE STANDARDS AND GUIDELINES

A. General Requirements

1. All work under this Contract shall be done in strict accordance with all applicable Federal, State and Local regulations, standards and codes governing asbestos abatement and any other trade work done in conjunction with the abatement.

2. The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirements shall be utilized.

3. Copies of all standards, regulations, codes and other applicable documents, including this specification and those listed herein shall be available at the worksite in the clean change area of the worker decontamination system.

B. Specific requirements

1. Occupational Safety and Health Administration (OSHA)

a. Title 29 Code of Federal Regulations Section 1910.1001 - General Industry Standard for Asbestos.

b. Title 29 Code of Federal Regulations Section 1910.134 - General Industry Standard for Respiratory Protection.

c. Title 29 Code of Federal Regulations Section 1926 - Construction Industry.

d. Title 29 Code of Federal Regulations Section 1910.2 - Access to Employee Exposure and Medical Records.

e. Title 29 Code of Federal Regulations Section 1910.1200 - Hazard Communication

2. Environmental Protection Agency (EPA)

a. Title 40 Code of Federal Regulations Section 61 Subparts A and M (Revised Subpart B) - National Emission Standard For Asbestos

C. Submittals and Notices

1. AAC shall:

a. Prior to Commencement of Work:

1. The AAC shall send notification in accordance with 40 CFR Part 61.146 of Subpart M, to the appropriate State or Federal air pollution control agency responsible for the enforcement of the National Emission Standard for Asbestos at least ten (10) days prior to the commencement of any on-site project activity. Provide Project Designer with a copy of the notice.

2. Obtain and submit a copy of the letter from the landfill stating that it is qualified to dispose of asbestos containing material.

3. Submit documentation satisfactory to the Building Owner and Project Designer that the AAC's employees, including foreman, supervisors and any other company personnel or agents who may be exposed to airborne asbestos fibers or who may be responsible for any aspects of abatement activities, have received the appropriate certificates from the Mississippi Department of Environmental Quality.

4. Maintain "ON SITE" and available for inspection at any time by authorized persons copies of all Accreditation Certificates for each and every person working on this Project, for which accreditation is required.

b. Upon completion of Abatement Work

1. Submit job progress reports detailing abatement activities. Include review of progress with respect to previously established milestones and schedules, major problems and action taken, injury reports, equipment breakdown and bulk material and air sampling results conducted by AAC's Air Sampling Professional.

2. Submit copies of all transport manifests, trip tickets and disposal receipts for all asbestos waste materials removed from the work area during the abatement process.

3. Submit copies of worksite entry logbooks with information on worker and visitor access.

4. Submit logs documenting filter changes on respirators, HEPA vacuum, negative pressure ventilation units, and other engineering controls.

5. Submit results of bulk material analysis and air sampling data collected during the course of the abatement, including OSHA compliance air monitoring results.

2. Owner Shall:

a. Prior to Commencement of Work

1. Notify occupants of work areas that may be disrupted by the abatement of project dates and requirements for relocation. Arrangements must be made prior to start, for relocation of equipment and personal possessions to avoid unauthorized access into the work area.

1.7 SITE SECURITY

A. The work area is to be restricted only to authorized, trained and protected personnel. These may include the AAC's employees, employees of Subcontractors, Owner employees and representatives, State and Local inspectors and any other designated individuals. A list of authorized personnel shall be established prior to job start and posted in the change room.

B. Entry into the work area by unauthorized individuals shall be reported immediately to the Building Owner by the AAC.

C. A logbook shall be maintained in the clean room area of the worker decontamination system. Anyone who enters the work area must record name, affiliation, time in, and time out for each entry.

D. Access to the work area shall be through a single worker change room. All other means of access (doors, windows, hallways, etc.) shall be blocked or locked so as to prevent entry to or exit from the work area. The only exceptions for this rule are the waste pass-out airlock which shall be sealed except during the removal of containerized asbestos waste from the work area, and emergency exits in case of fire or accident. Emergency exits shall not be locked from the inside, however, they shall be sealed with polyethylene sheeting and tape until needed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General (all abatement projects)

1. Deliver all materials in the original packages, containers of bundles bearing the name of the manufacturer and the brand name (where applicable).

2. The AAC shall determine the method of attaching polyethylene sheeting to walls, where required. The manner in which polyethylene sheeting is to be supported shall be selected to minimize damage to equipment and surfaces.

3. Polyethylene sheeting utilized for worker change room shall be opaque white or black in color.

4. Disposal bags shall be of 6-mil polyethylene, pre-printed with labels as required by EPA regulation 40 CFR 61.152 (b) (i) (iv) or OSHA requirement 29 CFR 1910.1001 (g) (2) (ii). Disposal bags will be "TRANSLUCENT" or CLEAR", **OPAQUE bags not approved.**

5. Disposal drums shall be metal or fiberboard with locking ring tops.

6. Stick-on labels as per EPA or OSHA requirement for disposal drums.

7. Warning signs as required by OSHA 29 CFR 1910 et al, August 10, 1994.

B. Removal

1. Surfactant (wetting agent) shall be a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, or equivalent, mixed in a proportion of 1 fluid ounce to 5 gallons of water or as specified by manufacturer. (An equivalent surfactant shall be understood to mean a material with a surface tension of 29 dynes/cm as tested in its properly mixed concentration, using ASTM method D1331-56 - "Surface and Interfacial Tension of Solutions of Surface Active Agents.") Where work area temperature may cause freezing of the amended water solution, the addition of ethylene glycol in amounts sufficient to prevent freezing is permitted.

2.2 EQUIPMENT

A. General (all abatement projects)

1. A sufficient quantity of negative pressure ventilation units equipped with HEPA filtration and operated in accordance with ANSI 29.2-79 (local exhaust ventilation requirements) and EPA guidance document EPA 560/5-83-002 Guidance for Controlling Friable Asbestos-Containing Materials in Buildings Appendix F: Recommended Specifications and Operating Procedures for the Use of Negative Pressure Systems for Asbestos Abatement shall be utilized so as to provide four (4) workplace air changes every hour.

2. Spectacle kits and eyeglasses must be provided for employees who wear glasses and who must wear full facepiece respirators. Respirators shall be provided that have been tested and approved by the National Institute of Occupation Safety and Health for use in asbestos contaminated atmospheres.

3. Full body disposable protective clothing, including head, body and foot coverings consisting of material impenetrable by asbestos fibers ("Tyvek" or equivalent) shall be provided to all workers and authorized visitors in sizes adequate to accommodate movement without tearing.

4. Additional safety equipment (e.g. hard hats meeting the requirements of ANSI Standard Z89.1-1981, eye protection meeting the requirements of ANSI Standard Z87.1-1979, safety shoes meeting the requirements of ANSI Z41.1-1967, disposable PVC gloves), as necessary, shall be provided to all workers and authorized visitors.

B. Removal

1. A sufficient supply of scaffolds, ladders, lifts and hand tools (e.g. scrapers, wire cutters, brushes, utility knives, wire saws, etc.) shall be provided as needed.

2. Sprayers with pumps capable of providing 500 pounds per square inch (psi) at the nozzle tip at a flow rate of two (2) gallons per minute for spraying amended water.

3. Rubber dustpans and rubber squeegees shall be provided for cleanup.

4. A sufficient supply of HEPA filtered vacuum systems shall be available during cleanup.

PART 3 - EXECUTION

3.1 EXECUTION

A. Work Areas

1. Post caution signs meeting the specifications of OSHA 29 CFR 1910 et al at any location and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of workplace enclosure barriers.

2. Provide necessary electric power and access to the electric breakers and switch gear in this work area. Provide temporary power and lighting. Insure safe installation (including ground faulting) of temporary power sources and equipment by compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems. All costs for electrical power shall be paid for by the Contractor.

3. Shut down and lock out all heating, cooling and air conditioning system (HVAC) components that are in, supply or pass through the work area. (Note: Interiors of existing ductwork may require decontamination.

4. The AAC shall provide sanitary facilities for abatement personnel outside of the enclosed work area (containment area) and maintain them in a clean and sanitary condition throughout the project.

5. AAC shall connect to existing system if available. Otherwise the contractor shall provide his own water for this project.

6. Seal off all windows, doorways, elevator openings, corridor entrances, drains, ducts, grilles, grates, diffusers, skylights and any other openings between the work area and uncontaminated areas outside of the work area (including the outside of the building, tunnels and crawl spaces) with 4-mil polyethylene sheeting and tape.

B. Worker Change Room

1. Worker change room shall be provided at all locations where workers will enter or exit the work area. One system at a single location for each contained work over is preferred. These systems may consist of existing rooms outside of the work area, if the layout is appropriate, that can be enclosed in plastic sheeting and are accessible from the work area. When this situation does not exist, enclosure systems may be constructed out of metal, wood or plastic support as appropriate.

2. Plans for construction, including materials and layout, shall be submitted as shop drawings and approved by the Owner’s representative prior to work initiation. Worker decontamination enclosure systems constructed at the worksite shall utilize 6-mil opaque black or white polyethylene sheeting or other acceptable materials for privacy.

3. The worker decontamination enclosure system for areas with friable asbestos shall consist of at least a clean room, a shower room, and an equipment room, each separated from each other and from the work area by airlocks. For floor tile and mastic removal, the shower may be omitted and the clean room and equipment room can be combined into one change room.

4. Entry to and exit from all airlocks and decontamination enclosure system chambers shall be through curtained doorways consisting of two (2) sheets of overlapping polyethylene sheeting. One sheet shall be secured at the top and left side, the other sheet at the top and right side.

5. Access between any two (2) rooms in the change room or the work area shall be through an airlock with at least three (3) feet separating each curtained doorway. Pathways into (from clean to contaminated) and out from (contaminated to clean) the work area shall be clearly designated.

6. Change room shall be sized to adequately accommodate the work crew. Benches shall be provided as well as hooks for hanging up street clothes. (Lockers may be provided for valuables, however, workers may be requested to secure valuables in their cars.)

7. A Shower room, will be required if the floor tile is made friable by the removal process.. Each showerhead shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to insure against leakage of any kind. An adequate amount of soap, shampoo and towels shall be supplied by the AAC and available at all times. Shower water shall be drained, collected and filtered through a system with at least five (5) micron particle size collection capability. (Note: Shower rooms will not be required for removal of non-friable, NESHAP Category I material.) If a shower room is required, then a separate equipment room will be required between the shower room and the work area.

8. The Change room (or equipment room if required) shall be used for storage of equipment and tools at the end of a shift after they have been decontaminated using a HEPA filtered vacuum and/or wet cleaning techniques as appropriate. Replacement filters (in sealed containers until used) for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement may also be stored here as needed.

C. Isolation of the work area from occupied areas of the building (where applicable).

1. The contaminated work area shall be separated from uncontaminated, occupied areas of the building by the construction of air tight barriers.

2. Walls shall be constructed of wood or metal framing to support barriers in all openings larger than 4 feet X 8 feet.

3. A sheeting material (plywood, drywall) of at least 3/8 inch thickness shall be applied to work side of barrier.

4. Cover both sides of partition with a double layer of 6-mil polyethylene sheeting with staggered joints and seal in place.

5. Caulk edges of partition at floor, ceiling, walls and fixtures to form an air

tight seal.

6. Make-up air shall be filtered, where necessary, to prevent migration of construction debris into the work area.

D. Maintenance of workplace barriers and worker decontamination enclosure systems

1. Following completion of the construction of all polyethylene barriers and decontamination system enclosures, allow overnight settling to insure that barriers will remain intact and secured to walls and fixtures before beginning actual abatement activities.

2. All polyethylene barriers inside the workplace, in the worker decontamination enclosure system, in the waste container pass-out airlock and at partitions constructed to isolate the work area from occupied areas shall be inspected at least twice daily, prior to the start of each day's abatement activities and following the completion of the day's abatement activities. Document inspections and observations in the daily project log.

3. The negative air units must be started before any asbestos containing material is disturbed. After abatement procedures within the containment area have begun, the unit should run continuously to maintain a constant negative pressure until the area has passed clearance. The unit should not be turned off at the end of the work shift or when removal operations are interrupted temporarily for any reason.

4. Once constructed and reinforced as necessary, with negative pressure ventilation units in operation as required, test enclosure for leakage utilizing smoke tubes. Repair or reconstruct as needed. Provide filtration for make-up air where dusty conditions exist outside the work area.

5. Clearly identify and maintain emergency and fire exits from the work area.

E. Commencement of work shall not occur until:

1. Enclosure systems have been constructed and tested.

2. Negative pressure ventilation systems are functioning adequately.

3. All pre-abatement submissions, notifications, postings and permits have been provided and are satisfactory to the Building Owner and Project Designer.

4. All equipment for abatement, clean-up and disposal are on hand.

5. All worker training (and certification) is completed.

6. AAC receives written permission from Building Owner to commence abatement.

F. Workplace Entry and Exit Procedures

1. Personnel entry and exit

a. All workers and authorized personnel shall enter the work area through the worker change room.

b. All personnel who enter the work area must sign the entry log, located in the clean room, upon entry and exit.

c. All personnel shall proceed first to the clean room, remove all street clothes and appropriately don respiratory protection (as deemed adequate for the job conditions) launderable and/or disposable coveralls, head covering and foot covering. Hard hats, eye protection and gloves shall also be utilized if required. Clean respirators and protective clothing shall be provided and utilized by each person for each separate entry into the work area.

d. Personnel wearing designated personal protective equipment shall proceed from the clean room through the shower room, if required, and equipment room to the main work area.

e. Before leaving the work area all personnel shall remove gross contamination from the outside of respirators and protective clothing by brushing and/or wet wiping procedures. Each person shall clean bottoms of protective footwear in the walk-off pan just prior to entering the equipment room.

f. Personnel shall proceed to equipment room where they remove all protective equipment except respirators. Deposit disposable (and launderable) clothing into appropriately labeled containers for disposal (and laundering.)

g. Reusable, contaminated footwear shall be stored in the equipment room when not in use in the work area. Upon completion of abatement it shall be disposed of as asbestos contaminated water. (Rubber boots may be decontaminated at the completion of the abatement for reuse.)

G. Removal Procedures

1. Clean and isolate the work area.

2. Wet all asbestos containing material with an amended water solution using equipment capable of providing a fine spray mist, in order to reduce airborne fiber concentrations when the material is disturbed. Saturate the material to the substrate, however, do not allow excessive water to accumulate in the work area. Keep all removed material wet enough to prevent fiber release until it can be containerized for disposal.

3. Saturated asbestos containing material shall be removed in manageable sections. Removed material should be containerized before moving to a new location for continuance of work. Surrounding areas shall be periodically sprayed and maintained in a wet condition until visible material is cleaned up.

4. Containers (6-mil polyethylene bags or drums) shall be sealed when full. Wet material can be exceedingly heavy. Double bagging of waste material is required. Bags shall not be overfilled. They should be securely sealed to prevent accidental opening and leakage by tying tops of bags in an overhand knot or by taping in gooseneck fashion. Do not seal bags with wire or cord.

5. Asbestos containing waste with sharp-edged components (e.g. nails, screws, metal lathe, tin sheeting) which would tear the polyethylene bags and sheeting shall be placed into drums for disposal.

H. Clearance Air Monitoring

1. Aggressive sampling shall be performed with portable fans circulating air in the work area to simulate actual use conditions. Negative pressure ventilation units shall not be de-energized during this period.

2. The average concentrations of airborne fibers shall be less than 0.01 fibers/cc for CLEARANCE release of the work area. The clearance test shall be PCM type testing. The AAC shall be responsible for the cost of the clearance air testing.

3. Areas exceeding this level shall be re-cleaned using procedures in Section 3.5 and re-tested until satisfactory levels are obtained. If the AAC fails a clearance test, then the AAC will be responsible for the cost of all subsequence clearance test required to clear the abatement area. TEM cassettes that are overloaded with dust and debris to the extent that the samples are unreadable shall be considered to have failed.

I. Disposal Procedures

1. As the work progresses, to prevent exceeding available storage capacity on-site, sealed and labeled containers of asbestos containing waste shall be removed and transported to the prearranged disposal location.

2. Disposal must occur at an authorized site in accordance with regulatory requirements of NESHAP and applicable State and Local guidelines and regulations.

3. All dump receipts, trip tickets, transportation manifests or other documentation of disposal shall be delivered to the Building Owner for his records. A recommended record keeping format utilizes a chain-of-custody form which includes the names and addresses of the Generator (Building Owner), AAC, pickup site, and disposal site, the estimated quantity of the asbestos waste and the type of containers used. The form should be signed by the Generator, the AAC, and the Disposal Site Operator, as the responsibility for the material changes hands. If a separate hauler is employed, his name, address, telephone number and signature should also appear on the form.

J. Transportation to the landfill

1. Once drums, bags and wrapped components have been removed from the work area, they shall be loaded into an enclosed truck for transportation.

2. When moving containers, utilize hand trucks, carts and proper lifting techniques to avoid back injuries. Trucks with lift gates are helpful for raising drums during truck loading.

3. The enclosed cargo area of the truck shall be free of debris and lined with TWO (2) LAYERS OF 6-mil polyethylene sheeting to prevent contamination from leaking or spilled containers. Floor sheeting shall be installed first and extend up the side walls a minimum of TWENTY-FOUR (24) inches. Wall sheeting shall be overlapped and securely taped into place.

4. Drums or bags shall be placed on level surfaces in the cargo area and packed tightly together to prevent shifting and tipping. Large structural components shall be secured to prevent shifting and bags placed on top. Do not throw containers into truck cargo area.

5. Personnel loading asbestos containing waste shall be protected by disposable clothing including head, body and foot protection and at a minimum, half-facepiece, air-purifying, dual cartridge respirators equipped with high efficiency filters.

K. Disposal at the landfill

1. Upon reaching the landfill, trucks are to approach the dump location as closely as possible for unloading of the asbestos containing waste.

2. Bags, drums and components shall be inspected as they are off-loaded at the disposal site. Material in damaged containers shall be repacked in empty drums or bags as necessary. (Local requirements may not allow the disposal of asbestos waste in drums. Check with appropriate agency and institute appropriate alternative procedures.)

3. Waste containers shall be placed on the ground at the disposal site, not pushed or thrown out of trucks (weight of wet material could rupture containers.)

4. Personnel off-loading containers at the disposal site shall wear protective equipment consisting of disposable head, body and foot protection and, at a minimum, half-facepiece, air-purifying, dual cartridge respirators equipped with high efficiency filters.

L. Reestablishment of the Work Area and Systems

1. Reestablishment of the work area shall only occur following the completion of clean-up procedures and after clearance air monitoring has been performed and documented to the satisfaction of the Building Owner.

2. Polyethylene barriers shall be removed from walls and floors at this time, maintaining decontamination enclosure systems and barriers over doors, windows, etc., as required.

3. The AAC shall visually inspect the work area for any remaining visible residue. Evidence of contamination will necessitate additional cleaning requirements.

M. Air Sampling Professional (ASP)

1. The AAC shall engage the services of an independent Air Sampling Professional to conduct Air sampling procedures in accordance with all pertinent OSHA, EPA, NIOSH or other regulations.

2. The AAC's ASP shall conduct air sampling in accordance with the NIOSH Standard Analytical Method for Asbestos in Air P&CAM 239 and/or Method 7400 or other acceptable methods as otherwise agreed upon.

3. The AAC's ASP shall be experienced and knowledgeable about the methods for asbestos air sampling and be able to select representative numbers and locations of samples.

4. The AAC's ASP shall have adequate liability insurance to protect against errors and omissions in the performance of support activities.

3.2 PERSONNEL MANAGEMENT

A. The AAC shall exercise complete control over all actions of his employees while on the project site or while off site from the start of work to completion of the entire project.

END OF SECTION 020800

ASBESTOS INSPECTION REPORT
April 1, 2025

FOR

Landry Lewis Germany Architects
5211 Old Highway 11
Hattiesburg, MS 39402

Inspected Building

Building 1471

Camp Shelby Training Center, Camp Shelby MS

PREPARED BY

JOE VENUS, JR

ENVIRONMENTAL SERVICES, LLC

253 DELK ROAD HATTIESBURG, MS 39401

OFFICE 601.582.2277 EMAIL nspector@netdoor.com

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APPENDICES

APPENDIX A: Detailed Asbestos Laboratory Sample Results

APPENDIX B: MDEQ Notifications and Asbestos Inspectors Credentials

ENVIRONMENTAL SERVICES, LLC

253 Delk Road, Hattiesburg, MS 39401

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1.0 EXECUTIVE SUMMARY

Environmental Services, LLC was retained by Landry Lewis Germany Architects, 5211 Old Highway 11, Hattiesburg, MS 39402, to perform a limited Asbestos Containing Materials (ACM) inspection, on building #1471 located at the Camp Shelby Training Center. The inspected items included all suspect building materials like but not limited to siding, ceilings, caulking, insulations, and textured items.

The surveyed was completed on August 1, 2025. Lee Roberts, of Environmental Services, LLC, a certified MDEQ inspector did the inspection. The purpose of the survey was to verify the presence, extent, and condition of asbestos containing materials (ACM), in the referenced areas of the building above. The asbestos survey was performed in accordance with applicable Local, State, and Federal regulations.

During the survey, sixteen (16) Homogenous Areas was discovered with a total of forty-eight (48) samples collected. Some of the samples collected had multiple layers (mastics, etc.) with these additions; the total samples analyzed by an independent laboratory were one hundred fifty-four (54) samples. The analytical results indicated that all three (03) collected samples detected concentrations of asbestos. The Laboratories Analytical Results are located in **Appendix A** of this report.

1.1 Asbestos Containing Material Summary

The analytical results of the bulk samples collected during the site survey identified the following materials, with any concentrations of asbestos. Suspect materials with greater than 1% asbestos are considered to be an asbestos containing material by the Environmental Protection agency (EPA). OSHA references worker protection guidelines for exposure to any amounts of asbestos, even below the >1% recognized by the EPA and State Regulators. **Appendix A** has the detailed laboratory results of all samples collected.

Positive Asbestos Containing Materials (ACM), Camp Shelby Bldg #1471

Homogeneous Area/Location	Sample Number	Material Sampled, Condition	Asbestos Content	NESHAP Category	Square footage
Interior HA-03	7,8,9	Exterior wall siding panels Fair, Non friable	8% Chrysotile		

2.0 PROJECT SUMMARY

Lee Roberts, a certified asbestos inspector, is accredited through the State of Mississippi Department of Environmental Quality (MDEQ). He has successfully completed Environmental Protection Agency approved training in asbestos inspection and removal, and participates in ongoing training offered by accredited associations. His MDEQ Certification Number is ABI-00001353. Upon arriving at the Site, Mr. Roberts did a short tour of the overall Site. He observed the suspect ACM material to be sampled and assigned a Homogeneous Area (HA) number, description, and measurement to the suspect materials. Homogeneous Areas are defined as suspect materials similar in color, texture, and apparent age of application.

2.1 Asbestos Survey Protocol

The ACM inspection was preformed in accordance with the U.S. Environmental Protection Agency (USEPA) requirements for implementation of the Asbestos Hazard Emergency Response Act (AHERA), and the Asbestos School Hazard Reauthorization Act (ASHARA).

The technique used for sampling the suspected materials was designed to minimize possible fiber release and in turn possible contamination of surrounding areas. The MDEQ's guide to suspect asbestos containing materials include, all building materials, except, unpainted glass, unpainted wood, and unpainted metals. All representative suspect materials sampled were collected in accordance with EPA's AHERA and "Guidance for Controlling Asbestos Containing Materials in Buildings" (EPA 560/66-85-024, June 1985).

The sample location is sprayed with amended soapy water mixture when applicable. Then, a core sample of material was collected and properly stored, in a labeled airtight bag. The chain of custody form was completed for bulk samples collected and subsequently delivered to Triangle Environmental Services Center, Inc (a certified NVLAP laboratory) for analysis using Polarized Light Microscopy (PLM). Triangle Environmental Services Center, Inc utilizes the dispersion staining technique according the U. S. EPA method 600/M4-82/020 incorporating visual estimates of identified material percentages. This survey was to identify any of the six major types of asbestos, Chrysotile, Amosite, Crocidolite, Anthophylite, Tremolite, and Actinolite in the materials sampled.

During the sampling activities, each suspect ACM was touched by the inspector to determine its friability and observed to determine the physical condition of the material. A Friable Material is a material is defined as a material that can be crumbled, or reduced to a power by hand pressure. Friability of a material directly relates to a potential of the ACM to release airborne fibers. The inspector assessed the suspect ACM, according to its physical condition.

The results of this inspection may not be considered to be a product endorsement by Environmental Services, LLC, NVLAP, or any agency of the U.S. Government.

Environmental Services, LLC recommends that the identified ACM should be either managed in place with an Operations and Maintenance (O&M) Plan, or abated by a licensed contractor in accordance with all applicable local, State and Federal rules and regulations. Should additional suspect materials not included in this survey be discovered during maintenance or renovation activities, Environmental Services, LLC recommends that samples of these materials be tested for asbestos content.

2.2 Asbestos Survey Findings

The analytical results of the bulk samples collected during the site survey; April 1, 2025 identified the following materials with concentrations of asbestos. Suspect materials with greater than 1% asbestos are considered to be an asbestos containing material by Mississippi Department of Environmental Quality (MDEQ) and the Environmental Protection Agency (EPA). OSHA references worker protection guidelines for exposure to any amounts of asbestos, even below the >1% recognized by the EPA and State Regulators. **Table 1** has the positive sample results of all samples collected.

During the survey, sixteen (16) Homogenous Areas was discovered with a total of forty-eight (48) samples collected. Some of the samples collected had multiple layers (mastics, etc.) with these additions; the total samples analyzed by an independent laboratory were one hundred fifty-four (54) samples. The analytical results indicated that all three (03) collected samples detected concentrations of asbestos. The Laboratories Analytical Results are located in **Appendix A** of this report.

2.3 Limitations

This survey was completed in accordance with Federal and State protocols for identifying the presence of asbestos-containing materials. Environmental Services, LLC or the inspector do not warrant that all asbestos containing materials have been located or identified during this inspection. Other areas of suspect ACM may be present in areas not visible or readily accessible to Environmental Services, LLC at the time of the survey. Additionally, prior renovation or repair activities may have altered building materials such that suspect ACM could not be properly identified by the inspector. Should additional suspect ACMs be identified, they should be assumed to contain asbestos and sampled for asbestos content.

The person or persons in charge of the facility should exercise care, any time a suspect material is to be disturbed, which has not been sampled or assumed to contain asbestos.

The liability of Environmental Services, LLC is limited to the amount paid by the client for this report. The client assumes all responsibility for the further distribution of this report and its contents. By making such distribution the client agrees to hold Environmental Services, LLC harmless against all claims of persons so informed of the contents hereof.

If an amount of ACM is listed in this report, it is an approximation based upon field observations and/or limited measurements. A Licensed Asbestos Management Planner prior to development of an O&M Plan should determine the actual quantity of ACM requiring management. Similarly, a Licensed Asbestos Consultant prior to initiation of abatement activities should verify the quantity of ACM requiring abatement.

The inspection date was April 1, 2025. Any changes occurring after this date can alter the data in this inspection report.

2.4 Asbestos Positive Sample Results

Table 1

Please see Appendix A (lab report), attached, for detailed composition of materials. Results of samples taken from any location may be considered the same for identical materials in other areas of these buildings.

Reference: Building # 1471
Camp Shelby Training Center

Sample #	Description	Results
07	**Exterior wall siding panels HA-03**	**Contian asbestos**
08	**Exterior wall siding panels**	**Contian asbestos**
09	**Exterior wall siding panels**	**Contian asbestos**

Materials samples
Roof shingles
Roof felt
Exterior soffett panels
Block mortar
Door and window caulking
Flooring materials
Insulation
Sheetrock
Sheetrock textures
Pipe insulations

3.0 DATA SUMMARY FOR ASBESTOS

Based on the Asbestos Inspection, Environmental Services, LLC, offers the following; three (03) asbestos-containing material (ACM) was identified as a result of this investigation and are classified in these categories:

Miscellaneous Materials-interior sink mastic materials

3.1 Assessment and Locations of Survey Samples
Bldg 1471

The exterior wall siding panels, contains asbestos

Estimated Removal Cost:

Exterior siding materials Approximately $2.00-$5.00 per square foot

Contractors will charge a set price for removal of small amounts of asbestos and it could range from $2,450.00 to $3,500.00 per visit (mobilization).

3.2 Procedures for Renovation and Demolition

(These procedures are required in Mississippi)

If renovation to the buildings' interior or exterior should occur and these actions directly affect the physical condition of any or all of the ACMs, then abatement of these materials should be performed before such activities begin. If abatement (removal, repair, enclosure or encapsulation) actions should occur, the building owner or operator should comply with the following requirements:

a. Asbestos abatement actions should be performed by an accredited and licensed asbestos abatement contractor in a manner prescribed by the Environmental Protection Agency (EPA) Regulation 40 CFR Parts 61.145, and 61.150 (November 20, 1990), the Mississippi Department of Labor, Occupational Safety and Health Administration (OSHA), Standard 29 CFR 1926.1101.

b. If reportable quantities of ACM's are abated, the Mississippi Department of Environmental Quality (MDEQ) should be notified of planned renovation, demolition, or asbestos abatement activities at least 10 working days prior to the scheduled start of these activities, as required by EPA 40 CFR Part 61.145(a)

3.3 Procedures for Renovation and Demolition, Continued

(These procedures are required in Mississippi)

c. All removed asbestos-containing waste material(s) should be transported and deposited at an EPA (MDEQ) approved landfill site, in accordance with EPA 40 CFR Part 61.150 (b)-(e). The disposal site shall be operated in accordance with EPA 40 CFR Part 61.154

d. The Occupation Safety and Health Administration's (OSHA) Right-to-Know regulation requires the contractor to advise all workers of the presence of asbestos in the area in which they are working and to inform them of the nature of the hazard involved with exposure to asbestos.

Should any regulated or non-regulated ACM be allowed to remain in these buildings, an Operational and Maintenance (O&M) Plan should be developed so that administration and maintenance personnel can monitor the physical condition of the ACM.

If you should have any questions about this limited asbestos inspection, please contact me at the letterhead address and phone number.

Joe Venus

Joe Venus, Jr.

Appendix A

Detailed Asbestos Laboratory Report

Appendix B

Mississippi Dept. of Environmental Quality Notification Form and Credentials

State of Mississippi

Department of Environmental Quality

Office of Pollution Control

Certificate of Licensure

In accordance with the Asbestos Abatement Accreditation and Certification Act,
Enacted as 1989 Mississippi Law, Chapter 505

Be it known that

Lee M. Roberts

Having submitted acceptable evidence of qualifications and
training and other appropriate information, is hereby granted this

Asbestos Inspector

Certification

Certificate No.: ABI-00009020
Expiration Date: Jan 9th, 2026
Training Expires on Jan 9th, 2026

Chief, Asbestos & Lead Branch

47857 LIC20250001

MISSISSIPPI ASBESTOS DEMOLITION/RENOVATION NOTIFICATION FORM

Mail notification to: **MDEQ Asbestos Section, 515 E. Amite Street, Jackson, MS 39201**

Operator Project #	Postmark	Date Received (MDEQ use only)	Notification # (MDEQ use only)

I. Type of Notification (O=Original R=Revised C=Canceled A= Annual)

II. TYPE OF OPERATION (D=Demo O= Ordered Demo R=Renovation E=Emer. Renovation)

III. FACILITY DESCRIPTION (Include building name, number and floor or room number)

Bldg. Name:

Address

City:	State:	Zip:
Site Location:		Tel:
Building Size	# of Floors:	Age in Years:
Present Use:	Prior Use:	

IV. FACILITY INFORMATION (Identify owner, removal contractor, and other operator)

OWNER NAME:

Address:

City:	State:	Zip:
Contact:		Tel:

REMOVAL CONTRACTOR

Address:

City:	State:	Zip:
Contact:		Tel:

OTHER OPERATOR:

Address:

City:	State:	Zip:

Contact:

V. IS ASBESTOS PRESENT? (Yes/No)

VI. PROCEDURE, INCLUDING ANALYTICAL METHOD, IF APPROPRIATE, USED TO DETECT THE PRESENCE OF ASBESTOS MATERIAL (Include inspector name and date of inspection):

VII. APPROXIMATE AMOUNT OF ASBESTOS INCLUDING: 1. Regulated ACM to be Removed 2. Category I ACM Not Removed 3. Category II ACM Not Removed	RACM To Be Removed	Nonfriable Asbestos Material Not To Be Removed		Indicate Unit of Measurement Below	
		Category I	Category II	UNIT	
Pipes				LnFt:	Ln M:
Surface Area				SqFt:	Sq M:
Vol RACM Off Facility Component				CuFt:	Cu M:

VIII. SCHEDULED DATES ASBESTOS REMOVAL (MM/DD/YY) Start: Complete:

IX. SCHEDULED DATES DEMO/RENOVATION (MM/DD/YY) Start: Complete:

X. DESCRIPTION OF PLANNED DEMOLITION OR RENOVATION WORK, AND METHOD(S) TO BE USED:

XI. DESCRIPTION OF WORK PRACTICES AND ENGINEERING CONTROLS TO BE USED TO PREVENT EMISSIONS OF ASBESTOS AT THE DEMOLITION OR RENOVATION SITE:

XII. WASTE TRANSPORTER #1

Name:

Address:

City: | State: | Zip:

Contact Person: | Tel:

WASTE TRANSPORTER #2

Name:

Address:

City: | State: | Zip:

Contact Person: | Tel:

XIII. WASTE DISPOSAL SITE

Name:

Address:

City: | State: | Zip:

Tel:

XIV. IF DEMOLITION ORDERED BY A GOVERNMENT AGENCY, PLEASE IDENTIFY THE AGENCY BELOW:

Name: | Title:

Authority:

Date of Order (MM/DD/YY): | Date Ordered to Begin (MM/DD/YY):

XV. FOR EMERGENCY RENOVATIONS:

Date and Hour of Emergency (MM/DD/YY):

Description of the sudden unexpected event:

Explanation of how the event caused unsafe conditions or would cause equipment damage or an unreasonable financial burden:

XVI. DESCRIPTION OF PROCEDURES TO BE FOLLOWED IN THE EVENT THAT UNEXPECTED ASBESTOS IS FOUND OR PREVIOUSLY NONFRIABLE ASTESTOS MATERIAL BECOMES CRUMBLED, PULVERIZED, OR REDUCED TO POWDER:

Stop work call DEQ

XVII. I CERTIFY THAT AN INDIVIDUAL TRAINED IN THE PROVISIONS OF THIS REGULATION (40 CFR PART 61, SUBPART M) WILL BE ONSITE DURING THE DEMOLITION OR RENOVATION, AND EVIDENCE THAT THE REQUIRED TRAINING HAS BEEN ACCOMPLISHED BY THIS PERSON WILL BE AVAILABLE FOR INSPECTION DURING NORMAL BUSINESS HOURS.

Type or Print Name (Signature of Owner/Operator) (Date)

XVIII. I CERTIFY THAT THE ABOVE INFORMATION IS CORRECT:

Type or Print Name (Signature of Owner/Operator) (Date)

Triangle Environmental Service Center, Inc.
13509 East Boundary Road, Suite B, Midlothian VA 23112 PHONE (804) 739-1751 FAX (804) 739-1753

CHAIN OF CUSTODY FORM

Company Name: **Environmental Services**
Address: **253 Delk Road**
City, State, Zip: **Hattiesburg, MS 39401**
Client Account No.:
Phone: **601-582-2277** Fax: **601-582-2276**

Date: 4/2/25
Contact Name: Joe Venus
Sampler Name: Lee Roberts
Project No.: Camp Shelby 1403

			ASBESTOS					LEAD						OTHER METALS				
SAMPLE NUMBER	SAMPLE DATE	SAMPLE TIME	Bulk ID by PLM	Asbestos Wipe	Fiber Cnt.(PCM)	TEM Air	TEM Chatfield(bulk)	Air	Paint	Soil	Wipe	TCLP(Pb)	Waste Water	TCLP RCRA 8			Locations	COMMENTS
1	4/2/25		x														Bldg 1403 Exterioir	Roofing shingles
2			x															Roofing shingles
3			x															Roofing shingles
4			x															Roofing felt
5			x															Roofing felt
6			x															Roofing felt
7			x															Soffett panels
8			x															Soffett panels
9			x															Soffett panels
10			x															Door peremeter caulking
11			x															Door peremeter caulking
12			x															Door peremeter caulking
13			x															Window putty
14			x															Window putty
15			x															Window putty

Released by: _____ Signature: _____ Date: ___/___/_____
Received by: _____ Signature: _____ Date: ___/___/_____

Triangle Environmental Service Center, Inc.
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Contact Name: Joe Venus
Sampler Name: Lee Roberts
Project No.: Camp Shelby 1403

			ASBESTOS					LEAD						OTHER METALS				
SAMPLE NUMBER	SAMPLE DATE	SAMPLE TIME	Bulk ID by PLM	Asbestos Wipe	Fiber Cnt.(PCM)	TEM Air	TEM Chatfield(bulk)	Air	Paint	Soil	Wipe	TCLP(Pb)	Waste Water	TCLP RCRA 8			Locations	COMMENTS
16	4/1/25		x														Bldg 1403 Exterioir	Block mortar
17			x															Block mortar
18			x															Block mortar
19			x														Interior	Ceiling texture
20			x															Ceiling texture
21			x															Ceiling texture
22			x															Sheetrock ceiling
23			x															Sheetrock ceiling
24			x															Sheetrock ceiling
25			x															Wall sheetrock
26			x															Wall sheetrock
27			x															Wall sheetrock
28			x															Door caulking
29			x															Door caulking
30			x															Door caulking

Released by: _____ Signature: _____ Date: ____/____/_____
Received by: _____ Signature: _____ Date: ____/____/_____

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			ASBESTOS					LEAD						OTHER METALS				
SAMPLE NUMBER	SAMPLE DATE	SAMPLE TIME	Bulk ID by PLM	Asbestos Wipe	Fiber Cnt.(PCM)	TEM Air	TEM Chatfield(bulk)	Air	Paint	Soil	Wipe	TCLP(Pb)	Waste Water	TCLP RCRA 8			Locations	COMMENTS
31	4/1/25		x														Bldg 1403 Interior	Under kitchen sink
32			x															Under kitchen sink
33			x															Under kitchen sink

Released by: _____ Signature: _____ Date: ___/___/_____
Received by: _____ Signature: _____ Date: ___/___/_____

TRIANGLE ENVIRONMENTAL SERVICE CENTER, INC.

13509 East Boundary Road, Suite B, Midlothian, VA 23112
804-739-1751 • fax: 804-739-1753

BULK ASBESTOS SAMPLE ANALYSIS SUMMARY

CLIENT: Environmental Services, LLC
253 Delk Road
Hattiesburg, MS 39401

TESC LOGIN #: 250407AS

DATE OF RECEIPT: 4/7/2025
DATE OF ANALYSIS: 4/8/2025
DATE OF REPORT: 4/8/2025

CLIENT JOB/ #: **Camp Shelby 1403**

JOB SITE:

ANALYST: B. Trimmer

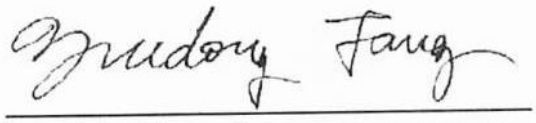
TESC SAMPLE #	CLIENT SAMPLE ID & GROSS DESCRIPTION	ESTIMATED % ASBESTOS	NON ASBESTOS % FIBERS	NON FIBROUS % MATERIALS
1	1 / Black tar-like	**NAD**	20% Fiberglass	80%
2	2 / Black tar-like	**NAD**	20% Fiberglass	80%
3	3 / Black tar-like	**NAD**	20% Fiberglass	80%
4	4 / Black fibers	**NAD**	98% Cellulose	2%
5	5 / Black fibers	**NAD**	98% Cellulose	2%
6	6 / Black fibers	**NAD**	98% Cellulose	2%
7	7 / Gray fibers and gray granular	**NAD**	90% Cellulose	10%
8	8 / Gray fibers and gray granular	**NAD**	90% Cellulose	10%
9	9 / Gray fibers and gray granular	**NAD**	90% Cellulose	10%

Samples are analyzed in accordance with "EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. None Detected: not detected at/or below the detected limit of method (Reporting limit: 1% Asbestos). Sodium Chloride is analyzed for quality control blank. TESC recommends by point count or Transmission Electron Microscopy (TEM), for materials regulated by the EPA NESHAP (National Emission Standards for Hazardous Air Pollutants) and found to contain less than ten percent (<10%) asbestos by Polarized Light Microscopy (PLM). Both services are available for an additional fee. This report must not be reproduced except in full with approval of Triangle Environmental Service Center, Inc. This test report relates only to the item(s) tested. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government. Client Samples condition acceptable for testing. Analysis of Dust Wipe, Soil, and Tape samples do not fall under NVLAP Accredition.

NVLAP Lab Code: 200794-0

[LEGEND NAD=No Asbestos Detected, Lino.=Linoleum, JC=Joint Compound]

Reviewed By Authorized Signatory:



Feng Jiang, MS Senior Geologist, Laboratory Director
Yuedong Fang, Senior Geologist

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CLIENT: Environmental Services, LLC
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CLIENT JOB/ #: **Camp Shelby 1403**

JOB SITE:

ANALYST: B. Trimmer

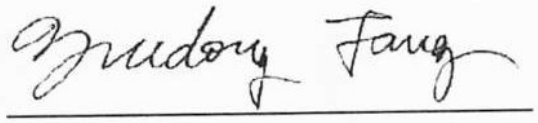
TESC SAMPLE #	CLIENT SAMPLE ID & GROSS DESCRIPTION	ESTIMATED % ASBESTOS	NON ASBESTOS % FIBERS	NON FIBROUS % MATERIALS
10	10 / White adhesive	NAD		100%
11	11 / White adhesive	NAD		100%
12	12 / White adhesive	NAD		100%
13	13 / Gray powder	NAD		100%
14	14 / Gray powder	NAD		100%
15	15 / Gray powder	NAD		100%
16	16 / Gray granular	NAD	2% Cellulose	98%
17	17 / Gray granular	NAD	2% Cellulose	98%
18	18 / Gray granular	NAD	2% Cellulose	98%
19	19 / White powder	NAD		100%

Samples are analyzed in accordance with "EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. None Detected: not detected at/or below the detected limit of method (Reporting limit: 1% Asbestos). Sodium Chloride is analyzed for quality control blank. TESC recommends by point count or Transmission Electron Microscopy (TEM), for materials regulated by the EPA NESHAP (National Emission Standards for Hazardous Air Pollutants) and found to contain less than ten percent (<10%) asbestos by Polarized Light Microscopy (PLM). Both services are available for an additional fee. This report must not be reproduced except in full with approval of Triangle Environmental Service Center, Inc. This test report relates only to the item(s) tested. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government. Client Samples condition acceptable for testing. Analysis of Dust Wipe, Soil, and Tape samples do not fall under NVLAP Accredition.

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Reviewed By Authorized Signatory:



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Yuedong Fang, Senior Geologist

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JOB SITE:

ANALYST: B. Trimmer

TESC SAMPLE #	CLIENT SAMPLE ID & GROSS DESCRIPTION	ESTIMATED % ASBESTOS	NON ASBESTOS % FIBERS	NON FIBROUS % MATERIALS
20	20 / White powder	NAD		100%
21	21 / White powder	NAD		100%
22	22 / White powder and brown fibers	NAD	20% Cellulose	80%
23	23 / White powder and brown fibers	NAD	20% Cellulose	80%
24	24 / White powder and brown fibers	NAD	20% Cellulose	80%
25	25 / White powder and brown fibers	NAD	20% Cellulose	80%
26	26 / White powder and brown fibers	NAD	20% Cellulose	80%
27	27 / White powder and brown fibers	NAD	20% Cellulose	80%
28	28 / White adhesive	NAD		100%
29	29 / White adhesive	NAD		100%

Samples are analyzed in accordance with "EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. None Detected: not detected at/or below the detected limit of method (Reporting limit: 1% Asbestos). Sodium Chloride is analyzed for quality control blank. TESC recommends by point count or Transmission Electron Microscopy (TEM), for materials regulated by the EPA NESHAP (National Emission Standards for Hazardous Air Pollutants) and found to contain less than ten percent (<10%) asbestos by Polarized Light Microscopy (PLM). Both services are available for an additional fee. This report must not be reproduced except in full with approval of Triangle Environmental Service Center, Inc. This test report relates only to the item(s) tested. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government. Client Samples condition acceptable for testing. Analysis of Dust Wipe, Soil, and Tape samples do not fall under NVLAP Accredition.

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Reviewed By Authorized Signatory:

Feng Jiang, MS Senior Geologist, Laboratory Director
Yuedong Fang, Senior Geologist

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CLIENT JOB/ #: **Camp Shelby 1403**

JOB SITE:

ANALYST: B. Trimmer

TESC SAMPLE #	CLIENT SAMPLE ID & GROSS DESCRIPTION	ESTIMATED % ASBESTOS	NON ASBESTOS % FIBERS	NON FIBROUS % MATERIALS
30	30 / White adhesive	**NAD**		100%
31	31 / Black adhesive	**7% Chrysotile**		93%
32	32 / Black adhesive	**7% Chrysotile**		93%
33	33 / Black adhesive	**7% Chrysotile**		93%

Total Samples/Layers Analyzed: 33

Samples are analyzed in accordance with "EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. None Detected: not detected at/or below the detected limit of method (Reporting limit: 1% Asbestos). Sodium Chloride is analyzed for quality control blank. TESC recommends by point count or Transmission Electron Microscopy (TEM), for materials regulated by the EPA NESHAP (National Emission Standards for Hazardous Air Pollutants) and found to contain less than ten percent (<10%) asbestos by Polarized Light Microscopy (PLM). Both services are available for an additional fee. This report must not be reproduced except in full with approval of Triangle Environmental Service Center, Inc. This test report relates only to the item(s) tested. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government. Client Samples condition acceptable for testing. Analysis of Dust Wipe, Soil, and Tape samples do not fall under NVLAP Accredition.

NVLAP Lab Code: 200794-0

[LEGEND NAD=No Asbestos Detected, Lino.=Linoleum, JC=Joint Compound]

Reviewed By Authorized Signatory:

Feng Jiang, MS Senior Geologist, Laboratory Director
Yuedong Fang, Senior Geologist

Tuesday, April 8, 2025

SECTION 024100 – DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Selective demolition of built site elements.

B. Abandonment and removal of existing utilities and utility structures.

1.2 DEFINITIONS

A. Removal of Obstructions: This work shall consist of the removal and satisfactory disposal of all items and obstructions which are not designated to remain. This work also consists of necessary excavation incidental to the removal of structures and obstructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fill Material: As specified in Section 312323 - Fill.

PART 3 EXECUTION

3.1 SCOPE

A. Remove paving and curbs as required to accomplish new work.

B. Remove other items indicated, for as indicated on the drawings.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Do not close or obstruct roadways or sidewalks without permit.
   6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.

2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

C. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.3 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Government.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Government.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.4 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 024100

SECTION 024119 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of selective demolition work is indicated on drawings.

B. Types of Selective Demolition Work: Demolition requires the selective removal and subsequent offsite disposal of the following:

1. Portions of building structure indicated on drawings and as required to accommodate new construction.
2. Removal of interior partitions as indicated on drawings.
3. Removal of doors and frames indicated.
4. Removal of built in cabinets indicated.
5. Removal of existing windows.
6. Removal and protection of existing fixtures and equipment.
7. Removal work specified elsewhere.
8. Cutting nonstructural concrete floors and masonry walls for underground piping and ducts, and for above grade piping, ducts, and conduit is included with the work of the respective mechanical and electrical Divisions specification sections.
9. Related work specified elsewhere.
10. Remodeling construction work and patching is included within the respective sections of specifications, including removal of materials for reuse and incorporated into remodeling or new construction.
11. Relocation of pipes, conduits, ducts, and other mechanical and electrical work are specified by respective trades.

1.3 SUBMITTALS

A. Schedule: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's representative for review prior to commencement of work, include coordination for shut off, capping, and continuation of utility services as required, together with details for dust and noise control protection.

B. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on site operations.

C. Coordinate with Owner's continuing occupation of portions of existing building with Owner's partial occupancy of completed new addition, and with Owner's reduced usage during summer months.

1.4 JOB CONDITIONS

A. Occupancy: Building's will not be occupied during work period.

B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.

1. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable; however, variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.

C. Partial Demolition and Removal: Items indicated to be removed but of salable value to contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.

1. Storage or sale of removed items on site will not be permitted.

D. Protections: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.

1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of building.
2. Erect temporary covered passageways as required by authorities having jurisdiction.
3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.
4. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
5. Protect floors with suitable coverings when necessary.
6. Construct temporary insulated solid dustproof partitions where required to separate areas where noisy and extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks if required.
7. Provide temporary weather protection during interval between demolition and removal of existing construction to insure that no water leakage or damage occurs to structure or interior areas of existing building.
8. Remove protections at completion of work.

E. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.

F. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

1. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

G. Explosives: Use of explosives will not be permitted.

H. Utility Service: Maintain existing utilities indicated to remain and protect against damage during demolition operations.

1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities.

I. Environmental Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - EXECUTION

2.1 INSPECTION

A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's representative prior to starting work.

2.2 PREPARATION

A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

1. Cease operations and notify the Owner's representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

B. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.

C. Erect and maintain dustproof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.

1. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dustproof partitions of minimum 4" studs, 5/8" drywall (joints taped) on occupied side, 1/2" fire retardant plywood on demolition side, and fill partition cavity with sound deadening insulation.
2. Provide weatherproof closures for exterior openings resulting from demolition work.
3. Locate, identify, stub off and disconnect utility services that are not indicated to remain.
4. Provide by pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of seventy-two hours advance notice to Owner if shut down of service is necessary during change over.

2.3 DEMOLITION

A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with demolition schedule and governing regulations.

B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power driven masonry saw or hand tools; do not use power driven impact tools.

C. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.

1. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
2. Demolish foundation walls to a depth of not less than 12" below existing ground surface. Demolish and remove below grade wood or metal construction. Break up below grade concrete slabs.
3. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
4. Completely fill below grade areas and void resulting from demolition work. Provide fill consisting of approved earth, gravel or sand, free of trash and debris, stones over 6" diameter, roots or other organic matter.

D. If anticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's representative in written, accurate detail. Pending receipt of directive from Owner's representative rearrange selective demolition schedule as necessary to continue overall job progress without delay.

2.4 SALVAGE MATERIALS

A. Salvage Items: Where indicated on drawings as "salvage deliver to Owner", carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.

1. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance remain the property of the Owner. Notify Owner's representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

2.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off site.

1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.
2. Burning of removed materials is not permitted on project site.

B. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

C. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 024119

SECTION 03 10 00 - CONCRETE FORM WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to work specified in this section.

1.2 DESCRIPTION OF WORK:

A. Formwork for cast-in-place concrete with shoring, bracing and anchorage. Form accessories and stripping forms.

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

1. ACI 301 "Specifications for Structural Concrete for Buildings".

2. ACI 347 "Recommended Practice for Concrete Formwork".

3. PS 1 "Construction and Industrial Plywood"

B. Design, engineer, and construct formwork, shoring, and bracing to meet design and code requirements, so that resultant concrete conforms to required shapes, lines and dimensions.

C. The design and engineering of the formwork, as well as its construction, shall be the responsibility of the General Contractor and in accordance with ACI 301 and ACI 347.

D. Design formwork for loads, lateral pressures, and allowable stresses outlined in Section 102 and 103 of ACI-347. Recommended Practices for Concrete Formwork and wind loads so specified by the governing building code.

E. Forms shall conform to the shapes, lines, and dimensions of the members as called for on the plans, and shall be constructed as to ensure that the concrete surfaces will conform to the tolerances of ACI-347, Section 203.1.

PART 2 - PRODUCTS

2.1 FORM MATERIALS:

A. Lumber: Southern Yellow Pine species; #2 S4S grade with grade stamp clearly visible. Use only on unexposed surfaces.

B. Form for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

C. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

2.2 FORMWORK ACCESSORIES:

A. Form Ties: Removable and Snap-off metal of fixed or adjustable length; 1-1/2 inch break back dimension; free of defects that will leave holes no larger than one-inch diameter in concrete surface.

B. Use removable ties for exposed finish surface only.

C. Form Release Agent: Colorless material which will not stain concrete, absorb moisture; or impair natural bonding.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size as required; of strength and character to maintain formwork in place while placing concrete.

PART 3 - EXECUTION

3.1 FORMS:

A. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

B. Construction joints in grade beams shall have two horizontal rows of keys, of tapered 2x4’s.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

D. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

F. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

1. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is at least 1-1/2" inside concrete.

2. Unless otherwise shown, provide form ties which will not leave holes larger than 1" diameter in concrete surface.

G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.2 INSTALLATION OF EMBEDDED ITEMS:

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.3 PREPARATION OF FORM SURFACES:

A. Coat contact surfaces of forms with a form-coating compound before reinforcment is placed.

B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.4 REMOVAL OF FORMS:

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F. (10 degrees C.) for twenty-four hours after placing concrete, provided concrete is sufficiently hard to

not be damaged by form removal operations, and provided curing and protection operations are maintained.

3.5 RE-USE OF FORMS:

A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

END OF SECTION

SECTION 031500 - CONCRETE ACCESSORIES

PART 1 – GEN ERAL

1.1 DESCRIPTION

A. Scope:
1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install concrete accessories.
2. The types of concrete accessories required include the following:
a. Construction joints.
b. Expansion joints and fillers.
c. Control joints.

B. General: All joints subject to hydrostatic pressure shall be provided with continuous water stop.

C. Related Work Specified Elsewhere:

1. Section 033001 - Concrete Formwork.

1.2 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
1. ACI 301, Specifications for Structural Concrete for Buildings, Chapter 6, Joints and Embedded Items.
2. ASTM A 36, Structural Steel.
3. ASTM D 1752, Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
4. ASTM B 164, Nickel-Copper Alloy Rod and Bar.

B. All manufactured items shall be installed in accordance with manufacturer's instructions.

1.3 SUBMITTALS

A. Samples: Submit for approval the following samples:
1. Cork expansion joint fillers.
2. Multipolymer plastic bearing strips.

B. Shop Drawings: Submit for approval the following:
1. Manufacturer's specifications and installation instructions for all materials required.
2. Layout of all construction joint locations prior to the submittal of steel reinforcing drawings.

PART 2 - PRODUCTS

2.1 WATERSTOPS

Waterstops shall be Volclay Rx or SynkoFlex type in self adhering strips, FS SS-S-00210A and shall have a cross sectional area of approximately one (1) square inch

2.2 PREMOLDED EXPANSION JOINT FILLER

A. Premolded joint filler (PJF) for interior expansion joints shall be self-expanding cork consisting of preformed strips that have been formed from clean granulated cork particles securely bound together by a synthetic resin of an insoluble nature. The PJF shall be capable of expanding 140 percent of its original thickness, which shall be 3/4-inch unless shown otherwise on the Drawings. The PJF shall meet the specification requirements of the latest revision of Corps of Engineers' Specification CRD-C 509, Type III and ASTM D 1752 Type III. Manufacturers meeting the specification requirements are: Sealtight Products by W.R. Meadows, Inc., P.O. Box 543, Elgin, IL 60120, (312) 683-4500 and Tex-Mastic Products by J & P Petroleum Products, Inc., P.O. Box 4206, Dallas, TX 75208, (214) 331-5401. Other products shall not be used without prior review and acceptance by the Engineer.

B. Premolded joint filler (PJF) for exterior expansion joints between concrete slabs and structural walls, where specifically shown on the Drawings shall be asphalt impregnated fiber board conforming to the latest revision of ASTM D 1751. Thickness of the PJF shall be 3/4-inch unless otherwise shown on the Drawings. Manufacturers meeting the specification requirements are: Sealtight Products by W.R. Meadows, Inc., P.O. Box 543, Elgin, IL 60120, (312) 683-4500 and Tex-Mastic Products by J & P Petroleum Products, Inc., P.O. Box 4206, Dallas, TX 75208, (214) 331-5401. Other products shall not be used without prior review and acceptance by the Engineer.

2.3 CONCRETE CONSTRUCTION JOINT ROUGHENER

A. Provide a water soluble non-flammable, surface-retardant roughener.

B. Product and Manufacturer: Provide one of the following:
1. Rugasol-S by Sika Chemical Corporation, for horizontal joints only.
2. EAC-S by Preco Industries, Ltd., for horizontal joints only.
3. Tuf-Cote (Deep Etch) by Preco Industries Ltd., for vertical joints.
4. Or equal.

2.4 EPOXY BONDING AGENT

A. Provide an epoxy-resin bonding agent, two component, polyamide type.

B. Product and Manufacturer: Provide one of the following:
1. Sikadur Hi-Mod by Sika Chemical Corporation
2. Epoxtite Binder (Code #2390) by A.C. Horn, Inc.
3. Or equal.

2.5 PREFORMED BEARING STRIPS

A. Provide a multipolymer plastic bearing strip with a coefficient of friction less than .01. Bearing strip to be 1/8 inch thick by nine inches wide.

B. Product and Manufacturer:
1. Korolath bearing strips by Koro Corporation.
2. Or equal.

ANCHOR BOLTS

A. These shall conform to ASTM A675, Grade 50. Anchor bolts shall be galvanized on all exposed surfaces in accordance with ASTM A153.

B. Set all anchor bolts by template, rigidly secure the bolts in place to prevent their displacement, and verify all bolt locations before placing concrete, so that the bolt locations in the completed foundations will conform accurately to the bolt setting dimensions indicated on the foundation drawings.

2.7 Backer-rod shall be high-grade extruded closed-cell polyethylene foam that is completely compatible with polysulfide and urethane type sealants. Backer-rod shall also be ultraviolet stable, resistant to oils, chemicals, ozone and weathering. The size of the rod shall be 1 inch diameter for 3/4 inch wide joints. To the extent possible only full length rods shall be used; splices shall be minimized. Acceptable manufacturers are: Sonofoam by Sonneborn Building Products, 7711 Computer Avenue, Minneapolis, MN 55435, (612) 835-3434 and Tex-Mastic Products by J & P Petroleum Products, Inc., P.O. Box 4206, Dallas, TX 75208, (214) 331-5401. Other products shall not be used without prior review and acceptance by the Engineer.

2.8 Mastic used to prevent bond at joints indicated on the Drawings shall be Igas joint system by Sika Corporation, Box 297, Lyndurst, NJ 07071, (201) 933-8801 or approved equal. Primer shall be as recommended by the manufacturer.

2.9 Materials for forming joints and load transfer devices for installation in street and roadway pavement slabs shall be in accordance with MDOT Specifications, Section 707.

PART 3 - EXECUTION

3.1 INSPECTION

Examine conditions under which joints are to be installed, and notify ENGINEER in writing of unsatisfactory conditions existing. Do not proceed with the Work until unsatisfactory conditions or deficiencies have been corrected in a manner acceptable to ENGINEER.

3.2 CONSTRUCTION JOINTS

A. Comply with ACI 301, Chapter 6, and as specified below.

B. Locate and install construction joints as shown.

C. Horizontal Joints:

1. Roughen concrete at the interface of construction joints in accordance with instructions of the manufacturer of joint roughener. Immediately before placing fresh concrete, thoroughly clean the existing contact surface using a stiff brush or other tools and a stream of water under pressure. The surface shall be clean and wet, but free from pools of water at the moment the fresh concrete is placed.

2. Remove laitance, waste mortar or other substance which may prevent complete adhesion.

3. Place a 2-inch thick coat of mortar, of similar proportions to the mortar in the concrete, over

the contact surface of the old concrete. Place fresh concrete before the mortar has attained its initial set.

D. Vertical Joints:

1. Apply roughener to the form in a thin, even film by brush, spray or roller in accordance with the manufacturer's instructions. After roughener is dry, concrete may be placed.

2. When concrete has been placed and the form removed, wash loosened material off with high pressure water spray to obtain roughened surface subject to approval by ENGINEER.

E. Place two layers of 1/8 inch thick bearing strips on concrete bearing surface prior to placing concrete slab to provide sliding bearing as shown.

3.3 EXPANSION JOINTS

A. Comply with ACI 301, Chapter 6, and as specified below.

B. Locate and install expansion joints as shown. Install cork filler in accordance with manufacturer's instructions.

3.4 BONDING WITH EPOXY ADHESIVE

A. Use adhesive for the following:
1. Bonding of fresh concrete to concrete cured at least 28 days or to existing concrete.

2. Bonding of horizontal construction joints where these are required by the Drawings .

B. Handle and store epoxy adhesive in compliance with the manufacturers printed instructions, including safety precautions.

C. Mix the epoxy adhesive in complete accordance with the instructions of the manufacturer.

D. Before placing fresh concrete, thoroughly roughen and clean hardened concrete surfaces and coat with epoxy grout not less than 1/16-inch thick. Place fresh concrete while the epoxy material is still tacky, without removing the in-place grout coat, and as directed by the epoxy manufacturer.

3.5 WATERSTOPS

A. Install waterstops for all joints indicated on the Drawings. Waterstops shall be continuous around all corners and intersections so that a continuous, water-tight seal is provided. Splices shall be made by welding in accordance with the manufacturer's recommendations, subject to acceptance of the Engineer. The finished splices shall provide a cross-section that is dense and free of porosity.

B. Where movement at the joint in provided for, the water stops shall be of a type permitting movement without injury.

PART 4 -COMPENSATION

4.1 MEASUREMENT

There shall be no separate measurement for items in this section.

4.2 PAYMENT

There shall be no separate payment for items in this section.

** END OF SECTION **

SECTION 03 20 00 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to work specified in this section.

1.2 DESCRIPTION OF WORK:

A. Reinforcing steel bars, welded steel wire fabric for cast-in-place concrete.

B. Support chairs, bolsters, bar supports, spacers, and other devices for supporting reinforcements.

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

1. ACI 301 "Specifications for Structural Concrete for Buildings".

2. ACI 315 "Details and Detailing of Concrete for Reinforcing.

3. ANSI/ASTM A185 - "Welded Steel Wire Fabric for Concrete Reinforcement".

4. ASTM A615 - "Deformed and Plain Billet-Steel Bars for Concrete Reinforcement".

5. CRSI - "Manual of Practice".

6. CRSI 63 - "Recommended Practice for Placing Reinforcing Bars".

7. CRSI 65 - "Recommended Practice for Placing Bar Supports, Specifications and Nomenclature".

1.4 SUBMITTALS:

A. Shop Drawings; Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, splicing, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement include special reinforcement required and openings through concrete structures.

B. Submit shop drawings to the Architect that show approval of the Contractor. The Contractor and/or steel fabricator is urged to contact the Structural Engineer to resolve any questions that might arise during preparation of the shop drawings. If it is apparent to the Architect or Structural Engineer that the Contractor has not thoroughly checked the shop drawings prior to submittal, the Contractor will be notified to resubmit a set that has been properly checked and the previous

submittal will be abandoned. Only complete sets of shop drawings will be reviewed unless an agreement to check partial submittals is obtained prior to the first submittal. Do not fabricate any material until approval of the Architect has been obtained.

1.5 PRODUCT HANDLING

A. Deliver reinforcing to project site in bundles marked with metal gages indicating contents of bundle keyed to fabrication schedule.

B. Handle and store materials to prevent contamination and deterioration.

PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS:

A. Reinforcing Steel: ASTM A615, Grade 60 billet-steel deformed bars, uncoated finish.

B. Steel Wire: ANSI/ASTM A 82, plain, cold-drawn, steel.

C. Welded Wire Fabric: ANSI/ASTM A 185, welded steel wire fabric.

D. Tie Wire: Minimum 18 gage annealed type.

E. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations, unless otherwise acceptable. All bolsters, chairs, etc. to be plastic tipped.

F. Other Supports: Concrete bricks may be used in bottom of ground supported grade beams to support reinforcing steel.

2.2 FABRICATION:

A. Fabricate in accordance with ACI 315, providing concrete cover specified in Section 03300.

B. Locate reinforcing Splices not indicated on Drawings at points of minimum stress. Indicate location of splices on shop drawings.

PART 3 - EXECUTION

3.1 PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Place reinforcement to obtain at least minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install vertical dowel steel before placing concrete. Provide template to assure proper location and alignment.

F. Refer to Structural Drawings for additional requirements.

END OF SECTION

SECTION 03 30 00 - CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to work specified in this section.

B. Vapor Barriers are specified in SECTION 07 25 00

C. Concrete Reinforcement is specified in SECTION 03 20 00

D. Concrete Formwork is specified in SECTION 03 10 00

1.2 DESCRIPTION OF WORK:

A. The extent of concrete work shown on drawings.

B. Above Grade

C. Slabs on fill

D. Concrete foundations, walls, and footings.

E. Walls

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

1. American Concrete Institute (ACI):

2. ACI 301 "Specifications for Structural Concrete for Buildings".

3. ACI 318 "Building Code Requirements for Reinforced Concrete".

4. ACI 315 "Manual of Standard Practice for Detaining Reinforced Concrete Structures".

5. ACI 347 "Recommended Practice for Concrete Formwork".

6. American Society for Testing & Materials (ASTM):

7. ASTM A 615 "Deformed and Plain Billet Steel Bar for Concrete Reinforcement".

8. ASTM A 185 "Welded Steel Wire Fabric for Concrete Reinforcement".

9. ASTM C 33 "Concrete Aggregates".

10. ASTM C 94 "Ready-Mixed Concrete".

11. ASTM C 150 "Portland Cement".

12. ASTM C 260 "Air-Entraining Admixtures".

13. ASTM C 309 "Liquid Membrane Forming Compounds for Curing Concrete".

14. ASTM C 494 "Chemical Admixture for Concrete".

1.4 CONCRETE TESTING:

A. Quality Control

1. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

2. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

3. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

4. Testing Agency Qualifications: An independent agency, acceptable to the Architect, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

5. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

6. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

C. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

D. ACI 301, "Specification for Structural Concrete,"

E. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Contractor shall employ at his expense a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. The contractor shall furnish all concrete mix designs to the Architect for review.

H. Test and Testing

1. Materials and installed work may require testing and retesting, as directed by the Architect at any time during progress of work. Allow free access to material during progress of work. Allow free access to material stockpiles and facilities. Tests, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

2. The testing laboratory providing quality control has total authority and responsibility for the concrete exiting the truck. Any alteration of the concrete in the truck including addition of water, admixtures, or any other product will be allowed only at the discretion of the testing laboratory.

3. The quality control laboratory has total authority of rejection of concrete prior to placement for duration of time since departure from batch plant, or any inconsistency or deviation from standards set forth herein.

I. Required Test:

1. Compression Test Specimens: ASTM C31; one set is defined as 6 standard cylinders for each compressive strength test, unless otherwise indicated or directed. Mold and store cylinders for laboratory cured test specimens except field-cure one test specimen.

2. Compressive Strength Tests: ASTM C39; a minimum of one set as follows or fraction thereof, of each concrete class placed in any one day. 2 specimen tested at 7 days, 3 specimen tested at 28 days Test Field cured specimen at 28 days, 1 cylinder held as a test back up cylinder at 56 days or as directed by Architect.

Footings:	1 set for each truck
Piers:	1 set for each truck
Grade Beams:	1 set for each 100 cubic yards
Slabs on Grade:	1 set for each 100 cubic yards or any one pour for each 5000 sq. ft.
Floor Topping:	1 set for each 100 cubic yards or any one pour for each 5000 sq. ft.
Concrete Paving:	1 set for each 25 cubic yards
Concrete Walks:	Not Required
Concrete Curb Gutters:	Not Required
Manholes, Catch Basins, Junction Boxes, Fence Post, Light Pole Supports, Headwalls:	Not Required

3. Slump: ASTM C143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.

4. Air Content: ASTM C173, volumetric method for normal weight for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.

5. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below; and when 80 degrees and above; and each time a set of compression test specimens made.

6. When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protection and curing in-place concrete.

7. Test results will be reported in writing to Architect and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placements, name of concrete testing service, concrete type and class design mix identification, locations of concrete batch in structure shall be described so that it is easily determined where and to what extent it is in the project. Design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of test results shall be considered satisfactory if they equal 70% of the 28-day design requirements at a 7-day break.

8. Additional Tests: The testing service will make additional test of in-place concrete when test results indicate specified concrete strength and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

1.5 CEMENT MIXES

A. Ready-Mix Concrete: Comply with requirements of ANSI/ASTM C94, and as herein specified.

B. Concrete Design mix is to be established to provide concrete of ten percent (10%) higher strength than the specified job strength.

C. CONCRETE STRENGTHS FOR VARIOUS COMPONENTS AND LOCATIONS ARE INDICATED ON THE DRAWINGS.

D. Design mixes to provide required strengths concrete with the following properties for the:

1. 5000 psi 28 day compressive strength; 658 lbs cement per cu. yd. minimum; W/C ratio, 0.44 maximum.

2. 4000 psi 28-day compressive strength; 611 lbs. cement per cu. yd. minimum; W/C ratio, 0.46 maximum.

3. 3500 psi 28-day compressive strength. For slabs on grade, slabs on metal deck – no entrained air. See notes on structural drawings.

4. 3000 psi 28-day compressive strength. For grade beams and footing – no entrained air. See Notes on structural drawings.

E. Proportions shall be made by weight and shall be uniformly and accurately controlled and inspected by the testing laboratory.

F. During hot weather or under conditions contributing to rapid setting of concrete a shorter mixing time than specified in ANSI/ASTM C 94, may be required.

1.6 SUBMITTALS:

A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, admixtures, patching compounds, curing compounds, and others as requested by Architect.

B. Submit for review detailed shop drawings showing layout, sizes, arrangements, bar supports, etc., for reinforcing steel, all reinforcing for grade beams, walls, etc. shall be shown in elevations so as to indicate bar lengths, locations of splices, etc.

C. Submit layout of construction joints for Architect review.

D. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources and descriptions.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS:

A. Portland Cement: ANSI/ASTM C 150, Type I.

1. Use one brand of cement throughout project, unless otherwise acceptable to Architect.

B. Aggregates: ANSI/ASTM C 33, maximum size one inch (1").

C. Water: Potable, clean free of oil, alkali, or other deleterious substances.

D. Air-Entraining Admixture: ANSI/ASTM C260.

E. Water-Reducing Admixture: ANSI/ASTM C494, Type A and contain not more than 1% chloride ions.

F. Water Reducing: Accelerator Admixture L ASTM C494, Type C or E

1. Subject to compliance with requirements, provide one of the following:
   a. Accelguard HE; Euclid Chemical Co.
   b. Pozzolith 122-HE; Master Builders
   c. Darex; W.R. Grace
   d. Sikacrete; Sika Chemical Co.

G. Superplasticizer:

1. Subject to compliance with requirements, provide one of the following:
   a. R. Grace
   b. Monex

2.2 RELATED MATERIALS:

A. Non-Shrink Grout: ASTM C1107, factory pre-mixed grout.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Type D, Non-metallic
      1) "Masterflow 713"; Master Builders.
      2) "Sonogrout"; Sonneborn-Contech.
      3) "Euco-NS"; Euclid Chemical Co.
      4) "Five-Star Grout"; U.S. Grout Co.
      5) "Duragrout"; L & M Const. Chemical Co.

B. Curing Hardener, Sealer: Acrylic base compound equal to Sonneborne's Gray Kure-N-Seal. Use this material for curing and sealing of exposed finished concrete floors as noted in Finish Schedule as "Concrete (Sealed)".

C. Bonding Compound: Polyvinyl acetate, rewettable type.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. "Weldcrete"; Larson Products.
   b. "Everbond"; L & M Construction Chemicals.
   c. "EucoWeld"; Euclid Chemical Co.
   d. "Daraweld C"; W.R. Grace.
   e. "Sonocrete"; Sonneborn-Contech.

D. Epoxy Adhesive: 100% solids, two component material suitable for use on dry or damp surfaces.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. "Thiopoxy"; W.R. Grace.
   b. "Sikadur Hi-Mod"; Sika Chemical Corp.
   c. "Euco Epoxy"; Euclid Chemical Co.

E. Floor Leveling Compound: Ardex K-15 and primer Ardex P-51.

F. Chemical Anchors: Adhesive anchor capsules and threaded anchor rods or reinforcing bars equal to "HILTI HVA Adhesive Anchors" or "RAWL CHEM - Stud Anchors" to be installed in accordance with manufacturer's recommendations.

G. Admixtures:

1. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F.

2. Use Air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate.

3. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

H. Superplasticizer:

1. Use superplasticizer in concrete slabs at contractor’s option.

2. Foundations, columns, at contractors’ option.

3. Cement content shall not be reduced with use of superplasticizer.

4. Use manufacturer’s recommendations for quantity per cubic yard not to exceed a slump of 9”.

I. Slump Limit: Proportion and design mixes to result in concrete slum at point of placement as follows:

1. Ramp and Sloping Surfaces: Not more than 3".

2. Reinforced Foundation Systems: Not less than 3" and not more than 4".

3. Slab: Not less than 4" nor more than 5".

4. Other Concrete: Not less than 4" and not more than 5".

J. Fly ash shall be used, not more than 20% of the cement, by weight, may be replaced by fly ash. Fly ash shall be ASTM C-618, Class C or F. Class F shall be per MDOT specifications.

K. Calcium chloride shall not be used.

L. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F reduce mixing and delivery time to 60 minutes.

M. In cold weather, concrete operation may be assisted by using hot water or by preheating the aggregates prior to mixing operation or a combination thereof to insure that concrete is maintained at a temperature of 40 degrees or more.

N. All concrete design mixes shall have the mix number indicated on the submittal to the Architect. The delivery ticket left at the job site shall also bear the design mix number.

O. Refer to drawings for compressive strength requirements.

PART 3 - EXECUTION

3.1 PREPARATION OF FORM SURFACES:

A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.2 CONCRETE PLACEMENT:

A. Pre-placement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

C. General:

1. Comply with ACI 304, and as herein specified.

2. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

D. Placing Concrete in Forms:

1. Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

2. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping.

3. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

4. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

E. Placing Concrete Slabs:

1. Deposit and consolidate concrete slabs in a continuous operation within limits of construction joints until the placing of a panel or section is completed.

2. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

3. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

4. Maintain reinforcing in proper position during concrete placement operations.

F. Cold Weather Placing:

1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
   a. When air temperature has fallen to or is expected to fall below 40 degrees F. (4 degrees C), do not place concrete.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

G. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305.

2. Wet forms thoroughly before placing concrete.

3. Use water-reducing retarding admixture (Type D) when required by high temperatures,

4. If the testing laboratory technician, at the job site, determines that water is to be added to a load of concrete, the drum shall be turned 60 to 80 revolutions at 12 to 15 revolutions per minute after the water has been added. The slump is then to be rechecked.

3.3 FINISH OF FORMED SURFACES:

A. Rough Form Finish:

B. For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

C. Smooth Form Finish:

1. For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and

symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

2. Moisten concrete surfaces and rub with Carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. Rubbed Concrete:

1. Provide rubbed finish to concrete surfaces which are in view in interior and exterior locations, or as indicated on the plans.

2. Combine one part Portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Use of proprietary additives may be used at contractor's option. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that final color of dry grout will closely match adjacent surfaces.

3. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

E. Related Uniformed Surfaces:

1. At tops of walls, horizontal offsets surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces.

2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.4 MONOLITHIC SLAB FINISHES:

A. Float Finish:

1. Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

2. After screening, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 1/4" in 10' when tested with a 10' straightedge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

B. Trowel Finish:

1. Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, paint or other thick film finish coating system.

2. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8" in 10' when tested with a 10' straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.

C. Non-Slip Broom Finish:

1. Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.

2. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

D. Curing Hardener Sealer:

1. Apply three (3) coats of chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical hardener for curing of the concrete surface. Evenly apply each coat, and allow 24 hours for drying between first two (2) coats. Apply 3rd coat just prior to occupancy.

2. Apply proprietary chemical hardeners in accordance with manufacturer's printed instructions.

3. After final coat of chemical hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

3.5 CONCRETE CURING AND PROTECTION:

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

2. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than seven days.

3. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least seven days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

B. Provide moisture-cover curing as follows:

1. Cover concrete surfaces with moisture-retaining cover for curing concrete placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

C. Curing Formed Surfaces:

1. Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by using curing compound.

3.6 MISCELLANEOUS CONCRETE ITEMS:

A. Filling-In:

1. Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

2. All areas under concrete floor slab shall have moisture barrier with joints lapped at least 12". Take care to lay material smooth and even, and avoid tearing or puncturing. Seal tightly at all expansion joints and spaces around pipes, conduits and other penetrations using coal, tar, pitch, or asphalt mastic.

3. The general contractor is to VERIFY the sizes and locations of all required floor and roof openings, equipment supports, etc. with the various subcontractors. Any conditions which require revisions or additions to the structural framing are to be brought to the attention of the architect and structural engineer prior to any construction. Any cost for the required changes will be borne by the general contractor.

B. Steel Pan Stairs:

1. Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and finish concrete surfaces as scheduled.

C. Reinforced Masonry:

1. Provide pea gravel aggregate in concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Allow 6” slump. Maintain accurate location of reinforcing steel during concrete placement.

3.7 CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas:

1. Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.

2. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than one inch (1"). Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

3. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

B. Repair of Formed Surfaces:

1. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

2. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

C. Repair of Unformed Surfaces:

1. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface planes to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.

2. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

3. Correct high areas in unformed surfaces by grinding, after concrete has cured at least fourteen days.

4. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching and floor leveling compounds may be used when acceptable to Architect.

5. Repair defective areas, except random cracks and single holes not exceeding one-inch (1") diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

6. Repair isolated random cracks and single holes not over one inch (1") in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture

in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than seventy-two (72) hours.

7. Use epoxy-based mortar for structural repairs, where directed by Architect.

8. Repair methods not specified above may be used, subject to acceptance of Architect.

END OF SECTION

SECTION 044203 – CONCRETE MASONRY UNITS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of each type of masonry work is indicated on drawings and schedule.
   1. Exterior CMU Wall.
   2. Interior CMU Partitions.
   3. Exterior Pre-Finished CMU (Split Faced)

1.3 QUALITY ASSURANCE

A. Unit Masonry Standard: Comply with ACI 530.1/ASCE 6 "Specifications for Masonry Structures", except as otherwise indicated.

B. Revise ACI 530.1/ASCE 6 to exclude Sections 1.4 and 1.7; Parts 2.1.2, 3.1.2, and 4.1.2; and Articles 1.5.1.2, 1.5.1.3, 2.1.1.1, 2.1.1.2, and 2.3.3.9 and to modify Articles 2.1.1.4 by deleting requirements for installing vent pipes and conduits built into masonry.

C. Fire Performance Characteristics: Where fire resistance ratings are indicated for unit masonry work, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E 119 by a recognized testing and inspecting organization or by another means as acceptable to authority having jurisdiction.

1.4 SUBMITTALS

A. Samples: Submit, for verification purposes, samples of each exposed masonry unit and colored masonry mortar, if any, include in each set of samples the full range of exposed colors and textures to be expected in completed work.

B. For verification purposes, submit the following: Facing brick samples for each type of exposed brick required, include in each set the full range of exposed color and texture to be expected in the completed work.

1.5 JOB CONDITIONS

A. Protection of Work: During erection, cover top of walls with heavy waterproof sheeting at end of each days' work. Cover partially completed structures when work is not in progress.

B. Extend cover a minimum of twenty four inches down both sides and hold cover securely in place.

C. Do not apply loads for at least three days after building masonry walls or columns.

D. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry. Protect base of walls from rain splashed mud and mortar splatter by means of covering spread on ground and over wall surface.

E. Protect sills, ledges and projections from droppings of mortar.

F. Cold Weather Protection:

1. Do not lay masonry units which are wet or frozen.

2. Do not lay masonry units when masonry bed is frozen.

3. Do not lay masonry units when temperature is freezing or expected to drop below freezing.

4. Remove all masonry determined to be damaged by freezing conditions.

PART 2 – PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Manufacturer: Obtain masonry units from one manufacturer of uniform texture and color for each kind required for each continuous area and visually related areas.

B. Masonry Unit Characteristics: Provide units complying with standards referenced and requirements indicated.

2.2 CONCRETE MASONRY UNITS

A. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" (15 5/8" x 7 5/8" actual), unless otherwise indicated.

B. Special Shapes: Provide where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.

C. Weight Classification: Lightweight units unless otherwise indicated. (Less than 105 lb. per cu. ft., oven dry weight of concrete).

D. Cure units by atmospheric drying for not less than 30 days before installation to comply with ASTM C 90, Type II. Grade “S” for above grade and grade “N” for below grade.

2.3 EXTERIOR SPLIT-FACE CONCRETE MASONRY UNITS

A. Acceptable Manufacturers:

1. DIV 2-4

   A Division of Tupelo Concrete Products, Inc.

   120 Industrial Road North

   Tupelo, MS 38801

   Toll free (800) 748-8703 or (866) DIV. TWO4

   www.div2-4.com

2. Trenwyth Industries – Trenwyth.com

3. E. Dillon and Company – edillon.com

B. Proprietary Product Systems: Decrastone with Integral Water repellent agent DRY-BLOCK, or equal.

1. Size: Unless otherwise indicated, provide units manufactured to the following actual dimensions: 15 5/8” x 7 5/8” x 3 5/8” Thickness. Provide other sizes as indicated on the drawings.

2. Special Shapes: Provide where required for sills, corners, control joints, bonding, and other special conditions.

C. Mortar: Mortar shall be Type S colored mortar as recommended by block manufacturer. Use Water Repellent add mixture DRYBLOCK in accordance with manufacturer’s specifications.

D. Exposed Faces: Provide manufacturer's standard color and texture, unless otherwise indicated.

2.5 MASONRY ACCESSORIES

A. Horizontal Joint Reinforcing and Ties for Masonry:

B. Provide welded wire units @ 16” O.C. vertically in all new CMU units prefabricated in straight lengths of not less than 10' with matching corner ("L") and intersecting ("T") units. Fabricate from cold drawn steel wire complying with ASTM A82 with deformed continuous side rods and plain cross rods into units with widths of approximately 2" less than nominal width of walls and partitions as required to position side rods for full embedment in mortar coverage of not less than 5/8" of joint faces exposed to exterior and not less than 1/2" elsewhere.

C. Provide the additional following type of joint reinforcing unless otherwise indicated.

D. Anchors and Ties:

1. Anchors from CMU to Steel Column 16" o.c. vertically HB 360 Gripstay Channel Slot with HB 365 Bent Gripstay - length as required, minimum of 8".

2. Anchors from masonry to new concrete wall or column spaced 16" o.c. HB 305-Dovetail Slot with HB 315 Flexible Dovetail Brick Tie anchors.

3. Anchors from masonry to existing concrete or masonry wall or column at 16" o.c. HB 360 Gripstay Channel with HB 363 Flexible Gripstay anchor.

4. Anchors for Cavity Wall with Stud Back-Up: HB X-SEAL Byna-Lok anchors spaced 16" o.c. vertically and horizontally at each stud.

5. For interior work, include devices which extend only into interior wythe’s of exterior masonry, fabricate from steel with mill galvanized or hot dip coating.

E. Flashings for Masonry:

1. Virgin polyvinyl chloride with plasticizers and other modifiers, formed into uniform flexible sheets not less than twenty mils thick and black in color, unless otherwise indicated.

2. Insect Screen: Wire cloth shall be 18x14 mesh .011 bronze.

2.6 MORTAR MATERIALS

A. Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents.

B. Do not use calcium chloride in mortar or grout.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification for types of mortar required, unless otherwise indicated.

D. Limit cementitious materials in mortar to portland cement lime.

E. Use Type M mortar for masonry below grade and in contact with earth, and where indicated.

F. Use Type S mortar for reinforced masonry and where indicated.

G. Use Type N mortar for exterior, above grade loadbearing and non-loadbearing walls; for interior loadbearing walls; and for other applications where another type is not indicated.

H. Mortar Color CMU:

1. Natural

I. Mortar Color Split Face Block:

1. Colored

J. Colored Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

A. Thickness: Build masonry construction to the full thickness shown, except, build single wythe walls (if any) to the actual thickness of the masonry units using units of nominal thickness shown or specified.

B. Build chases and recesses as shown and as required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.

C. Cut masonry units with motor driven saw designed to cut masonry with clean sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.

D. Do not wet concrete masonry units.

E. Bond Coursing:

1. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths and to properly locate openings, movement type joints, returns and offsets. Avoid the use of less than half size units at corners, jambs and wherever possible at other locations.

2. Lay up walls plumb and with courses level, accurately spaced and coordinated with other work.

3. Pattern Bond for load bearing walls: Lay exposed masonry in running bond vertical joint in each course centered on units in courses above and below. Lay concealed masonry with all units in a wythe bonded by lapping not less than 2". Bond and unlock each course of each wythe at corners, unless otherwise shown.

a. Pattern Bond CMU – Match Existing

F. Stopping and Resuming Work:

1. Rack back one half masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if specified to be wetted), and remove loose masonry units and mortar prior to laying fresh masonry.

G. Built-In Work:

1. As the work progresses, build in items specified under this and other sections of these specifications. Fill in solidly with masonry around built in items.

2. Fill space between hollow metal frames and masonry solidly with mortar.

H. Fire Rated Walls: Seal wall to deck above and all penetrations with grout.

I. Non-Loading Interior Partition Walls: Build full height of story to underside of deck above, unless otherwise indicated.

1. Grout around all penetrations in masonry.

2. Grout top of wall to deck.

3.2 MORTAR BEDDING AND JOINTING

A. Lay brick with completely filled bed, head and collar joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.

B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course.

C. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove unit, clean off mortar, and reset in fresh mortar.

D. Joints: Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with 3/8" joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials. Tool exposed joints slightly concave using a jointer larger than joint thickness. Rake out mortar in preparation for application of caulking or sealants where shown.

E. Flush Joints: Cut joints flush for masonry walls which are to be concealed or to be covered by other materials.

F. Joints Type: Tool exposed joints to match existing.

1. CMU

G. "V" Joints:

1. Split Face CMU

3.4 HORIZONTAL JOINT REINFORCING

A. Provide continuous horizontal joint reinforcing as shown and specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls and 1/2" at other locations. Lap reinforcement a minimum of 6". Do not bridge control and expansion joints with reinforcing, unless otherwise indicated. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bed units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

B. Reinforce masonry openings greater than 1'0" wide with horizontal joint reinforcing placed in two horizontal joints approximately 8" apart, both immediately above lintels and below sill. Extend reinforcing a minimum of 2'0" beyond jambs of the opening, bridging control joints where provided.

3.5 ANCHORING MASONRY WORK

A. Provide anchoring devices of the type indicated. If not indicated, provide standard type for facing and back up involved.

B. Anchor masonry to structural members where masonry abutts of faces such members to comply with the following:

1. Provide an open space not less than 1" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.

2. Anchor masonry to structural members with metal ties embedded in masonry joints and attached to structure. Provide anchors with flexible ties sections, unless otherwise indicated.

3.6 LINTELS

A. Install loose lintels of steel and other materials where shown.

B. Provide lintels where shown and wherever openings of more than 1'0" are shown without structural steel lintels. Provide steel lintels in accordance with the following schedule when not indicated on structural drawings.

1. Lintels at 4" brick:

2. up to 4’0” opng L 3 1/2" x 3 1/2" x 5/16"

3. up to 7’0” opng - L 5" x 3 1/2" x 5/16"

4. up to 10’0” opng - L 6” x 4” x 3/8”

C. Provide minimum bearing 8" at each jamb, unless otherwise indicated.

D. Provide masonry lintels where shown and where ever openings of more than 1'0" are shown without structural steel or other supporting lintels. Provide precast or formed in place masonry lintels. Thoroughly cure precast lintels before handling and installation. Temporarily support formed in place lintels.

E. Provide minimum bearing 8" at each jamb, unless otherwise indicated.

3.7 FLASHING MASONRY WORK

A. Provide concealed flashings in masonry work at, or above, all shelf angles, lintels, ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through wall flashing on bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar.

B. Extend flashings the full length of lintels and shelf angles and minimum of 4" into masonry each end. Extend flashing from a line 1/2" in from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4", and through the inner wythe to within 1/2" of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2". At heads and sills turn up ends not less than2" to form a pan.

C. Provide weeps of open head joints and bronze insect screen in the same course of masonry bedded in the flashing, space at 4'0" o.c.

D. Weep Hole Screens: Cut screen and fold to provide a "C" shape wedge which will space the width and height of the head joint at each weep hole.

E. Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

3.8 REPAIR, POINTING AND CLEANING

A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge any voids or holes except weep holes, and completely fill with mortar. Point up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.

C. Clean exposed brick masonry surfaces by the bucket and brush hand cleaning method or by high pressure water method. Comply with requirements of BIA Technical Notes No. 20, "Cleaning Brick Masonry".

1. Use commercial cleaning agents in accordance with brick manufacturer's instructions.

D. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.

3.9 LAYING CUSTOMIZED MASONRY

A. Lay customized masonry in running bond. Plumb, level and true dimensions. Layout work to masonry dimensions shown on the drawings. Cut block at course next to building corners; avoid using pieces less than 1/2 block.

B. Install wall flashing for base course flashing, head (lintel) flashing, sill flashing, spandrel flashing, coping flashing, and such other locations as specified or detailed on the drawings.

C. Place hay or straw around the perimeter of the building for a minimum of 5’ to prevent staining of customized masonry. Remove at end of job during final cleaning.

D. Brush clean as recommended by customized masonry manufacturer. Remove mortar splatters as recommended by customized masonry manufacturer. No high pressure cleaning is allowed. Use cleaner as required.

END OF SECTION 044203

SECTION 05 1200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Structural steel framing members, support members

B. Base plates.

C. Grouting under base plates.

1.2 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

B. Section 07 8100 - Applied Fireproofing: Fireproof protection to framing.

1.3 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction, Inc.

B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc..

C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts.

D. ASTM A1 - Standard Specification for Carbon Steel Tee Rails.

E. ASTM A36 - Standard Specification for Carbon Structural Steel.

F. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

G. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.

H. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

I. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

J. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

K. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

L. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

M. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

N. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.

M. ASTM A992 - Standard Specification for Structural Steel Shapes.

N. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

O. ASTM E94 - Standard Guide for Radiographic Examination.

P. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.

Q. ASTM F436 - Standard Specification for Hardened Steel Washers.

R. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.

S. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

T. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.

U. AWS D1.1 - Structural Welding Code - Steel; American Welding Society.

V. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings.

W. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings.

X. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
2. Connections not detailed.

3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."

B. Comply with Section 10 of AISC "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.

C. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience.

D. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Angles and Plates: ASTM A36.

B. Steel W Shapes and Tees: ASTM A992.

C. Rolled Steel Structural Shapes: ASTM A992.

D. Steel Shapes, Plates, and Bars: ASTM A36

E. Cold-Formed Structural Tubing: ASTM A500, Grade B.

F. Hot-Formed Structural Tubing: ASTM A501, seamless or welded.

G. Pipe: ASTM A53, Grade B, Finish black.

H. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325 , Type 1, medium carbon.

I. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 nuts and ASTM F436 Type 1 washers.

J. Load Indicator Washers: Provide washers complying with ASTM F959 at all connections requiring high-strength bolts.

K. Welding Materials: AWS D1.1; type required for materials being welded.

L. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C1107 and capable of developing a minimum compressive strength of 5,000 psi at 28 days.

M. Shop and Touch-Up Primer: Fabricator's standard.

N. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard.

2.2 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors.

2.3 FINISH

A. Prepare structural component surfaces in accordance with SSPC PS 14.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

2.4 SOURCE QUALITY CONTROL

A. Welded Connections: Visually inspect all shop-welded connections and test at least 5 percent of welds using one of the following:
   1. Radiographic testing performed in accordance with ASTM E94.
   2. Ultrasonic testing performed in accordance with ASTM E164.
   3. Liquid penetrant inspection performed in accordance with ASTM E165.
   4. Magnetic particle inspection performed in accordance with ASTM E709.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.2 ERECTION

A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".

E. Do not field cut or alter structural members without approval of architect and engineer.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.3 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch

3.4 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.

B. High-Strength Bolts: Verify that all bolts are in place, tightened, and are of the correct diameter and type.

C. Welded Connections: Visually inspect all field-welded connections. Test any suspect connection using one of the following:
   1. Radiographic testing performed in accordance with ASTM E94.
   2. Ultrasonic testing performed in accordance with ASTM E164.
   3. Liquid penetrant inspection performed in accordance with ASTM E165.
   4. Magnetic particle inspection performed in accordance with ASTM E709.

END OF SECTION

SECTION 055000 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Definition: Metal fabrications includes items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.

B. Types of work in this section include metal fabrications for:

1. Rough hardware.
2. Loose bearing and leveling plates.
3. Miscellaneous framing and supports.

1.3 QUALITY ASSURANCE

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show Anchorage and accessory items. Provide templates for anchor and bolt installation by others.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metals:

1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
2. Steel Plates, Shapes and Bars: ASTM A 36.

3. Steel Bar Grating: ASTM A 569 or ASTM A 36.
4. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.
5. Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled ASTM A 611, Class 1; of grade required for design loading.
6. Galvanized Steel: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.
7. Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.
8. Gray Iron Castings: ASTM A 48, Class 30.
9. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
10. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
11. Concrete Inserts: threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot dip galvanized, ASTM A 153.

B. Grout:

1. Non-Shrink Non-Metallic Grout: Pre mixed, factory packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD C588. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

C. Fasteners:

1. General: Provide zinc coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
3. Lag Bolts: Square head type, FS FF B 561.
4. Machine Screws: Cadmium plated steel, FS FF S 92.
5. Wood Screws: Flat head carbon steel, FS FF S 111.
6. Plain Washers: Round, carbon steel, FS FF W 92.
7. Masonry/Concrete Anchorage Devices: Expansion shields, FS FF S 325.
8. Toggle Bolts: Tumble wing type, FS FF B 588, type, class and TYPE as required.
9. Lock Washers: Helical spring type carbon steel, FS FF W 84.

D. Paint:

1. Metal Primer Paint: Red lead mixed pigment, alkyd varnish, linseed oil paint, FS TT P 86, Type II; or red lead iron oxide, raw linseed oil, alkyd paint, Steel Structures Painting Council (SSPC) Paint 2 64; or basic lead silicon chromate base iron oxide, linseed oil, alkyd paint, FS TT P 615, Type II.
2. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Division 9.
3. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing wields in galvanized steel, complying the Military Specifications MIL P 21035 (Ships).

2.2 FABRICATION, GENERAL

A. Workmanship:

1. Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed wields smooth and flush to match and blend with adjoining surfaces.
4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flat head (countersunk) screws or bolts.
5. Provide for Anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
6. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

B. Galvanizing:

1. Provide a zinc coating for those items shown or specified to be galvanized, as follows:
   a. ASTM A 153 for galvanizing iron and steel hardware.
   b. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.
   c. ASTM A 386 for galvanizing assembled steel products.
2. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

C. Shop Painting:

1. Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise indicated.
2. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mills scale in accordance with SSPC SP 2 "Hand Tool Cleaning", or SSPC SP 3 "Power Tool Cleaning", or SSPC SP 7 "Brush Off Blast Cleaning".
3. Remove oil, grease and similar contaminants in accordance with SSC SP 1 "Solvent Cleaning".

4. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.
5. Apply one shop coat to fabricated metal items, except apply two coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.3 MISCELLANEOUS METAL FABRICATIONS

A. Rough Hardware:

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.
2. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which

B. Loose Bearing and Leveling Plates:

1. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

C. Miscellaneous Framing and Supports:

1. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.
2. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
4. Except as otherwise shown, space anchors 24" o.c., and provide minimum anchor units of 1 1/4" x 1/4" x 8" steel straps.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION

A. General:

1. Fastening to In-Place Construction: Provide Anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws and other connectors as required.
2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.
4. Field Welding: Comply with AWS Code for procedures of manual shielded metal arc welding, appearance and quality of wields made, and methods used in correcting welding work.

B. Setting Loose Plates:

1. Clean concrete and masonry bearing surfaces of any bond reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
2. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.
3. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 ADJUST AND CLEAN

A. Touch-Up Painting: Immediately after erection, clean field wields, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. For galvanized surfaces: Clean field wields, bolted connections and abraded areas and apply two coats of galvanizing repair paint.

END OF SECTION 055000

SECTION 061000 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Definition: Rough carpentry includes carpentry work not specified as part of other sections and which is generally not exposed, except as otherwise indicated. Types of work in this section include rough carpentry for:

1. Wood grounds, nailers, blocking, curbs, cants, sleepers etc.

1.3 REFERENCES

A. Lumber Standards: Comply with PS 20 and with applicable rules of the respective grading and inspecting agencies for species and products indicated.

B. Plywood Product Standards: Comply with PS 1 (ANSI A 199.1) or, for products not manufactured under PS 1 provisions, with applicable APA Performance Standard for type of panel indicated.

1.4 SUBMITTALS

A. Wood Treatment Data: Submit treatment manufacturer's instructions for proper use of each type of treated material.

B. Pressure Treatment: For each type specified, include certification by treating plant stating chemicals and process used, net amount of preservative retained and conformance with applicable standards.

1.5 PRODUCT HANDLING

A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks.

1.6 JOB CONDITIONS

A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. LUMBER, GENERAL

1. Factory mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
2. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
3. Provide dressed lumber, S4S, unless otherwise indicated.
4. Provide seasoned lumber with 19% maximum moisture content at time of dressing.

B. MISCELLANEOUS LUMBER

1. Provide wood for support or attachment of other work including cant strips, bucks, nails, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:

   a. Moisture content: 19% maximum for lumber items not specified to receive wood preservative treatment.

2. Grade: Construction Grade light framing size lumber of any species or board size lumber as required. Provide construction grade boards (RIS or WCLB) or No. 2 boards (SPIB or WWPA).

C. DIMENSION LUMBER

1. Southern Pine No. 2 Grade

D. PLYWOOD

1. Trademark: Identify each plywood panel with appropriate APA trademark.
2. Concealed Performance-Rated Plywood: Where plywood panels will be used for concealed types of applications, provide APA Performance Rated Panels complying with requirements indicated for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.
3. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire retardant treated plywood panels with grade designation, APA C D PLUGGED INT with exterior glue, in thickness indicated, or, if not otherwise indicated, not less than 1/2".
4. OL Plywood: Smooth opaque resin fiber overlay one or both sides as required exposure durability classification exterior thickness as indicated.

E. MISCELLANEOUS MATERIALS

1. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommending nails.

2. Sleeper Anchors: Provide 16 ga. galvanized mud anchors designed to set in wet concrete.

2.2 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated or specified herein, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

C. Use treatment that does not promote corrosion of metal fasteners.

D. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

E. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not required.

F. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.

G. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

H. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

I. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

J. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

K. Application: Treat items indicated on Drawings, and the following:

1. Framing and plywood decking for raised platforms.
2. Framing and plywood decking for stages.
3. Plywood roof sheathing.
4. Concealed blocking.
5. Framing for non-load-bearing partitions.

6. Framing for non-load-bearing exterior walls.
7. Roof construction.
8. Plywood backing panels.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangements.

B. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

C. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.

D. Use common wire nails, except as otherwise indicated. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre drill as required.

3.2 INSTALLATION, WOOD GROUNDS, NAILERS, AND BLOCKING

A. Provide whenever shown and where required for proper support of all items which will be attached to gypsum board. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise show. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

C. Provide permanent grounds of dressed, preservative treated, key beveled lumber not less than 1 1/2" wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

3.3 INSTALLATION, SHEATHING

A. Install sheathing with end joints over supports, and with each piece extending over at least two spaces between supports. Screw to supports at 16" o.c. E.W.

END OF SECTION 061000

SECTION 072100 – INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of insulation work is shown on drawings, and indicated by provisions of this section.

B. Applications of insulation specified in this section include the following:

1. Board type building insulation.
2. Blanket type building insulation.
3. Under Concrete Slab Extruded Polystyrene Board

1.3 QUALITY ASSURANCE

A. Thermal Resistivity: Where thermal resistivity properties of insulation materials are designated by r values they represent the rate of heat flow through a homogeneous material exactly 1" thick, measured by test method included in referenced material standard or otherwise indicated. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and installation instructions for each type of insulation.

1.5 DELIVERY, STORAGE AND HANDLING

A. General Protection: Protect insulations from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Manufacturers of Board Insulation:

a. Amoco Foam Products Co.
b. Dow Chemical U.S.A.
c. Minnesota Diversified Products, Inc.
d. Johns Manville

e. Dupont

2. Manufacturers of Glass Fiber Insulation:

a. CertainTeed Corp.
b. Knauf Fiber Glass GmbH
c. Manville Corp.
d. Owens Corning Fiberglas Corp.

2.2 INSULATING MATERIALS

A. General:_ Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.

B. Preformed Units: Size to fit applications indicated, selected from manufacturer's standard thicknesses, widths and lengths.

C. Polyisocyanurate Board Insulation: Manufacturer’s standard product to yield a minimum R-Value of 6.5 per inch.

D. Unfaced Glass Fiber Blanket/Batt Insulation: Thermal insulation produced by combining mineral fibers manufactured from glass with thermosetting resins to comply with ASTM C 665 for Type I. Minimum R-Value for exterior walls to be R-21 for 6 inch batt insulation.

E. Under Concrete Slab Extruded Polystyrene Board - DuPont™ Styrofoam™ Brand Highload 40 XPS Insulation.

2.3 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Type recommended by insulation manufacturer, and complying with requirements for fire performance characteristics.

B. Mechanical Anchors: Type and size as recommended by insulation manufacturer for type of application and condition of substrate.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Require Installer to examine substrates and conditions under which insulation work is to be performed. A satisfactory substrate is one that complies with requirements of the section in which substrate and related work is specified. Obtain Installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

B. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections which might puncture vapor retarders.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

3.4 PROTECTION

A. General: Protect installed insulation and vapor retarders from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure.

END OF SECTION 072100

SECTION 072116 – PRE-ENGINEERED BUILDING BLANKET INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of insulation work is shown on drawings, and indicated by provisions of this section.

B. Applications of insulation specified in this section include the following:

1. Blanket type building insulation.

1.3 REFERENCES

A. Materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use:

1. American Society for Testing of Materials (ASTM):

a. ASTM C991 - Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings.

b. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

c. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

d. ASTM E 96 - Standard Test Method for Water Vapor Transmission of Materials in Sheet Form (Procedure A).

2. North American Insulation Manufacturers Association (NAIMA):

a. NAIMA 202-96(R) (Rev. 2000) STANDARD For Flexible Fiberglass Insulation to be laminated for Use in Metal Buildings.

3. National Fire Protection Association (NFPA):

a. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

4. Underwriters Laboratories (UL):

a. UL 723 - Test for Surface Burning Characteristics of Building Materials.

1.4 QUALITY ASSURANCE

A. Thermal Resistivity: Where thermal resistivity properties of insulation materials are designated by r values they represent the rate of heat flow through a homogeneous material exactly 1" thick, measured by test method included in referenced material standard or otherwise indicated. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and installation instructions for each type of insulation.

1.6 DELIVERY, STORAGE AND HANDLING

A. General Protection: Protect insulations from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Owens Corning Insulating Systems, LLC, Toledo, OH 43659; www.owenscorning.com, or equal.

2.2 MATERIALS

A. The OptiLiner® System consists of the following materials:

1. Unfaced light density fiberglass metal building insulation in the one of the following product categories:

a. Owens Corning Certified R Metal Building Insulation

1. Complies with ASTM C991 Type 1.

2. Complies with NAIMA 202-96-REV 2000.

3. Flame Spread Index <25 and Smoke Developed Index <50 when tested in accordance with ASTM E84, NFPA 255 and UL 723.

4. Minimum 50% recycled content (20% post consumer and 30% pre consumer).

5. Thermal Resistance: R-Values = R11 and R19.

6. Unfaced.

7. GREENGUARD Indoor Air Quality Certified®.

8. GREENGUARD Children & Schools Certified SM.

b. Owens Corning MBI Plus Metal Building Insulation

1. Flame Spread Index <25 and Smoke Developed Index <50 when tested in accordance with ASTM E 84, NFPA 255 and UL 723.

2. Minimum 50% recycled content (20% post consumer and 30% pre consumer).

3. Thermal Resistance: R-Values = R11 and R19.

4. Unfaced.

5. GREENGUARD Indoor Air Quality Certified®.

6. GREENGUARD Children & SchoolsCertified SM.

2. Fabric liner facing/vapor barrier composed of woven high-density polyethylene coated on both sides with polyethylene. Complies with the following:

a. ASTM C1136, Types I through Type VI

1. Type I-IV exception for dimensional stability (value is < 2.0%.)

b. Perm rating: ≤ 0.02 when tested in accordance with ASTM E 96 Procedure A.

c. Flame Spread Index < 25 and Smoke Developed Index < 50 when tested in accordance with ASTM E 84.

d. Color: White

3. Vapor barrier adhesive. Complies with the following:

a. Application temperature 10°F to 110° F

4. Double sided vapor barrier tape. Complies with the following:

a. Width 0.75”

b. Rubber based and free film

5. Patch tape. Complies with the following:

a. Adhesive added to one side

b. Installation temperature from 10°F to 110°F

c. 3" width

6. Metal Banding/Straps. Complies with the following:

   a. Coated steel

   b. 1.0" wide

   c. Structural Steel Grade 50 per ASTM C 653

   d. Exposed color to match vapor barrier: White.

   e. Backing – gray

7. Thermal breaks

   a. Closed cell polyethylene foam tape for wall applications. Complies with the following:

      1. 0.125" thick to 0.375" thick

      2. 3.0" wide

   b. Thermal spacer blocks. Complies with the following:

      1. Extruded or expanded polystyrene.

      2. Minimum width 3.0"

      3. Thickness 1.0"

8. Light gage steel fasteners

   a. Zinc plated cold forged steel.

   b. Head color to match vapor barrier – White.

   c. Contain rubber sealing washer.

9. Heavy gage steel fasteners

   a. Zinc plated cold forged steel.

   b. Head color to match vapor barrier – White.

   c. Contain rubber sealing washer.

10. Insulation Hangars

a. Insul-hold insulation hangars

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation. Verify structure, bracing, and concealed building systems have been tested and inspected.

B. Provide written report listing conditions detrimental to performance of work in this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install liner system in accordance with manufacturer's installation instructions and approved Shop Drawings.

B. Purlin and girt attachment surfaces should be clean and dry prior to attaching two-faced tape or sealing adhesive

C. Installed fiberglass insulation should fit snugly against purlin and girt walls in the cavity space. Avoid gaps, voids and any excess compression.

3.3 CLEANING

A. Clean dirt from vapor barrier fabric using a soft cloth with soap and water or non-abrasive household cleaner. Solvent-based cleaners and abrasive pads should be avoided.

3.4 SAFETY PRECAUTIONS

A. Installation contractor must have a site-specific safety plan and comply with all OSHA applicable local rules and regulations when installing this system.

B. Workers must use OSHA required fall protection when installing the banded liner system at heights (see OSHA regulations at 29 CFR 1926, Subpart M).

C. Banding has sharp edges and cut proof gloves should be worn when handling.

END OF SECTION 072116

SECTION 072500 – AIR/VAPOR BARRIER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications sections apply to work specified in this section.

1.2 DESCRIPTION OF WORK

A. Extent of Air/Vapor barriers is shown on drawings.

1.3 SECTION INCLUDES

A. Weather (Air/Vapor) barrier membrane (DuPont™ Tyvek® CommercialWrap® D)

B. Seam Tape (DuPont™ Tyvek® Tape)

C. Fasteners

1.4 REFERENCES

A. ASTM International
1. ASTM C 920; Standard Specification for Elastomeric Joint Sealants
2. ASTM C 1193; Standard Guide for Use of Joint Sealants
3. ASTM D 882; Test Method for Tensile Properties of Thin Plastic Sheeting
4. ASTM D 1117; Standard Guide for Evaluating Non-Woven Fabrics
5. ASTM E 84; Test Method for Surface Burning Characteristics of Building Materials
6. ASTM E 96; Test Method for Water Vapor Transmission of Materials
7. ASTM E 1677; Specification for Air Retarder Material or System for Framed Building Walls
8. ASTM E2178; Test Method for Air Permeance of Building Materials

9. ASTM E2357; Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

10. AATCC – American Association of Textile Chemists & Colorists
    a. Test Method 127 Water Resistance: Hydrostatic Pressure Test

11. TAPPI
    a. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
    b. Test Method T-460; Air Resistance of Paper (Gurley Hill Method)

1.5 SUBMITTALS

A. Refer to Section 013300 Submittals

B. Product Data: Submit manufacturer current technical literature for each component.

C. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver weather barrier materials and components in manufacturer’s original, unopened, undamaged containers with identification labels intact.

B. Store weather barrier materials as recommended by weather barrier manufacturer.

1.7 SCHEDULING

A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835); http://www.construction.tyvek.com or equal.

2.2 MATERIALS

A. Basis of Design: spun bonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® CommercialWrap® D and related assembly components.

B. Performance Characteristics:

1. Air Penetration: 0.001 cfm/ft2 at 75 Pa when tested in accordance with ASTME2178. Type 1 when tested in accordance with ASTM E 1677. ≤0.04 cfm/ft @ 75 Pa when tested in accordance with ASTM E2357.

2. Water Vapor Transmission: 30 perms, when tested in accordance with ASTM E 96, Method B.

3. Water Penetration Resistance: 235 cm when tested in accordance with AATCC Test Method 127.

4. Basis Weight: 2.4 oz/yd2, when tested in accordance with TAPPI Test Method T-410.

5. Air Infiltration Resistance: Air infiltration at >750 seconds, when tested in accordance with TAPPI Test Method T-460.

6. Tensile Strength: 33/41 lbs/in., when tested in accordance with ASTM D 822 , Method A.

7. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84 . Flame Spread: 15, Smoke Developed: 25.

2.3 ACCESSORIES

A. Seam Tape: 3” DuPont™ Tyvek® Tape as distributed by DuPont.

B. Fasteners:

1. Steel Frame Construction - DuPont™ Tyvek® Wrap Cap Screws,: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap fasteners.

C. Flashing

1. DuPont™ FlexWrap™ NF: Flexible membrane flashing materials for window openings and penetrations.

2. DuPont™ StraightFlash™: Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.

3. DuPont™ StraightFlash™ VF: Dual-sided flashing membrane materials for brick mold and non-flanged windows and doors.

4. DuPont™ Thru-Wall Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.

5. Preformed Inside and Outside Corners and End Dams as distributed by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.2 INSTALLATION - WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations

B. Install weather barrier prior to installation of windows and doors.

C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level

E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.

F. Window and Door Openings: Extend weather barrier completely over openings.

G. Overlap weather barrier

1. Exterior corners: minimum 12 inches.

2. Seams: minimum 6 inches.

H. Weather Barrier Attachment:

1. Steel or Wood Frame Construction: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

2. Masonry Construction: Attach weather barrier to masonry. Secure using weather barrier manufacturer recommend fasteners, space 6-18 inches vertically on center and 24 inches maximum horizontally. Weather barrier may be temporarily attached to masonry using recommended adhesive, placed in vertical strips spaced 24 inches on center, when coordinated on the project site.

I. Apply 4 inch by 7 inch piece of DuPont TM StraightFlashTM or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

3.3 SEAMING

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 OPENING PREPARATION (for use with non-flanged windows – all cladding types)

A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.5 FLASHING (for use with non-flanged windows – all cladding types)

A. Cut 9-inch wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening.

B. Cover horizontal sill by aligning DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanically fastening DuPont™ FlexWrap™ NF is not required.

D. Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start StraightFlash™ at head of opening and lap sill flashing down to the sill.

E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.

F. Install DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

G. Coordinate flashing with window installation.

H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer’s instructions and ASTM C 1193.

I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

J. Tape top of window in accordance with manufacturer recommendations.

K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer’s instructions and ASTM C 1193.

3.6 THRU-WALL FLASHING INSTALLATION

A. Apply primer per manufacturer’s written instructions.

B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.

C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.

D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.

E. Roll flashing into place. Ensure continuous and direct contact with substrate.

F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.

3.7 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL

A. Overlap thru-wall flashing with weather barrier by 6-inches.

B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.

C. Seal vertical and horizontal seams with tape or sealing membrane.

3.8 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT SHELF ANGLE

A. Seal weather barrier to bottom of shelf angle with sealing membrane.

B. Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.

C. Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

3.9 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD

A. Cut flap in weather barrier at window head.

B. Prime exposed sheathing.

C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.

D. Install end dams bedded in sealant.

E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.

F. Apply sealant along thru-wall flashing edges.

G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.

H. Tape diagonal cuts of weather barrier.

I. Secure weather barrier flap with fasteners.

3.10 PROTECTION

A. Protect installed weather barrier from damage.

END OF SECTION 072500

SECTION 077930 – JOINT SEALANTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. The extent of each form and type of joint sealer is indicated on drawings and by provisions of this section.

B. The applications for joint sealers as work of this section include the following:

1. Wall joints (exterior and interior).

2. Horizontal Surfaces.

3. Flashing and coping joints.

C. Refer to Division 8 sections for glazing requirements not work of this section.

D. Refer to sections of Divisions 15 and 16 for joint sealers in mechanical and electrical work not work of this section.

1.3 QUALITY ASSURANCE

A. General Performance: Except as otherwise indicated, joint sealers are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship. All products and materials used are to be carefully coordinated with manufacturer per specific manufacturer's recommendations so as to provide a complete waterproofing "system". All products are to be used in proper sequence, with all work being performed in compliance with manufacturer's recommendations. Use of any materials not specifically required (or prior approved in writing) by manufacturer shall constitute cause for retreatment of entire waterproofing system for entire project.

B. Manufacturer qualifications: Company regularly engaged in manufacturing and marketing of products specified in this section.

C. Contractor qualifications: Minimum of five years' experience in waterproofing and approved in writing by manufacturer providing warranty. Contractor must provide evidence of prior experience with specified manufacturer showing past work history with him on at least three (3) projects in comparable size and type of work.

D. Mockup: Provide mockup to include sealant joints in conjunction with windows, walls, and curtain walls. Construct mockup with specified sealant types and with other components noted. Locate where directed by Architect. Mockup may remain as part of work if acceptable to Architect.

1.4 GUARANTEES

A. Sealants

1. Provide five (5) year manufacturer's standard material warranty.

2. Warranty: include coverage for replacement of sealant materials which fail to achieve water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver products in original factory packaging bearing identification of product, manufacturer, batch number, and expiration date as applicable. Provide Material Safety Data Sheets for each product.

B. Store product in a location protected from freezing, damage, construction activity, precipitation and direct sunlight in strict accordance with manufacturer's recommendations.

C. Condition products to approximately 60 to 70 degrees F for use in accordance with manufacturer's recommendations.

D. Handle all products with appropriate precautions and care as stated on Material Safety Data Sheet.

1.6 PROJECT CONDITIONS

A. Do not use products under conditions of precipitation or freezing weather. Use appropriate measures for protection and supplementary heating to ensure proper drying and curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.

B. Ensure substrate is dry.

C. Protect all adjacent work from contamination due to mixing, handling, and application of sealants.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Provide products by one of the following: Sonneborn, Pecora, Tremco. Products listed below are manufactured by Sonneborn.

2.2 SEALANTS

A. Sealant #1: Sonolastic NP 1: Single component, non-sag polyurethane with plus or minus 25 percent movement capability for vertical joints.

B. Sealant #2: Sonolastic NP 2: Two component, non-sag polyurethane with plus or minus 50 percent movement capability where noted on plants.

C. Sealant #3: Caulking Compound (For General Interior Applications). 1 Part Architectural Acrylic Latex.

D. Sealant #4: Sealing Compound (For Interior Wet Areas "Finished" Application): General Electric SCS 1702.

E. Sealant #5: Sealing Compound (For Interior Wet Areas "Utility" Application): Sonneborn Sonolastic, 2 part polysulfide.

F. Sealant #6: Sonolastic SL 1: Single component, self-leveling polyurethane with plus or minus 25 percent movement capability for horizontal joints.

G. Sealant #7: Sonolastic SL 2: Two component, self-leveling polyurethane with plus or minus 25 percent movement capability for horizontal joints.

H. Color of sealants will be selected by Architect from manufacturer's standard color range.

I. Primer #733: Solvent based primer for concrete, masonry, aluminum, coated aluminum, glass, and natural stone.

J. Primer #757 or #759: Solvent based primer used with Sealant #5, Sonolastic, 2 part polysulfide Sealant only.

2.3 RELATED MATERIALS

A. Reducer 990: non-corrosive and non-staining joint cleaner.

B. Sonofoam Soft Backer Rod:

1. Provide non-gassing, reticulated closed-cell polyethylene rod designed for use with cold applied joint sealants for vertical applications complying to ASTM C1253-93.

2. Provide backer rod of size required for joint design.

C. Sonofoam Closed Cell Backer Rod:

1. Provide closed-cell polyethylene rod designed for use with cold applied joint sealants for on horizontal (surface) applications.

2. Provide backer rod of size required for joint design.

D. Sonoflex F Joint Filler:

1. Provide closed-cell polyethylene joint filler designed for use with cold applied joint sealants.

2. Provide joint filler of size required for joint design.

3. Bond breaker: pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 – EXECUTION

3.1 INSPECTION

A. Installer must examine substrates, (joint surfaces) and conditions under which joint sealer work is to be performed, and must notify contractor in writing of unsatisfactory conditions. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

B. Protect all surroundings from primers and sealant to include, but not be limited to, windows, roofs, walkways, drives, and landscaping

3.2 JOINT PREPARATION

A. Clean joint surfaces immediately before installation of gaskets, sealants or caulking compounds. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant or caulking compound. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Where the possibility of primer or sealant staining of adjacent areas or materials exists, mast joints prior to application. Do not remove masking tape before joints have been tooled and initial cure of sealant has taken place. Work stained due to failure of proper masking precautions will not be accepted.

3.3 INSTALLATION

A. Install appropriate size backer rod of a size larger than joint according to manufacturer's recommendations.

B. Bond Breaker: Install bond-breaker strip in joint to be sealed on top of back-up material to prevent adhesion of sealant to back material per manufacture's recommendations.

3.4 SEALANT APPLICATION

A. Prepare sealants that require mixing following manufacturer's recommended procedures, mixing thoroughly.

B. Mix only as much material as can be applied within manufacturer's recommended application time period.

C. Apply materials in accordance with manufacturer's recommendations taking care to produce beads of proper width and depth, to tool as recommended by manufacturer and to immediately remove surplus sealant.

D. Apply materials only within manufacturer's specified application life period. Discard sealant after application life is expired or if prescribed application period has elapsed.

E. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

3.5 LOCATION

A. Use Sealant #1 where sealant is to be painted.

B. Use Sealant #2 where sealant is not to be painted.

1. These are the general purpose sealants for use of interior and exterior up to 1" in width. One of these sealants shall be used unless otherwise specified herein. The following list is not intended to be inclusive of every condition.

2. At both exterior and interior joints, and recesses formed where frames and subsills of windows, doors, louvers, vents and the like adjoin other materials.

3. Joints or recesses on exterior of building (including locations not specifically shown or specified) where sealing is required to prevent infiltration of water, moisture, and wind into building construction.

4. Masonry joints in which shelf angles occur.

5. Exterior face of expansion and control joints in exterior concrete or masonry walls.

6. Interior face of expansion joints in exterior masonry walls.

7. Interior face of control joints in exterior masonry walls.

8. Openings where pipes, conduits and similar items pass through exterior walls.

9. Metal reglets where required and lead caulking rope is not used, and elsewhere where flashing is penetrated by coping dowels.

10. Metal-to-metal joints where sealing or caulking is shown or specified.

11. Metal to masonry where sealing or caulking is shown, specified, or necessary.

12. Joints occurring between ends of gravel stops, fascias and/or copings and adjacent walls.

13. Bottoms of exterior doorway frames.

14. Where sealant is shown on drawings except where sealing compounds for joints in horizontal surfaces and high temperature applications are specifically required.

15. Seats of metal thresholds for exterior doors.

16. All precast concrete joints.

17. Seats of metal thresholds for exterior doors.

C. Use sealant #3 for the following interior applications:

1. Openings 1/8” and less between walls and partitions and adjacent shelving, built-in or surface mounted equipment, plumbing, and lighting fixtures.

2. Interior locations where small voids between materials require filling for first class workmanship and painting.

D. Use sealant #4 for sealing around joints in wet areas, including plumbing fixtures, ceramic tile, countertops, shelving, pipe, surface mounted equipment, etc.

E. Use sealant #5 where sealant is underwater or wet constantly and a "finished" product is not required.

F. Use sealant #6 where indicated on drawings.

G. Use sealant #7 where indicated on drawings.

3.6 WORKMANSHIP

A. Surface Preparation: Surfaces of joint to receive caulking or sealants shall be clean, dry to the touch, free from frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. All joints shall be enclosed on three sides.

B. Exterior Joints to receive sealant shall have the following dimensional requirements:

1. At widths up to 1/2”, depth shall be equal to width.

2. At width over 1/2”, depth is to be 1/2 of the width.

C. Provide “backstop” material, required to form joint of proper depth for sealing, of a material approved by manufacturer of sealing compound as being compatible with primer and sealing compound used.

3.7 APPLICATION

A. Apply caulking and sealing compounds in strict accordance with manufacturer’s printed instructions. Avoid dropping or smearing compound on adjacent surfaces. Fill joints solidly with compound and tool. Finish compound smooth and flush, unless joint is otherwise detailed.

3.8 CLEANING

A. After filling and finishing joints, remove masking tape. Fresh compound that has accidentally been smeared on masonry shall be scrapped off immediately and rubbed clean with a solvent as recommended by the sealant manufacturer. Upon completion of application of compound, all remaining smears, stains, and other soiling resulting therefrom shall be removed with solvent or other means recommended by manufacturer of compound and the work left in a clean and neat condition.

3.9 CURE AND PROTECTION

A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability. Advise contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in a manner which will minimize increased in modules of elasticity and other accelerated aging effects. Replace or restore sealants which are damaged or deteriorated during construction period.

END OF SECTION 077930

SECTION 078400 – FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 SUMMARY

A. Section includes:

1. Through-penetration firestopping in fire rated construction.
2. Construction-gap firestopping at connections of the same or different materials in fire rated construction.
3. Construction-gap firestopping occurring within a fire rated wall, floor, or floor-ceiling system.
4. Construction-gap firestopping occurring at top of fire rated walls.
5. Through-penetration smoke-stopping in smoke partitions.
6. Construction-gap smoke-stopping in smoke partitions.

B. Related Items:

1. Partition closures at non-rated masonry partitions.
2. Partition closure at non-rated gypsum board partitions.
3. Fire dampers and manufactured mechanical devices: Refer to Mechanical Division.
4. Raceway seals and manufactured electrical devices: Refer to Electrical Division.

1.3 DEFINITIONS

A. Assembly: Particular arrangement of materials specific to given type of construction described or detailed in referenced documents.

B. Barriers: Time rated fire walls, smoke barrier walls, time rated ceiling/floor assemblies and structural floors.

C. Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire, gasses, and smoke.

D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials in not obtained.

E. Construction Gaps: Gaps between adjacent sections of walls, exterior walls, and structural floors or roof decks; and gaps between adjacent sections of structural floors and at wall tops between top of wall and ceiling.

F. System: Specific products and applications, classified and numbered by Underwriters Laboratories Inc., to close specific barrier penetrations.

G. Sleeve: Metal fabrication or pipe section extending through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other Sections and may or may not be required.

H. Manufacturer’s Engineering Judgments: Firestopping systems which are derived from other U.L. Systems/Designs or other tests, and acceptable to the code enforcing authorities.

1.4 SYSTEM DESCRIPTION

A. Fire Rated Construction: Maintain barrier and structural floor fire resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces or types of construction, at separations required to permit building movement and sound or vibration absorption, and at other construction gaps.

B. Smoke Barrier Construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations, connections with other surfaces and types of construction and at all separations required to permit building movement and sound or vibration absorption, and at other construction gaps.

1.5 SUBMITTALS

A. Comply with Section 013300, unless otherwise indicated.

B. Product Data: Manufacturer's specifications and technical data for each material including the following.

1. Composition and limitations.
2. Manufacturer's installation instructions.

C. Quality Control Submittals:

1. Statement of qualifications.

D. Contract Close-out Submittals: Comply with Section 017000.

1. Submit manufacturer's details of each system used for firestopping in the Work, identified by U.L. Design or System No., or manufacturers engineering judgment identification number.

1.6 QUALITY ASSURANCE

A. Installer's Qualifications: Firm experienced in installation or application of systems similar in complexity to those required for this Project, plus the following.

1. Acceptable to or licensed by manufacturer, State or local authority where applicable.
2. At least 2 years of experience with systems.
3. Successfully completed at least 5 comparable scale projects using this system.

B. Local and State Regulatory Requirements: Submit forms of acceptance for proposed assemblies not conforming to specific UL Firestop System and Design numbers, or to UL classified devices.

1.7 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver products in original unopened packsging with legible manufacturer's identification.

B. Coordinate delivery with scheduled installation date.

C. Storage and Protection: Comply with manufacturer's recommendations for storage of material.

1.8 PROJECT CONDITIONS

A. Environmental Requirements: Comply with fireproofing material manufacturer's recommendations for temperature and humidity conditions before, during, and after installation of fireproofing.

PART 2 - PRODUCTS

2.1 THROUGH-PENETRATION OF FIRE RATED CONSTRUCTION

A. Systems or devices listed in the UL Fire-Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetrant type, annular space requirements, and fire rating involved in each separate instance, and that the system be symmetrical for wall applications. Systems or devices must be asbestos-free.

B. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the product, or by the use of a separate product included as a part of the UL system or device, and designed to perform this function.

C. Acceptable manufacturers and products: Products listed in UL Fire Resistance Directory for UL System involved, and of following manufacturers:

1. 3M Fire Protection Products.
2. Bio-Fire Shield, Inc.
3. Hevi-Duty Nelson of General Signal.
4. Hilti Construction Chemicals, Inc.

2.2 CONSTRUCTION-GAP FIRESTOPPING OF FIRE RATED CONSTRUCTION

A. Firestopping of Construction Gaps Between Edges of Floor Slabs and Exterior Wall Construction:

1. 2 hour fire rating: USG Thermafiber Fire/Smoke-Stop system consisting of Foil-Faced Thermafiber Safing Insulation, Thermafiber Smoke Seal Compound and Safing Impaling Clips.

B. Firestopping at Construction Gaps Between Tops of Partitions and Underside of Structural Systems:

1. 2 hour fire rating: 3M System 5300-CJC82.J1, J2, J3, or J4 as applicable.

C. Firestopping of Construction Gaps in Fire Rated Masonry Partitions:

1. Acceptable Systems: 2 hour fire rating: UL Design No. U900L, No. U900D.
2. Other Acceptable Systems (based on published engineering judgments): 2 hour fire rating: Systems based on UL No. J900C.
3. Acceptable Manufacturers and Products: Those listed in UL Fire Resistance Directory for UL Design involved.

D. Non-Load Traffic Firestopping of Construction Gaps in Floors:

1. Acceptable systems: 3 hour fire rating: UL Design No. J900C, No. J900F, No. 102.
2. Acceptable Manufacturers and Products: Those listed in UL Fire Resistance Directory for the Design involved.

2.3 SMOKE-STOPPING OF SMOKE PARTITIONS

A. Through-Penetration Smoke-Stopping: Any system complying with requirements for through-penetration firestopping in fire rated construction, as specified in this Section, is acceptable, provided system provides a smoke seal.

B. Construction-gap Smoke-Stopping: Any system complying with requirements for construction-gap firestopping in fire rated construction, as specified in this Section, is acceptable, provided system provides a smoke seal.

2.4 ACCESSORIES

A. Fill, Void or Cavity Materials: As classified under category XHHW in UL Fire Resistance Directory.

B. Forming Materials: As classified under category XHKU in UL Fire Resistance Directory.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify barrier penetrations are properly sized and in suitable condition for application of materials.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide masking and temporary covering to prevent contamination of adjacent surfaces by firestopping materials.

B. Comply with manufacturer’s recommendations for temperature and humidity conditions before, during and after installation of firestopping.

C. Provide adequate ventilation.

D. Obtain code enforcing authorities approval of systems which are based on manufacturers engineering judgments.

3.3 INSTALLATION

A. Comply with firestopping material manufacturer’s recommendations, and UL System or Design.

B. Provide dams to permanently secure poured firestopping materials.

1. Where firestop systems are applied to joints in structural floors, attach a metal dam to 1 side of joint only.
2. Where firestopping is applied in hollow barriers (stud or block walls) install dams or non-combustible headers to prevent materials from collapsing into cavities.

C. Place firestopping in annular space around fire dampers before installation of damper’s anchoring flanges.

D. Close unused portions of large openings in structural floors with reinforced concrete, structurally equal to surrounding floor, solidly embedding penetrating materials. Provide dowels and reinforcement within such infills equal to reinforcing specified for slab.

1. Fill remaining spaces with applicable firestopping system.

2. Install firestopping in floors flush with top of slab, sleeve, or housekeeping pad.

E. Where large openings are created in concrete or masonry walls to permit installation of pipes and ducts, close unused portions of opening with masonry construction, equal to barrier rating, to within not more than 4 inches of penetrating materials.

1. Provide beams or lintels to bridge ducts or other large penetrations.
2. Close block cores with mortar or fiber dams
3. Close remaining space with applicable firestopping system.

F. Install smoke-stopping as specified for firestopping

G. Where rated walls are constructed with horizontally continuous air space, double wythe masonry, or double stud frame construction, provide vertical, 12 inch wide fiber dams for full thickness and height of air cavity at maximum 15 foot intervals.

3.4 FIELD QUALITY CONTROL

A. Examine sealed areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Manufacturer’s Field Services:

1. During installation, provide periodic inspection to assure proper application.

D. After installation is complete, submit findings in writing with certification that U.L. systems and designs were followed.

3.5 ADJUSTING AND CLEANING

A. Clean up spills of liquid components.

B. Neatly cut and trim materials as required.

END OF SECTION 078400

SECTION 081100 - METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. Extent of metal doors and frames is indicated and scheduled on drawings.

B. Finish hardware is specified elsewhere in Division 8.

C. Building in of anchors and grouting of frames in masonry construction is specified in Division 4.

1.3 QUALITY ASSURANCE:

A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

B. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows", and have been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.

B. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at opening, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show Anchorage and accessory items.

C. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings. Indicate coordinate of glazing frames and stops with glass an glazing requirements.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage.

B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create

humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering steel doors and frames which may be incorporated in the work include; but are not limited to, the following:

1. Amweld/Div. American Welding & Mfg. Co.
2. Ceco Corp.
3. Curries Mfg., Inc.
4. Mesket Industries, Inc.
5. Steelcraft/Div. American Standard Co.
6. Republic Builders Products Corp./ Subs. Republic Steel

2.2 MATERIALS:

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.

D. Supports and Anchors: Fabricate of not less than 18-gage galvanized sheet steel.

E. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanized items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

F. Shop Applied Paint Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

2.3 FABRICATION, GENERAL:

A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site. Comply with SDI-100 requirements as follows:

1. Exterior Doors: SDI-100, Grade III, extra heavy-duty, Style 4, 16-gage, Kraft honeycomb core.

B. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units from only cold-rolled steel.

C. Fabricate frames, concealed stiffeners, reinforcement, edge channels louvers and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).

D. Fabricate exterior doors, panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gage inverted steel channels.

E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

F. Sound Rating: Unless otherwise indicated, provide acoustical assemblies with sound ratings of STC 33 or better.

G. Finish Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

H. For concealed overhead door closers, provide space, cutouts, reinforcing and provisions for fastening in top rail of doors or head of frames, as applicable.

I. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

J. Locate finish hardware as shown on final shop drawings or, if not shown, in accordance with "Recommended Locations for Builder's Hardware," published by Door and Hardware Institute.

K. Shop Painting:

1. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

2. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

3. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

2.4 STANDARD STEEL DOORS:

A. Provide metal doors of types and styles as specified herein and indicated on drawings or schedules.

2.5 STEEL FRAMES:

A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 14-gage cold-rolled furniture steel.

B. Fabricate frames with mitered and continuous welded corners.

C. Form exterior frames of hot-dip galvanized steel.

D. Door Silencers: Except on weather-stripped frames, drill stops to receive three silencers on strike jambs of single-swing frames and two silencers on heads of double-swing frames.

E. Plaster Guards: Provide 26 gage steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts at all locations.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. General: Install steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.

C. Except for frames located at in-place concrete or masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

D. In masonry construction, locate three wall anchors per jamb at hinge and strike levels.

E. Install fire-rated frames in accordance with NFPA Std. No. 80.

F. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in SDI-100. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

3.2 ADJUST AND CLEAN:

A. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION 081100

SECTION 083953 - BLAST RESISTANT DOOR AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Blast and pressure resistant swinging hollow metal door and frame assemblies up to and including 4 pounds per square inch (PSI) resistance.

2. All components, frames, connections, support of frames and connection to the structural frame for all doors with glazing shall be design per the UFC 4-010-01, latest addition. Provide stamped engineering shop drawings for anchoring to steel studs.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for embedding anchors for blast resistant hollow metal work into masonry construction.

2. Division 08 Section "Glazing" for glass view panels in blast resistant doors.

3. Division 08 Sections "Door Hardware" and "Access Control Hardware" for door hardware for blast resistant doors and frames.

4. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

5. Division 26 "Electrical" Sections for electrical connections including conduit and wiring for door controls and operators installed on frames with factory installed electrical knock out boxes.

6. Division 28 Section "Access Control" for access control devices installed at door openings and provided as part of a security access system.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.

2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.

3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.

4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.

6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

8. ASTM E330-02: Standard Test Method for Structural Performance of Exterior Windows, Doors, Sky Lights and Curtain Walls by Uniform Static Air Pressure Difference.

9. ANSI/BHMA A156.15 - Hardware Preparation in Steel Doors and Frames.

10. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.

11. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.

12. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.

13. UL 10C (1998) - Positive Pressure Fire Tests of Door Assemblies; UL 1784 (2001) - Standard for Air Leakage Tests of Door Assemblies.

14. TM 5-853 - Department of Defense Security Engineering Manual

15. TM5-855-1 - Fundamentals of Design for Conventional Weapons; Department of the Army.

16. TM5-1300 - Structures to Resist the Effects of Accidental Explosions.

17. Publication - Formulas for Stress and Strain; J. W. Roark and W. C. Young; McGraw-Hill Book Company.

18. Publication - Simplified Design of Structural Steel; Harry Parker and James Ambrose; Wiley-Interscience Publication, John Wiley and Sons.

19. Publication - Structural Design for Dynamic Loads; Norris, Hansen, Holley, Briggs, Namyet, and Minami; McGraw-Hill Book Company.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.

2. Details of doors, including vertical and horizontal edge details and metal thicknesses.

3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

4. Locations of reinforcement and preparations for hardware.

5. Details of each different wall opening condition.

6. Details of anchorages, joints, field splices, and connections.

7. Details of accessories.

8. Details of moldings, removable stops, and glazing.

9. Details of preparations for power, signal, and control systems.

1.1 QUALITY ASSURANCE

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

C. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements". Do not modify size and dimensional requirements.
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.

F. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.

G. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

1.2 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.3 WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.
   10.

D. Samples for Verification:

   1. Samples are only required by request of the architect and for manufactures that are not current members of the Steel Door Institute.

E. Informational Submittals:

   1. Certificates of Compliance: Submit any information necessary to indicate compliance with this specification section.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Obtain blast resistant door and frame assemblies through one source from a single manufacturer with a minimum **[5]** years of documented experience producing blast resistant door and frame type work similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Blast resistant door and frame assemblies to be tested or engineered as a fully operable assembly in accordance with ASTM E330 to provide the blast or pressure resistance loads specified in pounds per square inch or pounds per square foot.

1. Provide blast resistant assemblies with minimum pounds per square rating of 80 PSI.

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C.

D. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

E. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

F. Smoke-Control Door Assemblies: Comply with NFPA 105.

G. Pre-Installation Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing blast resistant doors and frames and to verify installation of electrical knockout boxes at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver blast resistant hollow metal work palletized and crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store blast resistant hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.

D. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for blast resistant hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages and items with integral anchors. Deliver such items to Project site in time for installation.

1.8 WARRANTY

A. Provide manufacturer's written 5 year warranty against defects in materials and workmanship upon final completion and acceptance of Work in this section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Security Metal Products.

2. Overly Mfg

3. Krieger Steel

B. Substitutions: Material from alternate blast resistant door and frame fabricators will not be accepted on jobsite without prior written and sample approval in accordance with requirements specified in Division 01.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 BLAST RESISTANT HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of type and design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. Design: Flush panel.

C. Core Construction: Manufacturer's standard blast resistant door core construction designed or tested for the specified PSI rating.

1. 4 PSI force static load, infinite impulse load.

D. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 14 gage (0.067-inch -1.7-mm) thick steel, Model 2 (Fully welded, seamless face and edges).

E. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Edge, 1/8 inch in 2 inches (3 mm in 50 mm).

F. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 12 gage (0.105-inch -2.7 mm), extending the full width of the door and welded to the face sheet. Finish top and bottom to provide a smooth flush condition.

G. Surface Applied Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

2.4 BLAST RESISTANT HOLLOW METAL FRAMES

A. General: Provide frames of the type and profile indicated, not less than thickness indicated; to comply with ANSI/SDI A250.8.

B. Fabricate frames with mitered corners.

C. Fabricate frames with "closed and tight" mitered, full depth continuously welded seams, finished smooth with no visible seam unless otherwise indicated. Knock down type frames are not permitted.

D. Minimum 14 gage (0.067-inch -1.7-mm) thick steel sheet.

E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

F. Surface Applied Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Anchors to be steel stud strap anchors to meet Blast resistance specified.

B. Floor Anchors: Floor anchors to be provided at each jamb. Formed from same material as frames, not less than 14 gage (0.067-inch -1.7-mm) thick.

C. Mortar Guards: Provide minimum 26 gage mortar guards welded to the back of each hardware cutout.

2.6 FABRICATION

A. Fabricate blast resistant hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate blast resistant hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Blast Resistant Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape.

2. Astragals: Provide overlapping astragals on one leaf of pairs of doors where required for blast resistant rating or by NFPA 80 for fire-performance rating. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted.

3. Continuous Hinge Reinforcement: Provide welded continuous 12 gage strap for continuous hinges specified in hardware sets in Division 08 Section, "Door Hardware".

D. Blast Resistant Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

E. Welded Frames: Full depth continuously weld frame seams; grind, fill, dress, and make smooth and flush.

1. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

F. High Frequency Hinge Reinforcement: Provide 12 gage angle reinforcements for butt type hinges on every door and frame assembly.

G. Continuous Hinge Reinforcement: Provide welded continuous 12 gage straps for continuous hinges specified in hardware sets in Division 08 Section, "Door Hardware".

H. Electrical Knock Out Boxes: Factory weld 18 gage electrical knock out boxes to frame for electrical hardware preps; this includes but not limited to electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as noted in door hardware sets in Division 08 Section, "Door Hardware".

1. Provide electrical knock out boxes as required for Project.

2. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.

3. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section, "Door Hardware".

4. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.

I. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

J. Jamb Anchors: Provide number and spacing of anchors as follows:

1. Masonry Types: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

a. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 84 inches (2137 mm) high.

K. Surface Hardware Preparation: Factory prepare blast resistant hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section, "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

2. Reinforce doors and frames to receive non-template, mortised and surface-mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of blast resistant hollow metal work for hardware.

4. Coordinate locations of wiring boxes for electrical connections with Division 26 Sections.

2.7 STEEL FINISHES

A. Prime Finish: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

B. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

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

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded blast resistant hollow metal frames for squareness, alignment, twist, and plumbness.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install blast resistant hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Blast Resistant Hollow Metal Frames: Install blast resistant hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.

2. At fire-protection-rated openings, install frames according to NFPA 80.

3. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

4. Install door silencers in frames before grouting.

C. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

D. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with appropriate mortar.

E. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame.

F. Blast Resistant Hollow Metal Doors: Fit blast resistant hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

G. Non-Fire-Rated Standard Steel Doors:

1. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).

2. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).

3. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).

4. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including blast resistant hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from blast resistant hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 083953

SECTION 084115 – ALUMINUM STOREFRONTS

PART 1 – GENERAL

1.0 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.1 SUMMARY

A. Section Includes: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
   1. Types of Kawneer Aluminum Storefront Systems include:
      a. IR 501 Framing – 2-1/2" x 5" (63.5 mm x 127 mm) nominal dimension; Non-Thermal; Center Plane for 1-5/16" (33.4 mm) Blast Mitigation Glazing, Screw Spline Fabrication.

B. Related Sections:
   1. Division 7 - “Joint Sealants”
   2. Division 8 - “Glazing”

1.2 DEFINITIONS

A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

1.3 PERFORMANCE REQUIREMENTS

A. Storefront System Performance Requirements:
   1. See Structural Drawings for additional load requirements.
   2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft^2 (0.3 l/s · m^2) at a static air pressure differential of 6.24 psf (300 Pa).
   3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.
   4. Uniform Load: A static air design load of 65 psf (3112 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/180 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.4% of their clear spans shall occur.
   5. Blast Mitigation Performance: Shall be tested or proven through analysis to meet ASTM F1642, GSA-TS01, and UFC 04-010.01 latest addition. Provide stamped engineering shop drawings for anchoring to steel studs.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-frame storefront system indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.

C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, of aluminum-framed storefront.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
   1. Joinery.
   2. Anchorage.
   3. Expansion provisions.
   4. Glazing.
   5. Flashing and drainage.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

C. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 01 Section “Product Requirements”. Do not modify size and dimensional requirements.
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.

F. Structural-Sealant Glazing: Comply with ASTM C 1401, “Guide for Structural Sealant Glazing” for design and installation of structural-sealant-glazed systems.

G. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.7 WARRANTY

A. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty.
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product or Equal:
   1. Kawneer Company Inc.
   2. IR 501 Framing (Non-Thermal) - Blast Mitigation
   3. System Dimensions: 2-1/2" x 5" (63.5 mm x 127 mm)
   4. Glass: Center Plane

B. Substitutions: Refer to Substitutions Section for procedures and submission requirements.
   1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated

steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section “Glazing”.

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
   1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
      a. Color: Black
   2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
      a. Color: Matching structural sealant.

2.4 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section “Joint Sealants”.

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

2.5 FABRICATION

A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fit joints; make joints flush, hairline and weatherproof.

3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

D. Storefront Framing: Fabricate components for assembly using manufacturer's standard installation instructions.

E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:
1. Kawneer Permanodic™ AA-M10C21A44 / AA-M45C22A44, AAMA 611, Architectural Class I Color Anodic Coating – Color: #40 Dark Bronze.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight aluminum-framed storefront installation.
1. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum-framed storefront system, accessories, and other components.

B. Install aluminum-framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.

D. Install aluminum-framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within aluminum-framed storefront system to the exterior.

E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Clean aluminum surfaces immediately after installing aluminum-framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 084115

SECTION 087100 – DOOR HARDWARE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.

1.2 DESCRIPTION OF WORK

A. Definition: "Builders Hardware" includes items known commercially as builder’s hardware which are required for swing, sliding and folding doors. Types of items in this section include (but are not necessarily limited to):

1. Hinges
2. Lock cylinders and keys
3. Lock and latch sets
4. Exit devices
5. Push/pull units
6. Closers
7. Miscellaneous door control devices
8. Door trim units
9. Protection plates

1.3 QUALITY ASSURANCE

A. Manufacturer: Obtain each kind of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements.

B. Supplier: A recognized builders hardware supplier who has been furnishing hardware in the project's vicinity for a period of not less than two years, and who is, or employs an experienced hardware consultant who is available at reasonable times during the course of the work for consultation about project's hardware requirements to Owner, Architect and Contractor.

1.4 SUBMITTALS

A. Product Data: Submit manufacturers' technical information for each item of hardware, include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.

B. Hardware Schedule: Submit final hardware in manner indicated below. Hardware schedules are intended for coordination of work.

C. Final Hardware Schedule Content: Based on builders hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening, include the following information:

1. Type, style, function, size and finish of each hardware item.

2. Name and manufacturer of each item.

3. Fastenings and other pertinent information.

4. Location of hardware set cross referenced to indications on drawings both on floor plans and in door and frame schedule.

5. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.

6. Mounting locations for hardware.

7. Door and frame sizes and materials.

8. Keying information.

D. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

1.5 PRODUCT HANDLING

A. Packaging of hardware on a set by set basis is the responsibility of the supplier. Identify all hardware items by heading or item number to correspond with schedule.

B. Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that the count is correct.

C. Provide secure lock up for hardware delivered to the project, but not yet installed. Control, handling and installation of hardware items which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation.

1.6 JOB CONDITIONS

A. Coordination: Coordinate hardware with other work. Tag each item or package separately with identification related to the final hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thicknesses, profile, swing, security and similar requirements indicated, as necessary for proper installation and function. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

PART 2 – PRODUCTS

2.1 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of builders hardware is indicated in the Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following:

1. Manufacturer's Product Designations: One or more manufacturers are listed for each hardware type required. Provide either the product designated or the comparable product of one of another manufacturer which comply with requirements including those specified elsewhere in this section.

2.2 GENERAL MATERIALS AND FABRICATIONS

A. Hand of door: The drawings show the direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door movement as shown.

B. Fasteners: Manufacture hardware to conform to published templates generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

C. Furnish screws for installation with each hardware item. Provide Phillips flat head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

D. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use through bolts for installation where the bolt head or the nut on the opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work.

E. Tools for Maintenance: Furnish a complete set of specialized tools as needed for Owner's continued adjustment, maintenance, and removal and replacement of builder’s hardware.

2.3 HINGES, BUTTS AND PIVOTS

A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template produced units.

2.4 LOCK CYLINDERS AND KEYING

A. General: Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing.

B. Review the keying system with the Owner and provide the type required (master, grandmaster or great grandmaster), or integrated with Owner's existing system.

C. Equip locks with manufacturer's special six pin tumbler cylinder with construction master key feature which permits voiding of construction keys without cylinder removal.

D. Metals: Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.

E. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.

F. Key Material: Provide keys of nickel silver only.

G. Key Quantity: Furnish three change keys for each lock; five master keys for each master system; and five grandmaster keys for each grandmaster system.

1. Deliver keys to Owner.

2.5 LOCKS, LATCHES AND BOLTS

A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt with curved lip extended to protect frame; finished to match hardware set.

B. Provide dust-proof strikes for foot bolts, except where special threshold construction provides non recessed strike for bolt.

C. Provide roller type strikes where recommended by manufacturer of the latch and lock units.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division 9 sections. Do not install surface mounted items until finishes have been completed on the substrate.

C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

3.2 ADJUST AND CLEAN

A. Adjust and clean each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Final Adjustment: Wherever hardware installations is made more than one month prior to Acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes during the final adjustment of hardware.

3.3 SCHEDULE OF HARDWARE

A. FINISH: Generally shall be as indicated below unless otherwise noted in the schedule.

BHMA	FINISH	DESCRIPTION
626	US26D	Satin Chromium Plated
630	US32D	Satin Stainless Steel

B. The following are also acceptable manufacturers (or approved equal):

1. Best
2. DORMA
3. PBB, Inc.
4. Quickset
5. Ruswin
6. Sargent
7. Schlage
8. Yale

Hardware set number is indicated on the opening schedule on the drawings.

Hardware Set H1 (BLAST)

Doors: 100A, 100B, 101A, 112A

Each to Receive:

3	EA	Heavyweight Hinge	T4A3386xNRP 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Mortise Exit Device	ED5657L N9M57ET 630 CT6B	Corbin Russwin
1	EA	Core	CR8000-N24 626	Corbin Russwin
1	EA	Surface Closer	DC8210 689 A4 M54	Corbin Russwin
1	EA	Kick Plate	K1050 8" x 34" US32D	Rockwood
1	EA	Threshold	172A x 36"	Pemko
1	EA	Gasketing	303AV x 36" x 84" TKSP	Pemko
1	EA	Sweep	345AV x 36" TKSP	Pemko

Hardware Set H2 (BLAST)

Doors: 147

Each to Receive:

3	EA	Heavyweight Hinge	T4A3386xNRP 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Mortise Exit Device	ED5657L N9M57ET 630 CT6B	Corbin Russwin
1	EA	Core	CR8000-N24 626	Corbin Russwin
1	EA	Surface Closer	DC8210 689 A4 M54	Corbin Russwin
1	EA	Kick Plate	K1050 8" x 34" US32D	Rockwood
1	EA	Threshold	172A x 36"	Pemko
1	EA	Gasketing	303AV x 36" x 84" TKSP	Pemko
1	EA	Sweep	345AV x 36" TKSP	Pemko

Hardware Set H3 (BLAST)

Doors: 148

Each to Receive:

3	EA	Heavyweight Hinge	T4A3386xNRP 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Storeroom Lock	ML2057 NSA 626 CT6B	Corbin Russwin
1	EA	Core	CR8000-N24 626	Corbin Russwin
1	EA	Surface Closer	DC8210 689 A4 M54	Corbin Russwin
1	EA	Kick Plate	K1050 8" x 34" US32D	Rockwood
1	EA	Threshold	172A x 36"	Pemko
1	EA	Gasketing	303AV x 36" x 84" TKSP	Pemko
1	EA	Sweep	345AV x 36" TKSP	Pemko

Hardware Set H4

Doors: 146

Each to Receive:

3	EA	Hinge	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Storeroom Lock	ML2057 NSA 626 CT6B	Corbin Russwin
1	EA	Core	CR8000-N24 626	Corbin Russwin
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

Hardware Set H5

Doors: 101B, 112B

Each to Receive:

3	EA	Hinge	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Fire Rated Rim Exit	ED5200A N955ET 630 CT6B	Corbin Russwin
1	EA	Core	CR8000-N24 626	Corbin Russwin
1	EA	Surface Closer	DC8210 689 A4 M54	Corbin Russwin
1	EA	Kick Plate	K1050 8" x 34" US32D	Rockwood
1	EA	Gasketing	PK33D 18'	Pemko

Hardware Set H6

Doors: 145

Each to Receive:

3	EA	Hinge	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Privacy Lock w/Indicator	ML2030 NSA 626 M19V	Corbin Russwin
1	EA	Surface Closer	DC8210 689 M54	Corbin Russwin
1	EA	Kick Plate	K1050 8" x 34" US32D	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

Hardware Set H7

Doors: 149, 150

Each to Receive:

3	EA	Hinge	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Push Plate	70C-RKW US32D	Rockwood
1	EA	Pull Plate	110x70C US32D	Rockwood
1	EA	Surface Closer	DC8200 689 M54	Corbin Russwin
1	EA	Kick Plate	K1050 8" x 34" US32D	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

Hardware Set H8

Doors: 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123

Each to Receive:

3	EA	Hinge	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Dormitory Lock	ML2065 NSA 626 CT6B	Corbin Russwin
1	EA	Core	CR8000-N24 626	Corbin Russwin
1	EA	Wall/Floor Stop	409/441H US32D/26D (As Needed)	Rockwood
3	EA	Silencer	608-RKW	Rockwood

END OF SECTION 087000

SECTION 088000 – GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

1. Definitions: "Glass" includes prime glass, processed glass, and fabricated glass products. "Glazing" includes glass installation and materials use to install glass. Types of work in this section include glass and glazing for window wall/store front construction.

A. "Glass products" is hereby defined to include glazing plastics.

1.3 QUALITY ASSURANCE

A. Glass Manufacturer: One of the following for each type/color/pattern of glass:

1. ASG Industries, Inc.
2. C E Glass Division
3. Ford Glass Company
4. Libbey Owens Ford Company
5. PPG Industries, Inc.

B. Prime Glass Standard: FS DD G 451.

C. Safety Glass Standard: CPSC 16 CFR 1201.

D. Laminated (Safety Glass) Standard: CPSC 16 CFR 1201. Also Department of Defense Minimum Antiterrorism Standards for Buildings, Unified Facilities Criteria (UFC 4-010-01). See structural drawings for design criteria for blast resistance.

1.4 SPECIFIED PRODUCT WARRANTY

A. Warranty on Hermetic Seals: Provide insulating glass manufacturer's written warranty, agreeing to, within specified warranty period, furnish FOB project site, replacement units for insulating glass units which have defective hermetic seals (excluding that due to glass breakage); defined to include intrusion of moisture or dirt, internal condensation at temperatures above 20 degrees F (31 degrees C), deterioration of internal glass coatings, and other visual evidence of seal failure or performance failure; provided manufacturer's instructions for handling, installation, protection and maintenance have been adhered to during warranty period.

B. Warranty period is ten years after seal date permanently imprinted on unit, but not less than nine years after date of substantial completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS

A. Float/Plate Glass: Type I, Quality q3, clear unless otherwise indicated.

2.2 PROCESSED GLASS

A. Tempered Glass: Provide prime glass of color and type indicated, which has been heat treated to strengthen glass in bending to not less than 4.5 times annealed strength 1/4" thick.

B. Tong Marks: Provide tempered glass produced by manufacturer's special process which eliminates tong marks.

2.3 FABRICATED GLASS UNITS

A. Glass Type IG-1: Low-E coated, Bronze insulating glass, laminated.

1. Overall Unit Thickness: 1 5/16” inch.
2. Thickness of Each Glass Lite: 1/4 inch min.
3. Outdoor Lite: Fully tempered Bronze Tint float glass.
4. Interspace Content: Argon Gas.
5. Interlayer: Laminated.
6. Indoor Lite: Fully tempered clear float glass.
7. Provide safety glazing labeling.
8. SHGC=0.25 max.

2.4 GLAZING SEALANTS AND COMPONENTS

A. General: Provide color of exposed sealant/compound indicated or if not otherwise indicated, as selected by Architect from manufacturer's standard colors, or black if no color is so selected. Comply with manufacturer's recommendations for selection of hardness depending upon the location of each application, conditions at time of installation, and performance requirements as indicated. Select materials and variations or modifications carefully for compatibility with surfaces contacted in the installation.

B. Sealants: See section 077930 - Joint Sealers.

C. Molded Neoprene Glazing Gaskets: Molded or extruded neoprene gaskets of the profile and hardness required for water tight construction; comply with ASTM D 2000 designation 2BC 415 to 3BC 620, black.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

B. Setting Blocks: Neoprene or EPDM, 70 90 durometer hardness with proven compatibility with sealants used.

C. Spacers: Neoprene or EPDM, 40 50 durometer hardness with proven compatibility with sealants used.

D. Compressible Filler (Rod): Closed cell or waterproof jacketed rod stock of synthetic rubber or plastic foam, proven to be compatible with sealants used, flexible and resilient, with 5 10 psi compression strength for 25% deflection.

PART 3 - EXECUTION

3.1 STANDARDS AND PERFORMANCE

A. Watertight and airtight installation of each glass product is required, except as otherwise shown. Each exterior installation must withstand normal temperature changes, 25 lb. wind loading, impact loading (for operating sash and doors), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.

B. Protect glass from edge damage during handling and installation, and subsequent operation of glazed components of the work. During installation, discard units with significant edge damage or other imperfections.

C. Install insulating glass units to comply with recommendations by Sealed Insulating Glass Manufacturers Association, except as otherwise specifically indicated or recommended by glass and sealant manufacturers.

3.2 PREPARATION FOR GLAZING

A. Clean glazing channel and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.

3.3 GLAZING

A. Install setting blocks of proper size in sill rabbet located 1/4th of glass width from each corner. Set blocks in thin course of heel bead compound, if any.

B. Gasket Glazing: Miter cut and bond ends together at corners where gaskets are used for channel glazing, so that gaskets will not pull away from corners and result in voids or leaks in glazing system.

3.4 CURE, PROTECTION AND CLEANING

A. Protect exterior glass from breakage immediately upon installation, by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove non-permanent labels and clean surfaces. Cure sealants for high early strength and durability.

B. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

C. Wash and polish glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Comply with glass product manufacturer's recommendations for final cleaning.

END OF SECTION 088000

SECTION 09 30 50 - TILE SETTING MATERIALS AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Uncoupling membrane.

B. Waterproofing Membrane.

C. Floor drain, with integrated bonding flange.

D. Shower waterproofing: prefabricated substrates, waterproofing membrane, floor drain with integrated bonding flange, and sealant.

E. Setting materials: adhesives, mortars, grouts, and sealants.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 06 10 00 - Rough Carpentry.

C. Section 09 29 00 - Gypsum Board.

D. Section 09 30 00 - Tiling.

E. Section 09 30 70 - Tile Shower Components and Waterproofing Membrane. Shower trays, curbs, ramps, bench, niche, sealing compound, waterproofing membrane, drainage panels, drainage membrane compatible with floor drains.

F. Section 22 30 00 - Plumbing Equipment.

1.3 REFERENCES

A. Tile Council of North America (TCNA) Handbook for Ceramic Tile Installation.

B. American National Standard Specifications for the installation of ceramic tile A108 / A118 / A136.1.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and finish.

D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years experience.

B. Source Limitations for Setting Materials and Accessories: Obtain product of a uniform quality for each application condition from a single manufacturer.

C. Preinstallation Conference: Conduct conference at the Project site.
1. Convene one week prior to commencing work of this section.
2. Require attendance of installation material manufacturer, tile supplier, tile installer and installers of related work. Review installation procedures and coordination required with related work.
3. Meeting agenda includes but is not limited to:
a. Surface preparation.
b. Tile and installation material compatibility.
c. Edge protection, transition and pre-fabricated movement joint profiles.
d. Waterproofing techniques.
e. Crack isolation techniques.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

C. Store materials in a dry, warm, ventilated weathertight location.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 COORDINATION

A. Coordinate Work with other operations and installation of floor finish materials to avoid damage to installed materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design / Acceptable Manufacturer: Schluter Systems, L.P., 194 Pleasant Ridge Road, Plattsburgh, NY 12901-5841. ASD. Tel: (800) 472-4588. Fax (800) 477-9783. E-mail:specassist@schluter.com. Web:www.schluter.com.

B. Or Approved Equal

2.2 UNCOUPLING MEMBRANE

A. Schluter-DITRA
1. Description: 1/8 inch (3 mm) thick, orange, high-density polyethylene membrane with a grid structure of 1/2 inch by 1/2 inch (12 mm by 12 mm) square cavities, each cut back in a dovetail configuration, and a polypropylene anchoring fleece laminated to its underside. Conforms to definition for uncoupling membranes in the Tile Council of North America Handbook for Ceramic Tile Installation and is listed by cUPC to meet or exceed the requirements of the "American national standard specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10 and is listed by cUPC, and is evaluated by ICC-ES (see Report No. ESR-2467).

2.3 WATERPROOFING MEMBRANE

A. Schluter-KERDI
1. Description: 0.008 inch (0.2 mm) thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides, which is listed by cUPC to meet or exceed requirements of the "American national standard specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10 and is listed by cUPC, and is evaluated by ICC-ES (see Report No. ESR-2467).

B. Schluter-KERDI-BAND
1. Description: Seams and Corners material 0.004 inch (0.1 mm) thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides.
2. Width:
a. Width as required.

2.4 FLOOR DRAIN WITH INTEGRATED BONDING FLANGE

A. Schluter-KERDI-DRAIN, Plastic:
1. Description: floor drain 11-25/32 inch (300 mm) diameter, trapezoid-perforated, integrated bonding flange with polypropylene fleece thermally laminated to the surface and hubbed connection to 2 inch (50 mm) drain pipe. Grate assembly includes 4 inch by 4 inch (102 mm by 102 mm) square grate, height adjustment collar, and lateral adjustment ring with trapezoid perforations.
2. Drain listed by UPC to meet requirements of "International Association of Plumbing and Mechanical Officials Interim Guide Criteria for Floor Drain with Integrated Bonding Flange" (IGC 195), listed by CSA to meet requirements of the Canadian Standards Association standard, "Floor, Area, and Shower Drains, and Cleanouts for Residential Construction" (CSA B79), and referenced in method B422 and B422C of the Tile Council of North America Handbook for Ceramic Tile Installation.
3. Drain Housing Material:
a. PVC.
4. Grate Material and Finish:
a. E - Stainless Steel Type 304 = V2A.
5. Nominal Grate Size:
a. 4 inch (100 mm) by 4 inch (100 mm) square.
6. Drain Outlet:
a. 3 inch (75 mm) outlet or as indicated in Plumbing Drawings & Specifications.

B. Schluter-KERDI-DRAIN, Stainless Steel:
1. Description: stainless steel floor drain 9-27/32 inch (250 mm) diameter integrated bonding flange with 3 inch (75 mm) no-hub outlet, and grate assembly. Grate assembly includes stainless steel grate, height adjustment collar, and lateral adjustment ring with trapezoid perforations.
2. Drain listed by UPC to meet requirements of "International Association of Plumbing and Mechanical Officials Interim Guide Criteria for Floor Drain with Integrated Bonding Flange" (IGC 195), listed by CSA to meet requirements of the Canadian Standards Association standard, "Floor, Area, and Shower Drains, and Cleanouts for Residential Construction" (CSA B79), Drain detail as referenced in method B422 and B422C of the Tile Council of North America Handbook for Ceramic Tile Installation.
3. Drain Housing Material:
a. Stainless Steel.
4. Grate Material and Finish:
a. E - Stainless Steel Type 304 = V2A.
5. Nominal Grate Size:
a. 4 inch (100 mm) by 4 inch (100 mm) square.

6. Drain Outlet:
   a. 3 inch (75 mm) outlet or as indicated in Plumbing Drawings & Specifications.

2.5 PREFABRICATED SHOWER COMPONENTS

A. Schluter-KERDI-SHOWER-T/-TS/-TT
   1. Description: Trapezoid-imprinted, prefabricated, sloped tiled shower tray base, made of lightweight, self-extinguishing (HF-1 rating per UL-94) expanded polystyrene (PS 40), with 12-5/16 inch (313 mm) diameter removable recessed section and bonded Schluter KERDI Membrane 0.008 inch (0.2 mm) thick, which meet or exceed the requirements of the American National Standard Specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10, and is listed by cUPC, and is evaluated by ICC-ES (see Report No. ESR-2467). Meeting ANSI A118.10 as detail as referenced in method B422 of the Tile Council of North America Handbook for Ceramic Tile Installation.

B. Schluter-KERDI-BOARD-SC
   1. Description: Prefabricated waterproof Shower Curb, constructed of rigid extruded polystyrene foam building element panel, with reinforcement material and polypropylene fleece webbing laminated on both sides for thin-set ceramic tile and dimension stone Installations.
   2. Size:
      a. KBSC 115 150 1220 - 48 inch by 6 inch by 4-1/2 inch (122 cm by 150 mm by 115 mm).

2.6 WATERPROOF BUILDING PANEL FOR CERAMIC AND STONE TILE

A. Schluter-KERDI-BOARD
   1. Description: Rigid extruded polystyrene foam building element panel, with reinforcement material and polypropylene fleece webbing laminated on both sides for thin-set ceramic tile and dimension stone Installations.
   2. Panel Thickness:
      a. Thickness as required.
   3. Panel Size:
      a. 48 inch by 96 inch (122 by 244 cm) or as required.

2.7 SETTING MATERIALS

A. Schluter-SET Premium Unmodified Thin Set Mortar.
   1. Description: premium unmodified sag-resistant thin-set mortar specifically formulated for use with Schluter membranes and boards. Schluter-SET is suitable for use with ceramic, porcelain, and stone tile, including large and heavy tile, in conjunction with Schluter-Systems' uncoupling and waterproofing membranes. Meets the requirements of ANSI A118.1T.
   2. Color:
      a. Grey.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 099100 – PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Extent of painting work is shown on drawings and schedules, and as herein specified.

B. The work includes the painting or finishing of materials at both the interior and exterior of the building.

C. Examine other sections of these specifications, as well as the mechanical and electrical specifications for the various other trades, and become familiar with all their provisions regarding painting. All surfaces that are left unpainted by the requirements of other sections or other specifications shall be painted or finished as a part of this section.

D. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

E. Paint exposed surfaces whether or not colors are designated in "schedules", except where natural finish of material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint same as adjacent similar materials or areas. If color or finish is not designated, Architect will select these from standard colors available for materials systems specified.

F. Following categories of work are not included as part of field applied finish work, or are included in other sections of these specifications.

G. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, miscellaneous metal, hollow metal work, and similar items.

H. Mechanical and Electrical Work: Painting of mechanical and electrical work is specified in Division 15 and 16, respectively.

I. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory finishing or installer finishing is specified for such items as (but not limited to) metal toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, finished mechanical and electrical equipment including light fixtures, switchgear and distribution cabinets, entrance frames, doors and equipment.

J. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, pipe spaces, duct shafts and above ceilings.

K. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise indicated.

L. Operating Parts and Labels: Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting, unless otherwise indicated.

M. Do not paint over any code required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use. If paint is to be other than Sherwin Williams, submit a schedule of paint equivalent to that specified.

B. Samples: Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.

C. On actual wall surfaces and other interior building components, duplicate painted finishes of prepared samples. On at least 100 sq. ft. of surface as directed, provide full coat finish samples until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in place work.

1.4 DELIVERY AND STORAGE

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

1. Name or title of material.
2. Manufacturer's name.
3. Thinning instructions.
4. Application instructions.
5. Color name and number.

1.5 JOB CONDITIONS

A. Apply water base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C), unless otherwise permitted by paint manufacturer's printed instruction.

B. Apply solvent thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F (7 degrees C) and 95 degrees F (35 degrees C), unless otherwise permitted by paint manufacturer's printed instructions.

C. Do not apply paint in snow, rain, fog or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by paint manufacturer's printed instructions.

D. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 COLORS AND FINISHES

A. Prior to beginning work, Architect will furnish color chips for surfaces to be painted.

B. Use representative colors when preparing samples for review.

C. Final acceptance of colors will be from samples applied on the job.

D. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

E. Lead content in pigment, if any, is limited to contain not more than 0.5% lead, as lead metal based on the total non-volatile (dry film) of paint by weight.

F. This limitation is extended to interior surfaces and those exterior surfaces, such as stairs, decks, porches, railings, windows, and doors which are readily accessible to children under seven years of age.

G. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials proposed for use to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

2.2 MATERIAL QUALITY

A. Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturer. Materials not displaying manufacturer's identification as a standard, best grade product will not be acceptable.

B. Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers except paint for existing building.

C. Provide undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

2.3 MANUFACTURERS

A. Provide products from one of the following companies:

1. Sherwin Williams
2. PPG Industries
3. Devoe
4. Glidden
5. Mobile Paints
6. Benjamin Moore
7. Tnemac Company, Inc.

B. Mixing required shall be done with a mechanical mixer and materials shall be thoroughly mixed. No materials shall be reduced or changed in any way except as specified. Any material that has partially set will be discarded.

C. Colors will be selected by the Architect.

2.4 EXTERIOR FINISHES

A. References below are for Sherwin Williams products.

B. All exposed ferrous metal shall be given:

1. One (1) coat Kem Kromik Rust Inhabitive Primer B50WZ1.
2. Two (2) coats DTM Acrylic Gloss Coating, B66-100 Series. Galvanized iron or Steel:

1. One (1) coat Galvite B50W3.
2. Two (2) coats SuperPaint Exterior Latex Acrylic, Satin finish, A89-150 Series.

2.5 INTERIOR FINISHES

A. Masonry - (CMU - Concrete or Cinder Block)
1. Semi-Gloss Finish
a. 1st Coat: S-W PrepRite Block Filler, B25W25 (75-l25 square feet per gallon)
b. 2nd Coat and 3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2650 Series (4 mils wet, 1.3 mils dry per coat).
2. Epoxy Systems (Water Base) (where noted on drawings): Semi-Gloss Finish.
a. 1st Coat: S-W PrepRite Block Filler, B25W25 (75-l25 square feet per gallon)
b. 2nd Coat and 3rd Coat: Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss Finish, K46-1150 Series.

B. Metal - (Structural Steel, etc.)
1. Alkyd Systems - Gloss Finish:
a. 1st Coat: S-W Kem Kromik Universal Metal Primer, B50Z Series.
b. 2nd Coat:S-W Industrial Enamel, B54 Series
c. 3rd Coat: S-W Industrial Enamel, B54 Series (4 mils wet, 2.4 mils dry per coat).

C. Metal - (Galvanized)
1. Alkyd Systems - Semi-Gloss Finish:
a. 1st Coat: S-W Galvite HS, B50WZ30 (5 mils wet, 3 mils dry)
b. 2nd Coat: S-W ProMar 200 Alkyd Semi-Gloss B34-250 Series.
c. 3rd Coat: S-W ProMar 200 Alkyd Semi-Gloss B34W250 Series (4 mils wet, 1.7 mils dry per coat).

D. Metal - Exposed to View: (Doors, Partitions, Pumps, Motors, Machines, Ducts (Ventilating), Copper and Non-Galvanized Metal)
1. Semi-Gloss Finish:
a. 1st Coat: S-W DTM Acrylic Primer/Finish, B66W1 (2.5-4 mils dry per coat)
b. 2nd Coat: S-W Metalatex Semi-Gloss Coating, B42 Series

c. 3rd Coat: S-W Metalatex Semi-Gloss Coating, B42 Series (4 mils wet, 1.5 mils dry per coat).

E. Wood - (Walls, Doors, Trim, Cabinet Work, Partitions and Window Frames)
1. Latex Systems Semi-Gloss Finish:
a. 1st Coat: S-W Premium Wall & Wood Primer, B28W8111.
b. 2nd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss B31W2650 Series.
c. 3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss B31W2650 Series (4 mils wet, 1.5 mils dry per coat).

F. Drywall - (Walls, Ceilings and Gypsum Board)
1. Latex System - Semi-Gloss Finish:
a. 1st Coat: S-W PrepRite 200 Latex Primer, B28W2600 (4 mils wet, 1.2 mils dry)
b. 2nd Coat: S-W ProMar 200 Latex Semi-Gloss, B31W2650 Series
c. 3rd Coat: S-W ProMar 200 Latex Semi-Gloss, B31W2650 Series (4 mils wet, 1.3 mils dry per coat).

G. Drywall-(Walls, Ceiling and Gypsum Board)
1. Epoxy System- Semi-Gloss Finish:
a. 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W2650.
b. 2nd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-1150 Series.
c. 3rd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-1150 Series.

H. Concrete Floors:
2. System Type: Polyamide Epoxy system
3. Surface Preparation: Mechanically abrade all concrete surfaces using a planetary grinder, diamond cup grinder, or shot blast to achieve a finish in accordance with ICRI CSP2.
4. 1st Coat: S-W ArmorSeal 1000HS, B67 Series, 4.0 mils DFT.
5. Finish Coat: S-W ArmorSeal 1000 HS, B67 Series, 4.0 mils DFT.
6. Total DFT: 8.0 mils DFT.

I. All caulking shall have a suitable primer applied and two coats of paint to match adjoining surfaces to which caulking is applied.

PART 3 - EXECUTION

3.1 INSPECTION

A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to applicator.

B. Starting of painting work will be construed as applicator's acceptance of surfaces and conditions within any particular area.

C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION

A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

3.3 EXISTING SURFACES OR ITEMS INDICATED TO BE STRIPPED AND REFINISHED

A. Remove old finish down to bare substrate by methods non-destructive to substrate. Control spread of waste products, fumes, and removal media as required by authorities having jurisdiction. Do not contaminate or damage surfaces or items which are not indicated to be stripped and refinished. After stripping, wash entire surface involved with appropriate non-destructive solvent and allowed to dry. Bleach out stains on wood surfaces, sand with fine sandpaper and remove all dust with a tack rag. Refinish surfaces and items as specified for new work.

3.4 EXISTING SURFACES TO BE REPAINTED OR REFINISHED

A. Remove all loose, blistered, scaled or crazed finish to bare base material surface. Wash surfaces with T.S.P. and water or other solution as required.

B. Prevent impaired bond or bleed through by removing any accumulated film of wax, oil grease, smoke or other foreign matter.

C. After washing, rinse with potable water and allow to thoroughly dry.

D. On existing high gloss or semi-gloss interior work receiving gloss finishes, wash and rinse as noted above, then wipe with liquid de-glosser or other acceptable preparation material.

E. In addition to the above cleaning, provide the following work:

1. Existing interior wood: Sandpaper smooth or use liquid de-glosser to remove gloss and provide a “tooth” for finish boding. Prime bare spots with specified primer for new work. Putty, glaze or spackle cracks and other irregularities; color filler material to match stain or transparent finishes.
2. Existing gypsum wallboard, concrete and masonry: Fill minor isolated defects and damaged areas in previously painted surfaces with vinyl base spackle. Apply texture on minor work repaired under this Section as required to match existing adjacent surfaces. Using specified primer-sealer, prime all bare and newly textured surfaces scheduled to receive paint.
3. Existing painted ferrous metal: Sand rough edges of bare areas to featheredge to adjacent sound paint. Remove rust and loose paint to bare metal; solvent wash, then apply prime paint.

3.5 PRIMER

A. When recommended by paint manufacturer for surface being painted, provide primer or undercoat whether specified or not.

B. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide surface applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

C. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly painted surfaces.

D. All necessary puttying of nail holes, cracks, etc., shall be done after the first coat with putty of color to match that of the finish.

E. In general, exterior oil paints shall be allowed to dry at least forty eight (48) hours between coats and interior paint shall be allowed to dry at least twenty four (24) hours between coats unless noted in the detailed specifications. All coats shall be lightly sanded between coats with 00 sandpaper and dusted before succeeding coat is applied. Each coat of paint shall be inspected and approved before another coat is applied.

F. All undercoats of paint and enamel shall be tinted to the approximate shade of the final coat.

3.6 CEMENTITIOUS MATERIALS

A. Prepare cementitious surfaces of concrete and cement plaster to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughing as required to remove glaze.

B. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

C. Suction spots or "hot spots" in cement shall be touched up before applying the finish coat.

3.7 VOIDS AND AIR HOLES

A. Voids and air holes in concrete to be painted shall be spackled or filled with plastic patch.

B. Clean concrete floor surfaces scheduled to be painted with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid, and allow to dry before painting.

3.8 WOOD

A. Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sandpaper smooth when dried.

B. Prime, stain, or seal wood required to be job painted immediately upon delivery to job. Both sides of all cabinet doors shall be finished to match the face of the cabinet. Interior of cabinet and inside of wood drawers shall be given one coat of sealer. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.

C. BACK PRIME all wood trim, casings, molding, etc., interior and exterior.

D. When transparent finish is required, use spar varnish for back priming.

E. Tops, bottoms, and cutouts of all doors shall be finished to match the door.

F. Hardwood to be finished shall be sanded smooth and surface cleaned before first coat and between coats with fine sandpaper and shall be wiped with a tack rage after each sanding.

G. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

H. Touch-up shop-applied prime coats wherever damaged or bare where required by other sections of these specifications. Clean and touch up with same type shop primer.

I. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.9 MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3.10 APPLICATION

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

B. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

C. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

D. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

E. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

F. Sand lightly between each succeeding enamel or varnish coat.

G. Omit first coat (primer) on metal surfaces which have been shop primed and touch up painted, unless otherwise indicated.

H. Scheduling Painting: Apply first coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

I. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate

thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

J. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.

K. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in mechanical equipment rooms and in occupied spaces.

L. Mechanical items to be painted include, but are not limited to, the following in finished areas:

1. Mechanical equipment and supports.
2. Accessory items.

M. Electrical items to be painted include, but are not limited to, the following:

1. Panels in finished areas.

N. Prime Coats: Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.

O. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat to assure a finish coat with no burn through or other defects due to insufficient sealing.

P. Pigmented (Opaque Painted) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

Q. Transparent Finishes: Use multiple coats to produce glass smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

R. Completed Work: Match approved samples for color, texture and coverage. Remove, CLEAN-UP AND PROTECTION

S. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

T. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting as acceptable to Architect.

U. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

V. At the completion of work of other trades, touch up and restore all damaged or defaced painted surfaces.

END OF SECTION 099100

SECTION 099250 – GYPSUM BOARD ASSEMBLIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Gypsum drywall including screw type metal support system.

B. Drywall finishing (joint tape and compound treatment).

1.3 QUALITY ASSURANCE

A. Fire-Resistance Rating: Where gypsum drywall systems with fire resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories acceptable to authorities having jurisdiction. All products used in the assembly shall carry a classification label from a testing laboratory acceptable to authority having jurisdiction.

B. Provide fire resistance rated assemblies identical to those indicated by reference to GA File No's. in GA "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction.

C. Gypsum Board Terminology Standard: GA 505 by Gypsum Association.

D. Single-Source Responsibility: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product specifications and installation instructions for each gypsum drywall component, including other data as may be required to show compliance with these specifications.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.

C. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal corner beads and trim from being bent or damaged.

D. Steel framing and related accessories shall be stored and handled in accordance with A.I.S.I.'s "Code of Standard Practice."

1.6 PROJECT CONDITIONS

A. Environmental Requirements, General: Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer, for environmental conditions before, during and after application of gypsum board.

B. Cold Weather Protection: When ambient outdoor temperatures are below 55 deg F (13 deg C) maintain continuous, uniform, comfortable building working temperatures of not less than 55 deg F (13 deg C) for a minimum period of 48 hours prior to, during and following application of gypsum board and joint treatment materials or bonding adhesives.

C. Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Metal Support Materials:

a. Dietrich Metal Framing

b. Clark Western Building Systems

2. Direct Suspension Systems:

a. Chicago Metallic Corp.

b. Donn Corporation.

c. National Rolling Mills Co.

d. United States Gypsum Co.

3. Gypsum Board and Related Products:

a. American Gypsum Co.

b. Flintkote Products,

c. Genstar Building Materials Co.

d. Georgia Pacific Corp.

e. Gold Bond Building Products Div.,

f. National Gypsum Co.

g. United States Gypsum Co.

2.2 CEILING SUPPORT SYSTEMS AND MATERIALS

A. General: Size ceiling support components to comply with ASTM C 754 unless indicated otherwise.

B. Hanger Wire: ASTM A 641, soft, Class 1 galvanized.

C. Hanger Anchorage Devices: Screws, clips, bolts, cast in place concrete inserts or other devices applicable to the indicated method of structural Anchorage for ceiling hangers and whose suitability for use intended has been proven through standard construction practices or by certified test data. Size devices for 3x calculated load supported except size direct pull out concrete inserts for 5x calculated loads.

D. Furring Members: ASTM C 645; 0.0179" min. thickness of base metal, hat shaped.

E. Direct Suspension Systems: Manufacturer's standard zinc coated or painted steel system of main tees with 1 1/2" flange, double web design, cross tees with double web design and 1 1/2" flange, and accessories and wall tees designed for concealed support of gypsum drywall ceilings of type equal to "Donn Drywall Suspension System" with maximum deflection of 1/360 of span.

2.3 WALL/PARTITION SUPPORT MATERIALS

A. Studs: Meeting requirements of ASTM C645; C-channel, roll-formed from hot-dipped galvanized steel; complying with ASTM A1003 and ASTM A653 G40 or equivalent corrosion resistant coating. (A40 Galvannealed products are unacceptable per ASTM C 645). 20 ga. thickness of base metal unless otherwise indicated. Each door and window frame jamb reinforced with two 20 ga. studs.

B. Subject to compliance with requirements, provide Dietrich UltraSTEEL™ Framing [20 gauge-equivalent]. UltraSTEEL ® Fire rated partitions to be installed in accordance with UL V450 or UL V438 or UL U419.

C. Depth of Section: 3 5/8", except as otherwise indicated.

D. Runners: Match studs; type recommended by stud manufacturer for floor and ceiling support of studs and for vertical abutment of drywall work at other work.

E. Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:

1. Subject to compliance with requirements, provide one of the following:

2. Dietrich Metal Framing: [Heavy Duty Studs - HDS] and [Header Bracket - HDSC]

3. Brady Innovations ProX Header®

F. Channel Bridging and Bracing: U-Channel Assembly; Base metal thickness of .0538 inch (1.37mm) and minimum ½ inch (12.7mm) wide flanges.

1. Subject to compliance with requirements, provide one of the following:

2. Dietrich Metal Framing: Spazzer® 9200 Bridging and Bracing Bar

3. U-Channel Assembly: [3/4 inches] [1-1/2 inches] [2 inches]

4. Dietrich Metal Framing; EasyClip™ U-Series™ Clip Angle or equivalent.

G. Resilient Channel: ½ inch [12.7mm] deep, steel sheet members designed to reduce sound transmission, galvanized G40.

1. Subject to compliance with requirements, provide Dietrich Metal Framing Resilient Channel [RCSD] [RCUR].

H. Flat Strap and Backing Plate: Sheet for blocking and bracing in length and width indicated:

1. Subject to compliance with requirements, provide Dietrich Metal Framing: Danback™ Fire Treated Wood Backing Plate [D16F] [D24F]

2. Galvanized Sheet Steel.

I. Furring Members: ASTM C 645; 0.0179" min. thickness of base metal, hat shaped.

J. Z-Furring Members: Manufacturer's standard screw type galvanized steel, zee shaped furring members; ASTM A 653, G60, 0.0179" min. thickness of base metal; of depth indicated; designed for mechanical attachment of insulation boards or blankets to monolithic concrete and masonry walls.

K. Fasteners for Furring Members: Type and size recommended by furring manufacturer for the substrate and application indicated.

2.4 GYPSUM BOARD

A. Gypsum Wallboard: ASTM C 1396, of types, edge configuration and thickness indicated below in maximum lengths available to minimize end to end butt joints.

1. Type: Type X throughout unless otherwise noted.

2. Edges: Tapered and featured (rounded or beveled) for prefilling.

3. Thickness: 5/8", unless otherwise indicated.

B. Water-Resistant: ASTM C 1396, with tapered edges and of type and thickness indicated below in maximum lengths available to minimize end to end butt joints.

1. Type: Type X throughout unless otherwise noted.

2. Thickness: 5/8", unless otherwise indicated.

2.5 TRIM ACCESSORIES

A. General: Provide manufacturer's standard trim accessories of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for nailing or stapling, and beaded for concealment of flanges in joint compound. Provide corner beads, L type edge trim beads, U type edge trim beads, special L kerf type edge trim beads, and one piece control joint beads.

2.6 JOINT TREATMENT MATERIALS

A. General: ASTM C 475; type recommended by the manufacturer for the application indicated, except as otherwise indicated.

1. Include mold and locations in general where gypsum board abuts dissimilar materials.

B. Joint Tape: Paper reinforcing tape.

C. Joint Compound: Ready mixed vinyl type for interior use.

1. Grade: Two separate grades; one specifically for bedding tapes and filling depressions and one for topping and sanding.

D. Water-Resistant Joint Compound: Special water resistant type for treatment of joints, fastener heads and cut edges of water resistant backing board.

1. Product: Subject to compliance with requirements, provide Sheetrock Brand W/R Compound; United States Gypsum Co.

2.7 MISCELLANEOUS MATERIALS

A. General: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board.

B. Laminating Adhesive: Special adhesive or joint compound specifically recommended for laminating gypsum boards.

C. Gypsum Board Screws: Comply with ASTM C 646.

D. Gypsum Board Nails: Comply with ASTM C 514.

E. Sound Attenuation Blankets: FS HH I 251, Type I; semi rigid mineral fiber blanket without membrane, Class 25 flame spread, and thicknesses as indicated.

2.8 FIRE RATED PARTITION IDENTIFICATION

A. 7 inch by 3 ¾ inch sign, with the appropriate wording in white letters on red background; permanent adhesive back for mounting.

1. *__Hour Fire Barrier Protect All Openings

2. *__Hour Smoke Barrier Protect All Openings

3. *__Hour Fire and Smoke Barrier Protect All Openings

4. *Plans indicate type of wall and hour rating.

B. Acceptable manufacturers and product:

1. Metro Reprographics, Inc.

2. Comparable signage by other services.

3. Paint stenciled 2 inch high lettering may be provided in lieu of adhesive applied sign. Use orange fluorescent spray type paint.

PART 3 – EXECUTION

3.1 PREPARATION FOR METAL SUPPORT SYSTEMS

A. Ceiling Anchorages: Coordinate work with structural ceiling work to ensure that inserts and other structural Anchorage provisions have been installed to receive ceiling hangers.

B. Furnish concrete inserts, steel deck hanger clips and similar devices to other trades for installation well in advance of time needed for coordination with other work.

3.2 INSTALLATION OF METAL SUPPORT SYSTEMS

A. Metal Support Installation Standard: Comply with ASTM C 754. Ultra Steel Fire Rated Partitions to be installed in accordance with UL V450 or UL V438 or UL U419.

B. Do not bridge building expansion joints with support system, frame both sides of joints with furring and other support as indicated.

3.3 CEILING SUPPORT SUSPENSION SYSTEMS

A. Secure hangers to structural support by connecting directly to structure where possible, otherwise connect to inserts, clips or other Anchorage devices or fasteners as indicated.

B. Space main tees 4'0" o.c. and space hangers 4'0" o.c. along runners, except as otherwise shown.

C. Level main runners to a tolerance of 1/4" in 12'0", measured both lengthwise on each runner and transversely between parallel runners.

D. Clip cross tees to main tees and to other supports as required.

E. Install auxiliary framing at termination of drywall work, and at openings for light fixtures and similar work as required for support of both the drywall construction and other work indicated for support thereon.

3.4 WALL/PARTITION SUPPORT SYSTEMS

A. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar work to comply with details indicated or if not otherwise indicated, to comply with applicable published recommendations of gypsum board manufacturer, or if not available, of "Gypsum Construction Handbook" published by United States Gypsum Co.

B. Install runner tracks at floors, ceiling and structural walls and columns where gypsum drywall stud system abuts other work, except as otherwise indicated. Space fasteners at 24" o.c., and 2" from each end.

C. Extend partition stud system through ceilings and elsewhere as indicated on drawings.

D. Space studs 16" o.c., unless otherwise indicated, and attach with screws to runner tracks.

E. Frame door openings to comply with details indicated or if not otherwise indicated, to comply with applicable published recommendations of gypsum board manufacturer, or if not available, of "Gypsum Construction Handbook" published by United States Gypsum Co. Attach vertical studs at jambs with screws either directly to frames or to jambs anchor clips on door frames; install runner track section at head and secure to jamb studs.

F. Extend vertical jamb studs through ceilings and attach to underside of floor or roof structure above, unless otherwise indicated.

G. Frame openings other than door openings in same manner as required for door openings except only one 20 ga. stud required and install framing below sills of openings to match framing required above door heads.

H. Space wall furring members 16" o.c., unless otherwise indicated.

I. Erect sound attenuation blanket vertically between studs and hold in place until gypsum board is installed.

3.5 GENERAL GYPSUM BOARD INSTALLATION REQUIREMENTS

A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA 216.

B. Walls

1. Locate exposed end butt joints as far from center of walls as possible, and stagger not less than 1'0" in alternate courses of board.

2. Install wall/partition boards vertically to avoid end butt joints wherever possible.

3. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16" open space between boards. Do not force into place.

4. Locate edge joints over supports or where intermediate supports or gypsum board back blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill cut or field cut ends against mill cut or field cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

5. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

6. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.

7. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceiling, etc.), where partitions are to extend to deck above.

8. Space fasteners in gypsum boards in accordance with referenced standards and manufacturer's recommendations, except as otherwise indicated.

C. Ceilings

1. Locate exposed end butt joints as far from center of walls and ceilings as possible, and stagger not less than 1'0" in alternate courses of board.

2. Install ceiling boards in the direction and manner which will minimize the number of end butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 1'0", screws at 12" o.c.

3. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16" open space between boards. Do not force into place.

4. Locate edge joints over supports or where intermediate supports or gypsum board back blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill cut or field cut ends against mill cut or field cut ends. Do not place tapered edges against cut edges or ends.

5. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

6. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.

7. Space fasteners in gypsum boards in accordance with referenced standards and manufacturer's recommendations, except as otherwise indicated.

3.6 METHODS OF GYPSUM DRYWALL APPLICATION

A. On partitions/walls apply gypsum board vertically (parallel), unless otherwise indicated, and provide sheet lengths which will minimize end joints.

B. Single-Layer Application: Install gypsum wallboard.

1. On ceiling apply gypsum board prior to wall/partition board application to the greatest extent possible.

2. On partitions/walls apply gypsum board vertically (parallel), unless otherwise indicated, and provide sheet lengths which will minimize end joints.

C. Double-Layer Application: Install gypsum wallboard for base layer and exposed gypsum board for face layer.

1. On partitions/walls apply base layer and face layers vertically (parallel) with joints of base layer over supports and face layer joints offset at least 10" with base layer joints.

D. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:

1. Fasten with screws at 16" o.c., in field and 16" o.c. on edges.

E. Double-Layer Fastening Methods: Apply base layer of gypsum board and face layer to base layer as follows:

1. Fasten both base layers and face layers separately to supports with screws as follows:

2. Base layer at 16" o.c. in field and on edges.

F. Direct-Bonding to Substrate: Where gypsum board is indicated to be directly adhered to a substrate (other than studs, joists, furring members or base layer of gypsum board), comply with gypsum board manufacturer's recommendations and temporarily brace or fasten gypsum board until fastening adhesive has set.

3.7 INSTALLATION OF DRYWALL TRIM ACCESSORIES

A. General: Use screws to anchor trim accessory flanges trim to the studs.

B. Install metal corner beads at external corners of drywall work.

C. Attach corner beads at 16" o.c. with screws on both legs.

D. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi exposed. Provide type with face flange to receive joint compound. Install L type trim where work is tightly abutted to other work. Install U type trim where edge is exposed, revealed, gasketed, or sealant filled (including expansion joints).

3.8 FINISHING OF DRYWALL

A. General: Apply treatment at all gypsum board joints (both directions), flanges of trim accessories, penetrations, fasteners heads, surface defects and elsewhere as required to prepare work for decoration whether decoration is specified or not. Prefill open joints and rounded or beveled edges, if any, using type of compound recommended by manufacturer.

1. Apply joint tape at joints between gypsum boards, except where a trim accessories are indicated.

2. Apply joint compound in three coats (not including prefill of openings in base) and sand between last two coats and after last coat.

B. Water-Resistant Gypsum Board Base: Treat joints and fasteners to comply with directions of water resistant joint compound manufacturer.

1. In areas to be tiled, treat fastener heads with water resistant joint compound. Fill tapered edges in gypsum panels with water resistant joint compound, embed joint tape firmly and wipe off excess compound; follow immediately with a second coat of water resistant joint compound over taping coat, being careful not to crown the joint. Fold and embed tape in all interior angles to form true angles.

2. In areas not to be tiled, treat fastener heads and embed tape as indicated above using water resistant joint compound but finish with two coats of joint compound used for regular gypsum board work.

C. Partial Finishing: Omit third coat (if specified) and sanding on concealed drywall work which is indicated for drywall finishing or which requires finishing to achieve fire resistance rating, sound rating or to act as smoke barrier.

D. Refer to sections on painting, coatings and wall coverings in Division 9 for decorative finishes to be applied to drywall work.

3.9 FIRE RATED IDENTIFICATION

A. Install on both sides of partitions above suspended ceiling and in concealed spaces. Place one on each 10 linear feet of wall or partition, but not less than 2 in each concealed space. Install additional identification labels as directed by authorities having jurisdiction.

3.10 PROTECTION OF WORK

A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall work being without damage or deterioration at time of substantial completion.

END OF SECTION 099250

SECTION 099312 - PORCELAIN & CERAMIC TILE

PART 1 - GENERAL

1.1 GENERAL

A. Furnish all labor, materials, tools, equipment and services necessary for and reasonably incidental to complete the tile work as shown on the drawings or specified.

B. Related documents, drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Tile includes ceramic surfacing units made from clay or other ceramic materials.

B. Extent of tile work is indicated on drawings and schedules.

C. Types of tile work in this section include the following:
1. Unglazed ceramic mosaic tile.
2. Glazed wall tile.
3. Marble Thresholds.

1.3 REFERENCE STANDARDS

A. Comply with current editions and applicable Specifications of the following:
1. American Society for Testing and Materials (ASTM).
2. American National Standards Institute (ANSI).
3. Tile Council of North America (TCNA) Handbook for Ceramic Tile Installation.

1.4 QUALITY ASSURANCE

A. Provide tile materials of each type, color and finish from Crossville Porcelain Stone / USA, Crossville, Tennessee. Provide setting, grouting and related materials of each type, color and finish obtained from one source.

B. Deliver, store and handle materials in accordance with manufacturer's instructions.

C. Tile contractor, by commencing the work of this section, assumes overall responsibility to assure that all assemblies, components and parts shown or required within the work of this section comply with contract documents and are compatible with each other and with the conditions and expected use.

D. Qualified Labor (Because tile is a permanent finish, the lowest bid should not be the deciding factor but rather, but who is the most qualified to perform the scope of the work being specified. See TCNA Handbook for a list of recognized programs). Engage an installer with a minimum of five (5) commercial tile installations similar in material, design and scope to that indicated.

E. Pre-Installation Meeting: Prior to tile installation, conduct a pre-installation project meeting. Contractor, Subcontractor, Material Suppliers, Architect and Owner representative shall be notified of the meeting.

F. Field Mock-Up: Recommended scaled to appropriate size of the scope of the work will be reviewed for joint quality, color range, pattern and workmanship.

G. Extra Stock: Furnish extra stock of quantity equal to 5% of amount installed, in full-size units, for each type, color, size and finish of tile.

1.5 SUBMITTALS

A. Verification Samples: Submit the following for each type, color, size, and finish included in the work.
1. Full size tile and trim shapes, (indicate number of pieces required).
2. Grout color samples.
3. Sealant color samples or Prefabricated Joint/Transition Strip Samples

B. Product and Installation Data:
1. Porcelain tile manufacturer's product and technical data indicating compliance with applicable standards.
2. Master Grade Certificates for each type of tile issued by tile manufacturer and signed by the installer, only available after the material has shipped from the manufacturer.
3. Mortar and grout manufacturer's technical data sheets indicating suitability for the installation specified and compliance with applicable standards.
4. Sealant or prefabricated joint manufacturer's product and technical data.

1.6 SUSTAINABLE DESIGN SUBMITTALS

A. Recycled Content: Provide product data indicating percentage of postconsumer and preconsumer recycled content and cost.

B. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to project, means of transportation, and cost for each indigenous material.

C. Lab Test Reports: For liquid treatments, curing, and sealing compounds provide data indicating compliance with low-emitting materials.

D. Environmental Product Declarations (EPDs): Provide third-party verified Type III EPDs in accordance with ISO 14025 and ISO 21930 for products specified in this Section. EPDs shall be product-specific and relevant to the installed product.

E. Life Cycle Assessment (LCA) Data: Where available, provide LCA reports or equivalent documentation demonstrating environmental impacts across the product life cycle, consistent with EN 15804 or ISO 21930.

F. Health Product Declaration (HPD): Where available, provide completed in accordance with the HPD Open Standard, version 2.2 or later. Declare all ingredients to 100 ppm threshold. Documentation shall be third-party verified if available.

1.7 ENVIRONMENTAL

A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during and after installation.

B. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

C. Maintain minimum and maximum temperature limits as recommended by manufacturers.

D. Protect adjacent surfaces during progress of the work in this section.

E. Illuminate the work area during installation providing the same level and angle of illumination as will be available for final inspection. The use grazing or cove type lighting where lights are located either at the wall/ceiling interface, or mounted directly to the wall prompts the light to strike the tile finish at a straight down angle, creating unwanted shadows from grout lines giving the tile layout an un-flat irregular appearance. Installing overhead lighting at a wide downward angle 18”-24” away from the tiled wall will provide a flatter more uniform appearance to the tiled surface.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Furnish tile complying with "Standard/First Grade" requirements per ANSI A137.1 - 2021, for types of tile indicated.

B. Comply with ANSI Standard for Tile Installation Material and current Tile Council of North America (TCNA) Handbook for products and materials indicated for setting and grouting.

2.2 TILE

A. Basis of Design: Unglazed and glazed porcelain tile shall be standard quality as manufactured by Atlas Concorde USA, and shall conform to the requirements of ANSI A137.1 - 2022.
   1. Type: Porcelain tile shall be Cove Terra

B. Size: Porcelain and ceramic tile shall be manufactured to specific size after firing and shall be available in the following sizes; All measurements are in nominal inches unless otherwise specified.
   1. Tiles shall be available in 12x24, 24x48, 3x12, 2x2 mosaic
   2. Trims shall be available in 3x24 bullnose, 6x12 cove base.

C. Thickness: Porcelain tile shall be manufactured to specific thickness after firing and shall be nominal 9.0 mm or greater for large unit tile or 6.0mm or greater for Mosaics.

D. Color: Architect shall select from manufacturer's standard library.
   1. Floor – Black, 12x24
   2. Shower Floors - 2x2 mosaics – Black
   3. Walls – Gray, 12x24

E. Product Test Data:
   a. Water Absorption (ASTM C373): ≤ 0.5%%.
   b. Breaking Strength (ASTM C648): ≥ 350 lbf. avg.
   c. Bond Strength (ASTM C482): ≥ 100 psi.
   d. DCOF Dynamic Coefficient of Friction (ANSI A326.3-2022) > 0.42 Wet.

F. According to availability, provide matching trim shapes such as bullnose, corners, borders and cove base when specified.

2.3 THRESHOLDS

A. Provide marble thresholds at all doors and opening transitions where tile floor finishes are not continuous in size, style, color, or finish AND at all transitions between tile floor and other floor finish materials.

B. Provide marble material as follows: Black
   1. Thinset: 2" X 1/2" Double Bevel.
   2. Mortar Bed: 2" X ½" Single Bevel.

2.4 PERFORMANCE REQUIREMENTS

A. Materials Transparency – Material Ingredients. Provide copies of at least one current product disclosure:
   1. Declare Label: Third-party verified, red list free.
   2. Health Product Declaration (HPD):

B. HPD requirements (must meet all of the following criteria): 100 ppm, Third-party verified, ≥ 75% of ingredients GreenScreen assessed

C. Materials Transparency – Environmental Product Declarations. Provide copy of current product disclosure:
   1. Product-specific EPD: Third-party verified, cradle-to-grave scope, current, and specific to the product.

D. Multi-Attribute Sustainable Product Certifications. Provide at least one of the following:

1. ANSI 138.1 Green Squared Certification.
2. Living Product Challenge (LPC) Certification.

E. Embodied Carbon: Provide the following:
1. Product-specific Environmental Product Declaration (EPD) documents Global Warming Potential (GWP) (A1-A3) for 1 m2 declared unit: 23.9 kg CO2-eq.

F. Low-Emitting Materials: Product is considered an inherently non-emitting source of VOCs resulting from its ceramic composition and lack of integral organic-based coatings.

G. Chemicals of Concern: Product does not contain any chemical ingredients from the following chemicals of concern lists:
1. Living Building Challenge (LBC) Red List.

2.5 SETTING AND GROUTING MATERIALS:

A. Use appropriate installation mortars according to ANSI A118-2021.

B. Grouting Materials: Select grouting materials according to the following types: Tile setting and grouting epoxy: A118.6 Standard Cement Grout, A118.7, High Performance Cement Grout or A118.8, Modified Epoxy Emulsion Grout. Provide grout in colors selected by the Architect from standard colors available from the approved manufacturers.

C. Use waterproofing/Anti Fracture Membrane as required according to ANSI A118.12.

2.6 EXPANSION JOINTS, CONTROL, CONTRACTION, AND ISOLATION JOINTS:

A. Refer to most current TCNA Handbook, Method EJ171 for recommendations on locating, treating and detailing various types of construction joints. NOTE: Architect must specify type of expansion joints and show location and details on drawings.

B. Use sealant complying with ASTM C920 according to Type, Grade, Class and Uses required.

C. Prefabricated expansion joints can also be used when suitable for installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates where tile will be installed for compliance with requirements for installation tolerances and other conditions effecting performance of installed tile. Before tiling concrete surfaces saturated dry (SSD), free of standing water verify that substrates for setting tile are well cured, structurally sound dry, clean, and free from oil or waxy films, curing compounds or other coatings and surface treatments. Nonstructural shrinkage cracks should be pretreated with a crack suppression membrane (to prevent telegraphing of cracks through the finished tile installation) ANSI A118.12.

B. Do not proceed with installation until unsatisfactory conditions have been corrected. Commencement of work signifies acceptance of substrate and installation conditions.

3.2 PREPARATION

A. Substrate Preparation: Prepare and clean substrate in accordance with installation standards and manufacturer's instructions, and as follows:
   1. Remove protrusions, bumps and ridges by grinding or chipping.
   2. Repair, fill, and level cracks, holes, depressions and rough or chipped areas in substrate using patching material recommended by setting materials manufacturer.
   3. Slab to have light broom finish when tile is installed by thin-set method.
   4. Before tiling, verify that all surfaces to be tiled are structurally sound true to plane, and fall within maximum variations shown below: Ensure that the substrate is within the following tolerances:
      a. Horizontal surfaces (floors) - Maximum variation in substrate shall not exceed 1/4 " in ten feet* from required plane, depending on substrate.
      b. Vertical surfaces (walls) - Maximum variation in substrate shall not exceed 1/4 " in ten feet* from the required plane, depending on substrate.

B. Report all unacceptable surfaces to the architect in writing, and do not tile such surfaces until they are leveled enough to meet above requirements.

C. Jobsite Blending: Blend tiles before installing in accordance with reference standards to produce an even range and distribution of color and finish.

3.3 INSTALLATION

A. Manufacturers' Instructions: Perform work in compliance with standard accepted installation guidelines, Atlas Concorde instructions and setting materials manufacturers' instructions.

B. Comply with appropriate ANSI A108-2021 specification and current Tile Council of North America Handbook (TCNA) for appropriate method of installation for each specification. For thin set adhesive mortar application use following technique:
   1. With the flat side of trowel, key mortar into substrate.
   2. Using the appropriate size trowel, comb mortar in one direction with notched side of the trowel.
   3. Set tile with a sliding motion, perpendicular to the mortar ridges.
   4. Obtain as near 100% coverage as possible of mortar to tile.
   5. Mortar coverage shall be no less than 85% and shall be sufficiently distributed to give full support under all corners and edges of the tile.
   6. Note: 95-100% coverage is mandatory for wet and exterior areas. Periodically, remove sheets or individual tiles to assure proper bond coverage consistent with industry specifications.

C. Installing Tile:
   1. Install tile in pattern indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Adjust to minimize tile cutting and to avoid tile less than half size.

2. When possible, smooth cut edges of tile and/or use appropriate cutter or wet saw to produce smooth cuts. Provide straight cuts which align with adjacent materials.
3. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruption.
4. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment.
5. Provide tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints smooth and even, without voids, cracks, or excess mortar or grout.
6. Mix mortar in strict accordance with manufacturer's recommendations.
7. Apply setting material in accordance with manufacturer's directions and install tile before mortar has started initial cure. For thin set mortar application, use a notch trowel that will achieve the recommended coverage of mortar after tiles have been installed. Reference standard coverage information and follow manufacturer's recommendations for trowel size when using mortar.
8. Do not spread more material than can be covered within 10 to 15 minutes. If "skinning" occurs, remove mortar and spread fresh material. Spread mortar with notches running in one direction that shall be perpendicular to the pressing, pushing and pulling of tile during placement.
9. Place tile in fresh mortar, press, push and pull the tile slightly to achieve as near 100% coverage and contact of tile with setting material and substrate as possible. The coverage shall be no less than 85% and be sufficiently distributed to give full support of the tile. Make sure that all corners and edges are well supported with mortar. Leave no hollow corners or edges. NOTE: 95-100% coverage is mandatory for wet or exterior areas. A skim coat (“back-butter”) of mortar can be placed onto the entire back of the tile using a trowel in order to assist in optimum adhesion and coverage of the mortar being used.
10. Ensure there is a minimum 1/8" of mortar between tile and substrate after proper bedding. Installer must periodically remove sheets or individual tiles to assure proper bond coverage consistent with industry specifications. If coverage is found to be insufficient, use a larger size notch trowel.
11. Use a beating block and hammer or rubber mallet so that faces and edges of individual tiles are flush and level with faces and edges of adjacent tiles, and to reduce lippage.
12. For running bond/brick joint patterns utilizing tiles (square or rectangular) where the side being offset is greater than 18” (nominal dimension), the running bond offset will be a maximum of 33% unless otherwise specified by the tile manufacturer. If an offset greater than 33% is specified, specifier and owner must approve mock-up and lippage.

D. Grouting:
1. Install grout in accordance with ANSI A108.10, A108.6, A108.8, A108.9 correlating to grout type chosen and manufacturer’s recommendations.
2. Mix grout material in strict accordance with manufacturer's directions.
3. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps.
4. Before grouting entire area do a test area to assure there will be no permanent staining or discoloration of the tile and to verify that the grout is easily removed from the surface. If necessary, pre-coat exposed surfaces of tile with a grout release as recommended by the manufacturer, as this will facilitate removal of the grout.
5. Cure all setting and grouting materials in accordance with manufacturer's recommendations.

E. Cleaning and Protection:
   1. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter, in accordance with manufacturer's instructions. If a grout haze or residue remains, use a suitable grout haze remover or cleaner and contact grout manufacturer for recommendations. Flush surface with clean water before and after cleaning. Do not use harsh hydrochloric, muriatic or sulfuric acid or acid-based cleaners to clean glazed tiles or tiles grouted with latex modified grout.
   2. When a heavy residue of Portland cement grout is present, acceptable tile cleaning acids may be used. However, the grout should be allowed to cure a minimum of 10 days before this aggressive cleaning method is employed. Tile and grout shall be soaked with water before cleaning. In the absence of a recommendation from the grout manufacturer, acid cleaning may be done with a saturated solution of phosphoric or sulfamic acid, mixed in accordance with manufacturer's recommendations.
   3. Protect all floor tile installations with clean construction paper or other heavy covering during construction period to prevent staining or damage. After cleaning, provide protective covering and maintain conditions to protect tile work from damage or deterioration. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, and during move-in of furniture and equipment, cover protective covering with 1/4" hardboard, plywood or similar material. No foot or wheel traffic permitted on floor for at least 3 days after grouting. Owner/specifier is responsible for protecting tile from damage including allowing sufficient time for installed materials to cure properly typically 30-45 days is required for full cure of thin set bonding mortars.
   4. Leave finished installation clean and free of cracked, chipped, broken, un-bonded, and otherwise defective tile work.
   5. Consult most current Crossville Brochure "Care & Maintenance" for information on post installation cleanup and routine maintenance

END OF SECTION 099311

SECTION 099325 – SOLID SURFACE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. The extent of cultured marble is indicated on drawings and in schedules.

1. Aprons.

2. Countertops without bowl.

B. Joint sealers are specified in Division 7.

1.3 QUALITY ASSURANCE

A. Fabricator of solid surface is to be a firm which has successfully fabricated solid surface similar to quality specified for a period of not less than five years and is equipped to provide quantity required.

1.4 ALLOWABLE INSTALLED TOLERANCES

A. Variation from plumb: For surfaces and walls as well as for arises, external corners, joints and other conspicuous lines do not exceed 1/8" in 10".

B. Variation in level: Horizontal joints and other conspicuous lines, do not exceed 1/8" in ten feet maximum.

C. Variation in cross-section dimensions: Do not exceed minus 1/16", nor plus 1/16" from dimensions shown.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Products offered by manufacturers to comply with requirements include but are not limited to the following:
1. E. I. du Pont de Nemours & Co. Inc. Corian
2. Livingstone

2.2 SUBMITTALS

A. Shop Drawings: Submit setting drawings showing sizes, dimensions, sections and profiles of marble units, arrangement and provisions for jointing, anchoring and fastening, and other necessary details for reception of other work. Indicate location of each on setting drawings with number designation corresponding to number marked on each unit.

B. Samples: Submit one set of samples, not less than 6" x 6" of each different color, grade and finish of Corian required.

2.3 PRODUCT HANDLING, STORAGE AND DELIVERY

A. Protect Corian materials during storage and construction against soiling, staining and physical damage.

B. Handle Corian to prevent chipping, breakage, soiling or other damage.

C. Store Corian on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stock skids and Corian to distribute weight evenly and to prevent breakage or cracking. Protect stored Corian from weather with waterproof, non-staining covers or enclosures, but allow air to circulate.

2.4 MATERIALS

A. Color: Living Stone – Milky Way

B. Panel Adhesive: Manufacturers Standard.

2.5 FABRICATION

A. General: Fabricate Corian as shown and as detailed on final shop drawings.

B. Fabricate Units: Accurate to shape and dimensions shown on final shop drawings, maintaining fabrication tolerances listed.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Do not use units with chips, cracks, voids, stains, or other defects which might be visible in finished work, unless otherwise acceptable to Architect.

B. Execute work by skilled mechanics who are experienced in setting of interior stone of the type indicated and can perform necessary field cutting as stone is set.

C. Set units with joints uniform and accurately aligned in solid backing with adhesive specified.

3.2 ADJUSTMENTS, CLEANING AND PROTECTION

A. Remove and replace units which are broken, chipped, stained or otherwise damaged, and, where directed, which do not match adjoining units. Provide new matching units, install as specified and in manner to eliminate evidence of replacement. Recaulk defective and unsatisfactory joints as required to provide a neat uniform appearance.

B. Clean Corian after setting, caulking, curing is complete; use procedures recommended by manufacturer.

END OF SECTION 099325

SECTION 10 21 13 – TOILET PARTITIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Solid plastic toilet compartments including the following: (Hiny Hiders)
   1. Floor mounted overhead-braced toilet compartments.
   2. Privacy screens.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

1.3 REFERENCES

A. ASTM A666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.

D. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.

E. Sustainable Design Submittals:
   1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
   2. Regional Materials: Certify distance between manufacturer and Project.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.

B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.

C. Materials: Doors, panels and pilasters, constructed from high density polyethylene (HDPE) resins. Partitions to be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. Cover all plastic components with a protective plastic masking.

D. Performance Requirements:
1. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E 84, Class B:
a. Tested to Meet ASTM E84, Class B flame spread/smoke developed rating.
2. Material Fire Ratings:
a. National Fire Protection Association (NFPA) 286: Pass.
b. International Code Council (ICC): Class B.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. Labor not included in warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: All references to Scranton Products, which is located at: 801 E. Corey St.; Scranton, PA 18505; Toll Free Tel: 800-445-5148; Fax: 855-376-6161; Email:request info (info@scrantonproducts.com); Web:http://www.scrantonproducts.com
1. Or approved Equal.

2.2 MATERIAL

A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface.

B. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.

C. Stainless Steel Castings: ASTM A167, Type 304.

D. Aluminum: ASTM 6463-T5 alloy.

2.3 SOLID PLASTIC TOILET COMPARTMENTS

A. Basis of Design: Hiny Hiders Toilet Partitions as manufactured by and supplied by Scranton Products.
1. Style: Floor mounted overhead-braced toilet compartments.

B. Doors, Panels, and Pilasters: 1 inch (25 mm) thick with all edges rounded to a radius. Mount

doors and dividing panels based on height of specified system.
1. Door and Panel Height: 55 inches (1397 mm).
2. Aluminum heat sink fastened to bottom edges.
3. Panel Edge: Shiplap.
4. Pilasters: 82 inches (2083 mm) high and fastened to floor.

C. Panel Color:
1. Color to be Black Orange Peel.

D. Pilaster Shoes: 3 inches (76 mm) high one-piece molded HDPE. Secured to pilasters with a stainless steel tamper resistant Torx head sex bolt.
1. Pilaster Plastic Shoe Color: Silver (Matches Stainless/Aluminum Hardware).

E. Headrail: Heavy-duty extruded 6463-T5 alloy aluminum with anti-grip design. Finish to be clear anodized. Fastened to headrail brackets with stainless steel tamper resistant Torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant Torx head screws.
1. Headrail Brackets: 20 gauge stainless steel with satin finish. Secured to the wall with stainless steel tamper resistant Torx head screws.

F. Wall Brackets:
1. Aluminum Brackets: Heavy-duty aluminum 6463-T5 alloy.
2. Brackets are fastened to pilasters with stainless steel tamper resistant Torx head screws and fastened to the panels with stainless steel tamper resistant Torx head sex bolts.
3. Bracket Type: Continuous 54 inches (1372 mm) aluminum.

G. Door Hardware:
1. Continuous Aluminum Hinge:
a. Length: 54 inches (1372 mm).
2. Door Strike/Keeper: Heavy-duty extruded aluminum 6436-T5 alloy with a clear anodized finish. Secured to pilasters with stainless steel tamper resistant Torx head sex bolts. Bumper shall be made of extruded black vinyl.
a. Style: 3 inches (76 mm) stainless steel emergency access.
3. Latch Mechanism: Aluminum Slide Bolt Latch and Housing: Heavy-duty extruded 6463-T5 alloy aluminum. Latch and housing to have a clear anodized finish. Slide bolt and button to have a black anodized finish.
4. Doors supplied with one coat hook/bumper and door pull, clear anodized aluminum **
5. Equip outswing handicapped doors with second door pull and door stop.

2.4 SOLID PLASTIC PRIVACY SCREENS

A. Provide plastic privacy screens in urinal and entry toilet room applications as indicated or scheduled.

B. Panels, and pilasters, if required, 1 inch (25 mm) thick with edges rounded to a radius. Screens to be mounted at 14 inches (356 mm) above the finished floor. Color as selected by Architect from manufacturer's full line of current colors.
1. Aluminum heat sink fastened to bottom edges.
2. Recycled Content: Minimum 25 percent.

C. Screen Type: Pilaster supported.
1. Configuration: Floor pilaster supported screen.
2. Urinal Screens: 24 inches (610 mm) wide by 55 inches (1397 mm) high.
3. Pilaster: Pilaster screens shall be 56 inches (1422 mm) high.
4. Pilaster Shoes: One-piece molded HDPE secured to the pilaster with a stainless steel tamper resistant Torx head sex bolt.

a. Pilaster Shoes Color: Silver; matches clear anodized hardware.

D. Wall Brackets: Extruded PVC plastic. Fastened to the panel/pilaster with stainless steel tamper resistant torx head screws and fastened to wall with stainless steel tamper resistant torx head sex bolts.
1. Length of Wall Brackets: 54 inches (1327 mm).
2. Bracket Color: Black.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Examine areas to receive toilet partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

D. Verify heat sinks are properly factory installed and coordinate installation so that panels are installed with heat sinks located at the base of the panel facing the floor. Panels which are missing heat sinks, or where sinks are not facing the floor upon installation, will be rejected at the Contractor’s expense.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings.

C. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).

D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.

E. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 104415 – FIRE EXTINGUISHER CABINETS AND ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Definition: "Fire extinguishers" in this section refer to units which can be hand carried as opposed to those which are equipped with wheels or to fixed fire extinguishing systems, unless otherwise indicated.

B. Type of products in this section include:

1. Fire extinguishers (furnished by Owner).

2. Fire extinguisher cabinets.

3. Mounting brackets.

1.3 QUALITY ASSURANCE

A. Provide portable fire extinguisher cabinets and accessories by one manufacturer, unless otherwise acceptable to Architect.

B. UL Listed Products: Provide new portable fire extinguishers which are UL listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

C. FM Listed Products: Provide new portable fire extinguishers which are approved by Factory Mutual Research Corporation for type, rating, and classification of extinguisher indicated and carry appropriate FM marking.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required. For fire extinguisher cabinets include roughing in dimensions, and details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, style and materials. Where color selections by Architects required include color charts showing full range of manufacturer's standard colors and designs available.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:

1. J.L. Industries

2. Larsen's Mfg. Co.

3. Muckle Manufacturing, Division of Technico, Inc.

2.2 FIRE EXTINGUISHERS (Furnished by Owner)

A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities.

B. Abbreviations indicated below to identify extinguisher types related to UL classification and rating system, and not necessarily to type and amount of extinguishing material contained in extinguisher.

C. Multi-Purpose Dry Chemical Type: Indicated on plans as FE1 require cabinet as specified herein. FE2 requires bracket, no cabinet.

2.3 MOUNTING BRACKETS

A. Provide manufacturer's standard bracket designed to prevent accidental dislodgment of extinguisher of proper size for type and capacity of extinguisher indicated in manufacturer's standard plated finish.

B. Provide brackets for extinguishers not located in cabinets.

C. Identify bracket mounted extinguishers with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface. Letter size, style and location as selected by Architect.

2.4 FIRE EXTINGUISHER CABINETS

A. General: Provide fire extinguisher cabinets where indicated of suitable size for housing fire extinguishers of types and capacities indicated.

B. Construction: Manufacturer's standard enameled steel box, with trim, frame, door and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.

C. Cabinet Type: Suitable for mounting conditions indicated of the following types:

1. Surface-Mounted: Cabinet box (tub) fully exposed and mounted directly on wall. Indicated on drawings as FE1.

    a. Larsen 2409-SM Architectural Series (Projects 6 ¼") Door Style: Vertical Duo with Vertical Decal "Fire Extinguisher" Full Glass With Larson Lock.

D. Door Hardware: Provide manufacturer's standard continuous hinge door operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

2.5 FACTORY FINISHING OF FIRE EXTINGUISHING CABINETS

A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations except as otherwise indicated. Apply finishes in factory after products are assembled. Protect cabinets with plastic or paper covering, prior to shipment.

B. Baked Enamel Finish: Immediately after cleaning and pretreatment, apply manufacturer's standard baked enamel coating. Provide manufacturer's standard white color.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install items included in this section in locations and at 54" to top of cabinet to comply with applicable regulations of governing authorities.

B. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

C. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

D. Where exact location of surface mounted, bracket mounted fire extinguishers is not indicated, locate as directed by Architect.

END OF SECTION 104415

SECTION 105550 – SPECIALTY SIGNS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of specialty signs is to provide one sign per door on all Latrines.

B. Forms of specialty signs required include the following: Panel signs.

1.3 QUALITY ASSURANCE

A. Uniformity of Manufacturer: For each sign form and graphic image process indicated furnish products of a single manufacturer.

1.4 SUBMITTALS

A. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacture and design of each sign component including graphics.

B. Shop Drawings: Submit shop drawings for fabrication and erection of specialty signs include sign wording and lettering layout.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers of Panel Signs:

1. ASI Sign Systems Inc.

2. Best Manufacturing Co.

3. Mohawk Engraving Co., Inc.

B. Products, Numbers, and Names reference Mohawk Sign Systems, Inc. P. O. Box 966, Schenectady, NY 12301-0966. (518) 370-3433 or FAX (518) 370-3332 or approved equal.

2.2 RESTROOM SIGNS

A. Pictograph

B. The Gender shall be used where indicated and be accompanied with the verbal description placed directly below the symbols.

C. Color: To be selected from manufacturer's standard.

D. Plaque Size: 8" x 8".

E. Symbol Size: 4" gender symbol with 1" Helvetica Medium upper case letters.

F. Designated on plans as:

Mohawk Symbol No.	Copy
MS 3	Men
MS 4	Women

PART 3 – EXECUTION

3.1 MOUNTING

A. Irregular and masonry surfaces: Vinyl tape and Shim plate. 1/8" thick aluminum shim plate under-cut 1" from sign size. Mount shim plate with two oval head screws. Use vinyl adhesive tape to mount sign to shim plate.

B. Smooth Surface: Use vinyl adhesive tape.

C. Exterior Mounting – provide method recommended by manufacturer for installation on substrate.

D. The signs shall be mounted 60" from the floor to the center of the sign on the latch side. The distance between the door frame and the sign should be 2".

3.3 CLEANING AND PROTECTION

A. At completion of installation, clean soiled sign surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by Owner.

END OF SECTION 105550

SECTION 108000 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 QUALITY ASSURANCE:

A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete, built into masonry, or built into stud partitions; coordinate delivery with other work to avoid delay.

B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.

1.3 SUBMITTALS:

A. Product Data: Submit manufacturer's technical data and installation instructions for each toilet accessory.

B. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices in other work.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURES:

A. Manufacturer: Subject to compliance with requirements, provide toilet accessories by one of the following:

1. Bobrick Washroom Equip., Inc.
2. Bradley Corp.
3. A.S.I.

2.2 MATERIALS, GENERAL:

A. Stainless Steel: AISI Type 302/304 with polished No. 4 finish, 22 gage minimum, unless otherwise indicated.

B. Galvanized Steel Mounting Devices: ASTM A 386, hot-dip galvanized after fabrication.

C. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

2.3 FABRICATION:

A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted, except where otherwise indicated; inobtrusive labels on surfaces not exposed to view are acceptable.

B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Provide concealed anchorage wherever possible.

2.4 TOILET ACCESSORIES:

A. Toilet accessories models and numbers listed herein are Bradley unless otherwise noted.

B. Combination Paper Towel Dispenser/Waste Receptacle: Indicated on the drawings as “PTDW”. Provide where indicated on drawings.

1. (S) Surface Mounted 237-11.

C. Toilet Tissue Dispenser: Indicated on the drawings as “TTD”. Provide one at each water closet.

1. Model 5402 Surface

D. Robe Hooks: Indicated on drawings as “RH”.

1. Model 9114

E. Framed Mirrors: Indicated on drawings as "FM". Provide Mirror at each lavatory and as noted or indicated on the drawings.

1. 7805-1836

F. Mop and Broom Holder: Indicated on drawings as “MBH” - (length). Provide one in each Janitor Closet or Utility Sink location.

1. (36”) Model 9954

G. Soap Dispenser: Indicated on the drawings as “SD”. Provide where shown on drawings.

1. (S) Surface Wall Mount 6562

PART 3 - EXECUTION

3.1 GENERAL:

A. Provide framing members at anchor locations of all surface mounted accessory units.

B. Provide framing members (studs) at all sides of rough opening dimension for all recessed accessory units.

3.2 INSTALLATION:

A. Install toilet accessory units in accordance with manufacturer's instructions using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level firmly anchored in locations and at heights indicated.

3.3 ADJUSTING AND CLEANING:

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces after removing labels and protective coatings.

END OF SECTION 108000

SECTION 13 34 19
METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufacturer-engineered, shop-fabricated structural steel building frame.

B. Metal wall and roof panels including soffits.

C. Metal Building Insulation

1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications.

B. Section 07 9005 - Joint Sealers.

C. Section 08 1113 - Hollow Metal Doors and Frames.

D. Section 08 3613 - Sectional Doors.

E. Section 08 5113 - Aluminum Windows.

F. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

A. AISC 360 - Specification for Structural Steel Buildings; American Institute of Steel Construction, Inc.

B. ASTM A 36/ - Standard Specification for Carbon Structural Steel.

C. ASTM A 153/ - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

D. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

E. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

F. ASTM A 490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.

G. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

H. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

I. ASTM A 529 - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.

J. ASTM A 572 - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

K. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

L. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

M. ASTM A 992 - Standard Specification for Structural Steel Shapes.

N. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

O. ASTM C 991 - Standard Specification for Flexible Glass Fiber Insulation for Metal Buildings.

P. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

Q. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

R. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.

S. AWS D1.1 - Structural Welding Code - Steel; American Welding Society.

T. MBMA (LR) - Low Rise Building Systems Manual; Metal Building Manufacturers Association.

U. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings.

V. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 DESIGN REQUIREMENTS

A. Design members to withstand dead load, applicable snow load, and design loads due to pressure and suction of wind calculated in accordance with IBC, 2024 edition.

B. Design members to withstand _22 psf live load, _5 psf nominal ground snow load, 5 psf collateral load, and applicable positive and negative wind loads.

C. Exterior wall and roof system shall withstand imposed loads with maximum allowable deflection of 1/240 of span.

D. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 110 degrees F.

E. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on profiles, component dimensions, fasteners.

C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, framing anchor bolt settings, sizes, and locations from datum, foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature. Shop drawings shall not repeat the grid numbers and letters used on structural drawings unless they are in the same location. Failure to comply will result in rejected shop drawings.

D. Samples: Submit two samples of precoated metal panels for each color selected, 18 x 18 inch in size illustrating color and texture of finish.

E. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement , and other pertinent information as required.

F. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

G. Project Record Documents: Record actual locations of concealed components and utilities.

1.07 QUALITY ASSURANCE

A. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this Work.
   1. Design Engineer Qualifications: Licensed in the State in which the Project is located.
   2. Conform to applicable code for submission of design calculations as required for acquiring permits.
   3. Cooperate with regulatory agency or authority and provide data as requested.

B. Perform work in accordance with AISC 360 - Specification for Structural Steel Buildings.

C. Perform welding in accordance with AWS D1.1.

D. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

E. Erector Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Building Manufacturer shall provide manufacturer's standard material warranty.

C. Manufacturer's Guarantee: Twenty (20) year unlimited guarantee for water tightness covering material and workmanship on entire system.

D. Manufacturer's Guarantee: Twenty (20) year guarantee against blistering, peeling, cracking, shipping or rust through with a maximum fade of 5 NBS and minimum chalk rater of #8.

E. Contractor's Guarantee: Written guarantee agreeing to keep the roof free of leaks for a period of two(2) years beginning after Date of Substantial Completion.

F. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Buildings:
   1. Butler Manufacturing Company; Product equal to design basis: www.butlermfg.com/speclink.
   2. Ceco Building Systems; Product as specified as design basis: www.cecobuildings.com.
   3. Nucor Building Systems: Product equal to design basis. www.nucorbuildingsystems.com

2.02 METAL BUILDING

A. Single span rigid frame. Straight columns as indicated on drawings.

B. Bay Spacing: - see drawings for column grid/bay spacing.)

C. Primary Framing: Rigid frame of rafter beams and columns, canopy beams, and wind bracing.

D. Secondary Framing: Purlins, and other items detailed.

E. Wall System: Preformed metal panels of horizontal and vertical profiles as shown on drawings, with sub-girt framing/anchorage assembly and insulation, and accessory components as required and/or as shown on drawings.

F. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly, insulation, and liner panels, and accessory components.

G. Roof Slope: as shown on drawings)

2.03 MATERIALS - FRAMING

A. Structural Steel Members: ASTM A 572 Grade 50.

B. Structural Tubing: ASTM A 500, Grade B cold-formed.

C. Plate or Bar Stock: ASTM A 529, Grade 50.

D. Anchor Bolts: ASTM F1554, grade 36.

E. Bolts, Nuts, and Washers: ASTM A 325 , Type 1.

F. Welding Materials: Type required for materials being welded.

G. Primer: SSPC-Paint 20, zinc rich.

H. Grout: ASTM C 1107, Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 2400 psi in two days and 7000 psi in 28 days.

2.04 COMPONENTS

A. Doors and Frames: Specified in Section 08 1113.

B. Overhead Doors: Specified in Section 08 3613.

C. Overhead Door Frame: Formed steel sections braced to building frame specified in Section 05 5000.

D. Windows: Specified in Section 08 5113.

E. Wall Louvers: Manufacturers Standard type Z blade design, same finish as adjacent material, with steel mesh bird screen and frame, blank sheet metal at unused portions.

F. Thermal Insulation - Typical Roof:
   1. Provide glass fiber blanket insulation not less than 0.5lbs per cubic foot density, 6" thickness with UL flame spread classification of 25 or less, and 2" wide continuous vapor tight edge tabs. R Value to be R-19 in place. Provide thermal blocks.
   2. Vapor Barrier: Vinyl Film
   3. Retainer Strips: Provide 26ga formed galvanized steel retainer clips color to match insulation facing.
   4. Location: Locate insulation on underside of roof sheets, extending across top flange of purlin members and held taut and snug to roofing panels by retainer strips.

G. Thermal Insulation - any Exposed Roofs. "Simple Saver"
   1. Provide and install product equal to Johns Manville Simple Saver System. (Design Basis)
   2. Insulation: 9" Thick (R-30) Formaldehyde-Free fiber glass insulation.
   3. Finish: Standard Super White
   4. Install per manufacturer's guidelines and recommendations.

2.05 FABRICATION - FRAMING

A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.

B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.

2.06 FABRICATION - WALL AND ROOF PANELS

A. Metal Wall Panels:
   1. Vertical Wall Panels:
      a. Equal to MBCI Commercial/Industrial "PBC" Panels.
      b. Guage: 26 Guage
      c. Exterior Panel Finish: Galvalume Plus (Standard Interior Finish)
      d. Accessories: Install as recommended by panel manufacurer including all required trim and accessories with finish to match panel.
   2. Horizontal Wall Panels:
      a. Equal to MBCI Commercial/Industrial "7.2" panels.
      b. Guage: 26 Guage
      c. Panel Finish - Exterior: Precoated steel of silicone polyester finish, color as selected by Architect from Manufacture's standard colors. Equal to MBCI Signature 200.
      d. Accessories: Install as recommended by panel manufacturer including all required trim and accessories with finish to match panel.
   3. Interior Metal Liner Panels:
      a. Provide and install manufacturer's standard metal interior liner panels where shown on drawings with horizontal profile similar to "7.2" panel. No flat "v-groove" panels will be allowed.
      b. Finish: Color as selected by Architect from manufacturer standard options.
      c. Accessories: Install standard cap trim, base trim and other trim as required for finished appearance. Install additional secondary framing as required for attachment of panels.
   4. Special Accessories: Custom fabricate electrical device covers and other trim as required to fit neatly and weather-tight around all outlets, switches, light fixture mounts, etc. Cut and scribe/fabricate as required to fit in panel profile with same material as panel.

B. Roof Panels:

1. Equal to MBCI 16" BattenLok HS system with striations, 24 guage or thicker steel.
2. Panel Finish - Exterior: Precoated steel of silicone polyester finish, color as selected by Architect from Manufacturer's standard colors. Equal to MBCI Signature 200.
3. Panel Finish - Interior: Precoated steel with wash coat of polyester, manufacturer's standard finish.
4. Length: Maximum possible to eliminate end splices.
5. Closures: Manufacturer's standard type, closed cell or metal.
6. Fasteners: Manufacturer's standard type. Size and design to maintain load and weather tightness requirements. Fasteners to be stainless steel, heade and shank self drilling and tapping.
7. Accessories: Provide prefinished ridge cap, flashing connecting roof and accessories, flashing support angles and frames, closures, curbs, clips, fasteners and other necessary devices as required to ensure a weather/water tight seal. Material shall be compatible and shall not cause a corrosive condition. Exposed fasteners shall be fitted with weather-seal washers of synthetic rubber (EPDM) with stainless steel unless otherwise indicated.
   a. Gutters, Downspouts and Trim in connection with metal roofing shall have a siliconized polyester finish, of manufacturer's standard color on exterior face as selected by Architect.
   b. Gutters shall have inside finish of factory applied polyester with a coating resistant to weathering, and shall have soldered outlet tubes for connection of downspouts.
   c. Curbs shall be seamed-in-place type.
   d. Sealants: As recommended by manufacturer for each condition requiring sealant for water-tight installation.
   e. Clips shall be compatible with thermal blocks and thermal insulation.
   f. Ridge Cap: Where shown, provide ridge cap (low profile type) flashing by same manufacturerer as roof.
   g. All flashing, trim, ec. to be same fish as roof. Architect to select color from manufacturer standard.
8. Soffit Panels:
   a. Equal to MBCI Commercial/Industrial "R" panels.
   b. Guage: 26 Guage
   c. Panel Finish: Precoated steel of silicone polyester finish, color as selected by Architect from Manufacturer standard colors. Equal to MBCI Signature 200.
   d. Color Cordination Note: Roof and Soffit Panel to be by same manufacturer to mach finish and color exactly.

C. Girts/Purlins: Rolled formed structural shape to receive siding, roofing and liner sheet.

D. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake framed to required dimensions. Back break mitered internal corners as required.

E. Flashings, Closure Pieces, Fascia: Same material and finish as adjacent material, profile formed as detailed.

F. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

2.07 FABRICATION - GUTTERS AND DOWNSPOUTS

A. Fabricate of same material and finish as roofing metal.

B. Form gutters and downspout of profile as shown on drawings and size as required to collect and remove water. Fabricate with connection pieces.

C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.

D. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.08 FINISHES

A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.

B. Panel and Trim Finish: See Panel Fabrication sections above.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.02 ERECTION - FRAMING

A. Erect framing in accordance with AISC 360 - Specification for Structural Steel Buildings.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.

C. Set column base plates with non-shrink grout to achieve full plate bearing.

D. Do not field cut or alter structural members without approval from Structural Engineer.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION - WALL AND ROOF PANELS

A. Install in accordance with manufacturer's instructions.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Fasten cladding system to structural supports, aligned level and plumb.

D. Locate end laps over supports. End laps minimum cover as recommended by manufacturer (or minimum 2 inches whichever is greater. Place side laps over bearing.

E. Provide expansion joints where indicated.

F. Use concealed fasteners as required by roof manufacturer and exposed as required for wall panel attachment.

G. Install insulation and vapor retarder utilizing manufacturer recommendations for attachment.

H. Install sealant and gaskets to prevent weather penetration.

3.04 ERECTION - GUTTERS AND DOWNSPOUTS

A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Apply bituminous paint on surfaces in contact with cementitious materials.

C. Slope gutters minimum ____ inch/ft. (Or if not specified install with minimum slope per code as required to drain water to downspouts.)

D. Install splash prefabricated concrete splash pans under each downspout.

3.05 INSTALLATION - ACCESSORIES

A. Install door frames, doors, overhead doors, and windows and glass in accordance with manufacturer's instructions.

B. Seal wall and roof accessories watertight and weather tight with sealant in accordance with Section 07 9005.

3.06 TOLERANCES

A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.

B. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

SECTION 21 01 00 - FIRE PROTECTION GENERAL PROVISIONS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide all labor, materials, tools, and services for a complete installation of equipment and systems contained in contract documents.

B. Principal features of work included are:

1. Fire Protection system.
2. Demolition of existing equipment, and piping.

1.2 RELATED WORK

A. Electrical power and interlock and control wiring and conduit.

B. Field painting of exposed pipe.

1.3 GENERAL

A. The contract documents form a guide for a complete system. Provide all items necessary to provide a complete system but not specifically mentioned, such as hangers, transitions, offsets, and drains.

B. Layouts indicated on drawings are diagrammatical only. Coordinate exact location of equipment, ductwork, and piping to eliminate conflict with other divisions. Designer reserves right to make reasonable changes in location of equipment, and piping prior to construction.

C. Should Contractor find during progress of work that in his judgment existing conditions make desirable a modification, report such item promptly to Designer for instructions. Do not make deviations from contract documents without review of Designer.

D. Supervise all work with a competent mechanic specifically qualified in fire protection work.

E. The installing sprinkler contractor shall be licensed or permitted by the state and local authority having jurisdiction to perform fire protection installations. This shall be in compliance with all applicable state and local laws.

1.4 PERMITS

A. Secure and pay for permits, licenses, and inspections for work under this Division, including water connections.

1.5 CODES

A. Comply with all pertinent local, state, and national codes.

1.6 STANDARDS

A. Comply with all pertinent standards. This list is provided as a convenience to the contractor and is not to be considered all inclusive.

1. NFPA 13: Standard on automatic sprinkler systems.

1.7 SUBMITTALS

A. Submit for review complete brochures and shop drawings for materials and equipment proposed.

1. Brochures: Submit complete descriptions, illustrations and specification data for materials and equipment proposed. Clearly indicate proposed items when other items are shown on same sheet. Submit samples on request and/or set up for inspection. Samples will be returned to Contractor.
2. Shop Drawings: Complete equipment, and piping systems.

1.8 PROJECT MAINTENANCE MANUALS

A. Prior to final acceptance of project, provide Owner with bound maintenance manuals.

1.9 PROJECT TECHNICAL INSTRUCTION

A. Prior to final inspection of project, provide technical instruction to Owner as follows:

1. Field Instruction: Provide explanation of how systems and equipment are to operate.
2. Field Demonstration: Demonstrate operation and routine maintenance for systems and equipment.

1.10 CONSTRUCTION RECORD DOCUMENTS

A. Provide construction record documents. Keep at the project one set of drawings and daily record changes at the time they are made. Give drawings to Owner at project completion.

1.11 EXISTING SERVICES

A. Maintain existing services in operation during construction. Coordinate and schedule all service interruptions with Owner.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Provide materials and equipment of domestic manufacturer bearing the U.L. and F.M. label when such label is available.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate location of fire protection piping with equipment, ductwork, and other piping to eliminate conflict with other divisions.

B. Provide proper chases and openings. Place sleeves and supports prior to pouring concrete or installation of masonry.

3.2 CUTTING AND PATCHING

A. Repair or replace routine damage caused by cutting in performance of contract.

B. Correct unnecessary damage caused due to installation of fire protection work.

C. Perform repairs with materials that match existing in accordance with the appropriate sections of these specifications.

3.3 TRENCHING, EXCAVATION AND BACKFILLING

A. Provide trenching, excavation and backfilling necessary for performance of fire protection work in accordance with the appropriate section of these specifications.

3.4 IDENTIFICATION

A. Identify exposed or accessible piping with stenciling contents indicating pipe contents and direction of flow on piping not more than 20 feet apart, at valves, at access panels, and at least once above each space.

B. Contractors option to identify exposed or accessible piping with snap-on or strap-on type markers. Color code markers in accordance with ANSI. Indicate pipe contents and direction of flow on marker. Install markers on piping not more than 20 feet apart, at valves, at access panels, and at least once above each space.

C. Color code piping exposed in equipment rooms. Paint to be Sherwin Williams Metalatex fire protection red.

D. Identify all mechanical equipment with engraved brass, aluminum, or stainless steel nameplates or tags. Use equipment names and numbers appearing in schedules on drawings. Fasten nameplates to equipment using screws. Glue or adhesive is not acceptable. Fasten tags to equipment using brass, aluminum or stainless steel chains.

E. Identify each valve with engraved brass, aluminum, or stainless steel identification tag indicating valve service and sequential identification number. Attach tag to valve handle with brass, aluminum or stainless steel chain. Provide two bound manuals to Owner listing each valve sequentially and indicating valve manufacturer, style, size, service, normal position, and specific location for each valve.

F. Frame and mount control diagrams and sequences in each equipment room. Use non-fading black and white prints encased in aluminum frame with plexiglass cover.

3.5 CLEANING

A. Repair damaged factory finishes covering all bare places and scratches.

3.6 FOUNDATIONS AND PADS

A. Provide foundations, pads, and bases required for equipment. Concrete to be in accordance with concrete division of specifications.

B. Coordinate proper sizes and locations of foundations, pads, bases, anchors, supports, and other items to be built into structure.

3.7 TESTING

A. Test all installed equipment and systems and demonstrate proper operation. Correct and retest work found defective when tested.

B. Thoroughly check piping system for leaks. Do not add any leak-stop compounds to the system. Make repairs to piping system with new materials. Peening, doping, or caulking of joints or holes is not acceptable.

END OF SECTION

SECTION 21 11 19 - FIRE DEPARTMENT CONNECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish materials, accessories, equipment, tools, and transportation and performance of all services and labor required to completely execute the sprinkler and fire protection work for this project, as indicated on the drawings and as herein specified.

1.2 SCOPE OF WORK

A. Cutting of holes necessary for the installation of work specified under this Section. Coordinate cutting of material with other Divisions. Employ services of other trades for patching of concrete, masonry, and other material. Use same material for patching and finish neatly.

1.3 DESIGN REQUIREMENTS

A. Install in accordance with the drawings, specifications, and requirements of NFPA 13.

B. Furnish material and labor necessary to fully comply with the drawings and specifications and with the rules, regulations, and ordinances.

1. Provide a 3/4 inch ball drip for all types of fire department connections. Route discharge, to outside of building.

1.4 QUALITY ASSURANCE

A. Materials bearing UL and FM approval, where such approval is applicable or required by the agencies having jurisdiction over fire protection work.

B. Provide all hose threads, operating nuts, and accessories for Siamese connections, meeting local Fire Department Standard.

C. The installing sprinkler contractor shall be licensed or permitted by the state and local authority having jurisdiction to perform fire protection installations. This shall be in compliance with all applicable state and local laws.

1.5 SUBMITTALS

A. Equipment submittal drawings and data are required on all items named by manufacturer, including Siamese Connection - Type and Manufacturer.

1.6 APPLICABLE CODES

A. NFPA 13

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Acceptable Manufacturers: Croker-Standard, Potter Roemer, Elkhart.

B. Products listed indicate standard.

2.2 FIRE DEPARTMENT CONNECTION

A. Provide signage per NFPA 13, and requirements of local authority having jurisdiction for proper identification for fire department service.

1. Fire Department Connection (Siamese): Croker-Standard, Figure Number 6010-PB 4 inch by 2-1/2 inch two-way, flushed polished brass, with double clapper inlets siamese fire department connection. Hose threads shall be in accordance with local fire department requirements. Provide plugs with chains.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate installation with other Divisions to ensure there are no conflicts.

END OF SECTION

SECTION 21 13 13 - AUTOMATIC SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish materials, accessories, equipment, tools, and transportation and performance of all services and labor required to completely execute the sprinkler and fire protection work for this project, as indicated on the drawings and as herein specified.

1.2 SCOPE OF WORK

A. Shop drawings.

B. Valves including check valves, system valves, backflow preventer, and indicator valves.

C. Pipe, fittings, exterior.

D. Pipe, fittings, interior.

E. Hangers, supports and sleeves.

F. Sprinkler heads, extra sprinkler cabinet.

G. Alarm check valves and accessories.

H. Testing and flushing.

I. Excavation and backfill.

J. Hydraulically calculate sprinkler system, wet and/or dry as required by drawings. Maximum water velocity shall be 25 feet per second for interior piping and 10 feet per second for exterior piping.

K. Cutting of holes necessary for the installation of work specified under this Section. Coordinate cutting of material with other Divisions. Employ services of other trades for patching of concrete, masonry, and other material. Use same material for patching and finish neatly.

L. Unless otherwise noted on the drawings or these specifications, the entire project shall be fully protected, excluding no spaces.

M. In an area of renovation and existing systems that are converted and/or extended to include the use of quick-response sprinklers, all existing sprinklers in a compartmented space shall be changed to quick response type. A compartmented space is defined as the entire smoke compartment.

1.3 DESIGN REQUIREMENTS

A. Install system(s) in accordance with the drawings, specifications, and requirements of NFPA 13.

B. Furnish material and labor necessary to fully comply with the drawings and specifications and with the rules, regulations, and ordinances.

C. Include in sprinkler system design the following requirements:

1. Light Hazard Occupancies (offices, patient rooms, corridors, lobbies, classrooms, hotel guest rooms, institutional, residential, libraries with 8 ft. high shelves max, unused attics) shall be 0.10 GPM/sq. ft. over 1500 sq. ft.
2. Ordinary Hazard Group 1 Occupancies (electrical rooms, mechanical rooms, storage rooms, kitchens, parking garages, laundries, restaurant service areas, and similar areas) shall be 0.15 GPM/sq. ft. over 1500 sq. ft.
3. Ordinary Hazard Group 2 Occupancies (medical record, boiler rooms, loading docks, machine shop, mercantile, libraries with large stack areas, trash rooms and similar areas) shall be 0.20 GPM/sq. ft. over 1500 sq. ft.
4. Provide a 3/4 inch ball drip for all types of fire department connections. Route discharge to outside of building.
5. Provide the results of a Contractor independently performed flow test in accordance to NFPA 291 to determine the adequacy of the water supply before construction begins. The Contractor shall use this data obtained to hydraulically design the system. Submit this with sprinkler system drawings and calculations.
6. The hydraulic calculations shall be carried to the city water supply taking into account all fittings, valves, etc. The contractor shall be responsible for hydraulically sizing all new piping not sized on the drawings and shall take into consideration the existing piping to remain.

    a. Design calculations shall have a minimum of [**5%**] difference of system demand including hose stream and the available water supply flow and pressure.

1.4 QUALITY ASSURANCE

A. Materials bearing UL and FM approval, where such approval is applicable or required by the agencies having jurisdiction over fire protection work.

B. The installing sprinkler contractor shall be licensed or permitted by the state and local authority having jurisdiction to perform fire protection installations. This shall be in compliance with all applicable state and local laws.

C. All sprinkler piping from “Point of Service” including underground used for sprinkler or standpipe system shall be installed by a Registered Sprinkler Contractor. Underground mains and hydrants must be installed and in service prior to starting construction.

D. All castings used for coupling housings, fittings and valve bodies shall be date stamped for quality assurance and traceability.

1.5 SUBMITTALS AND SHOP DRAWINGS

A. Prepare complete detailed working drawings for Fire Protection System. Submit drawings to Designer and to for approval. After receiving this approval, submit shop drawings to State Fire Marshal and local AHJ for his review and approval prior to starting installation. Prior approval by above listed authorities is required before sprinkler installation is begun.

B. The Sprinkler Contractor shop drawings and calculations shall be stamped and signed by a firm employee who has a minimum NICET III level certification and signed by a Responsible Managing Employee. Shop drawings and calculations shall be submitted by a licensed and registered fire protection contractor.

C. Equipment submittal drawings and data are required on all items named by manufacturer, including the following:

1. Sprinkler Heads - Type and Manufacturer. The mixing of sprinkler manufacturer shall not be permitted.
2. Valves - Type and Manufacturer, interior and exterior. Sprinkler devices (alarm check valves, dry pipe valves, etc. shall be listed and approved as component packages and no intermixing of valve manufacturers shall be allowed.
3. Water Flow, Pressure and Tamper Switches - Type and Manufacturer.
4. Piping and fittings.

D. The sprinkler system shall be hydraulically designed by industry standard computer software. The Contractor shall submit computer calculations and copy of original water flow test report with working plans. Include in calculations allowance for outside hose streams and domestic water as required.

E. Contractor will supply as-built drawings to the Owner, the Owner’s Insurer, the Architect, the Engineer and other entities as required by the Owner or the Authority Having Jurisdiction.

1.6 SPRINKLER SYSTEM COORDINATION

A. The contractor will be responsible for ensuring that the reflected ceiling plan shown on the working drawings is the latest revision from the Architect before commencing work.

B. The contractor shall be responsible for providing to the Architect notification for any drawing changes resulting from movement of sprinkler piping or heads during installation.

C. Failure to coordinate sprinkler system and building systems (including, but not limited to: ductwork, mechanical piping, and lighting fixtures) prior to fabrication or installation of sprinkler systems shall be corrected, modified, or changed as necessary at the expense of the contractor.

D. The contractor is to completely investigate, PRIOR TO BID, all requirements of local water utility and fire department. Devices such as ADT and/or local alarm systems, double check valve assemblies, detector checks, tamper switches shall be provided complete, wired, connected, and installed in accordance with local authorities by this Contractor. In the event the authorities have no installation details, the Contractor shall submit for approval proposed installation.

1.7 APPLICABLE CODES

A. NFPA 13

B. NFPA 25

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Products listed indicate standard.

2.2 VALVES

A. Acceptable Valve Manufacturers: Ames, Nibco, Anvil, Kennedy, Wilkins, Tyco or Victaulic.

B. Outside System Valves

1. Full flow fire meters with OS&Y valves in a utility company approved vault. Size as indicated on drawings.
2. Sectional valves in valve pit: Kennedy Valve 8068A flanged pattern outside screw and yoke wedge gate valves, epoxy coated.
3. Underground sectional control valves: Kennedy Valve 8561 flanged, or Kennedy Valve 8571 mechanical joint, or G-Kennedy Valve 8901 Tyton joint, Non-Rising Stem gate valve, epoxy coated. Provide cast iron roadway box, extended to grade.
4. Post indicator valves: Kennedy Valve 8701ASS flanged or Kennedy Valve 8071SS mechanical joint, or Kennedy Valve 8901 PSS Tyton joint, NRS gate valve, epoxy coated. Kennedy Valve 2945A indicator post with required extension sleeve. Install indicator post with window 30" above finished grade.

C. Backflow Preventer

1. Double check detector valves: Ames C300 or Wilkins 350 ADA with 2" bronze by-pass meter or local water department standard. Size as indicated on drawings.

D. Interior Valves

1. Check valves

a. Iron body, Kennedy Valve 1126A swing check valve with resilent disc, flanged body.
b. Bronze body, Nibco KT-403-W threaded swing check valve with dielectric unions.
c. Ductile iron body, Tyco CV-1F swing check valve with grooved ends.

2. Gate valves

a. Iron body, OS&Y gate valve, Kennedy Valve FW-8068A, flanged.
b. Bronze body, OS&Y gate valve, Nibco T-104-0, threaded with dielectric unions.

c. Ductile iron body, OS&Y gate valve, Tyco with grooved ends.

3. Butterfly valves

a. Ductile iron body, indicating type, Kennedy Valve W300 with integral supervisory tamper switch, flanged.
b. Ductile iron body, indicating type, Tyco BFV-N with grooved ends.
c. Butterfly valves are not allowed on suction side of fire pumps.

E. Hi-Rise System Valves

1. Check valves

a. Iron body, swing check valves, Nibco F-968-B.
b. Bronze body, swing check valves, Nibco KT-403-W threaded with dielectric unions.
c. Ductile iron body, Tyco CV-1F swing check valve with grooved ends.

2. Gate valves

a. Iron body, OS&Y gate valve, 300 WWP, Kennedy Valve 7168SS.
b. Ductile iron body, OS&Y gate valve, Tyco with grooved ends.

3. Butterfly valves

a. Ductile iron body, indicating type, Kennedy Valve W300 with integral supervisory tamper switch, flanged.
b. Ductile iron body, indicating type, Tyco BFV-N with grooved ends.
c. Butterfly valves are not allowed on suction side of fire pumps.

F. Wall-Mounted Indicator Valves

1. Gate valve, Kennedy Valve 8701ASS, flanged NRS.
2. Wall indicator post, Kennedy Valve 641.

2.3 PIPE AND FITTINGS

A. Exterior Pipe and Fittings

1. Provide cement lined ductile iron pipe, Class 52 conforming to ANSI/AWWA C151/A21.51 for Tyton joint pipe or ANSI/AWWA C111/A21.11 for mechanical joint pipe. Acceptable Manufacturers: U.S. Pipe, American Pipe, McWane, or equivalent.
2. Fittings shall be push-on joint ductile iron fittings, 350 PSI, with field loc gaskets, or mechanical joint ductile iron fittings conforming to ANSI/AWWA C110/A21.10 and C111/A21.11.

a. Provide braces, bridle rods, or restraining systems typical of "MEGALUG" by EBBA, Inc., on all mechanical joint fittings and valves. Provide concrete thrust blocks at all fittings, valves, and changes in direction.

3. All exterior site piping shall be buried with a standard, permanent, bright colored, continuous printed plastic tape. Tape shall be intended for direct burial service and buried directly above the service line. The tape shall be 6 inches by 4 mils thick minimum. Tape shall be printed with proper identification of the service located below it.

B. Interior Pipe and Fittings

1. Piping for wet pipe systems shall be Schedule 40 black steel pipe 2" and smaller conforming to ASTM A135 or ASTM A53 and Schedule 10 black steel pipe 2-1/2" and larger conforming to ASTM A135.
2. Fittings for wet pipe systems

   a. Fittings shall be threaded or grooved for 2 inch and smaller and flanged or grooved for pipe 2-1/2 inch and larger.
   b. Ductile iron threaded fittings, ANSI B16.3 Class 300.
   c. Cast iron threaded fittings, ANSI B16.4 Class 125 and 300 (extra heavy).
   d. Cast iron flanged fittings, ANSI B16.1 Class 125 and 300.
   e. Grooved couplings and fittings, as manufactured by Tyco, Anvil, Victaulic or equivalent. Couplings shall be rigid type, equivalent to Tyco 577 Rigid Coupling with pre-lubricated Grade "A" EPDM gasket. All groove couplings and fittings shall be furnished by a single manufacturer. Associated piping shall be roll-grooved.
   f. Weldolet pipe outlets for branch connections shall be of approved manufacturer.

3. Flexible sprinkler drops shall be UL Listed and FM approved. The maximum length shall not exceed 4'-0" and the minimum bend radius shall not exceed the more stringent of the UL and FM guidelines. Flexible drops shall be installed per manufacturers printed instructions with mounting brackets supplied by the same manufacture. Hydraulic calculations shall allow for length of flexible drop used. Submit all product data including manufacturers mounting instructions with shop drawings submitted.
4. Mechanical tees are not allowed on this project.

C. Hangers, Supports, and Sleeves

1. Support piping with UL and FM approved hangers. Acceptable manufacturers: Anvil, B-Line, Fee & Mason.
2. Adjustable Clevis: Anvil Fig. 260.
3. Adjustable Swivel: Anvil Fig. 69. Beam Clamp with Anvil Fig. 92 or Anvil Fig. 218 with retaining strap. If Fig. 218 is used provided Fig. 157 rod attachment.
4. Concrete Fasteners: Anvil steel shell and expander plug.
5. Concrete Insert: Anvil Fig. 152.
6. Riser Clamp: Anvil Fig. 261.
7. Powder-driven inserts shall not be accepted.
8. All pipes passing through rated floors or walls shall be sleeved and/or firestopped to an equivalent rating of the floor or wall assembly. Firestop materials shall meet ASTM E814 requirements.
9. All piping hangers shall be listed for use with sprinkler systems.
10. All hangers, bracing, etc., shall be designed to constrain the sprinkler discharge resulting from a system pressure of 175 psig at the base of the riser.

2.4 SPRINKLER HEADS, EXTRA SPRINKLER CABINET

A. Provide the following sprinkler heads of proper types, ratings, and spacings for areas involved. Provide appropriate finishes compatible with space finishes being served. Acceptable manufacturers: Tyco, Viking, Victaulic and Reliable.

1. Quick Response Type

a. Pendent and upright chrome: Tyco TY-FRB (UL and F.M. approved). K-Factor = 5.6
b. Recessed, chrome: Tyco TY-FRB (UL and F.M. approved). K-Factor = 5.6
c. Fully concealed: Tyco-RF II, white or custom color as selected by Architect] coverplate. Coordinate with Architect for quantity of custom colors required and location of custom color coverplates] (UL approved). K-Factor = 5.6
d. Horizontal sidewall: Tyco-FRB (UL and FM approved) chrome.

2. Standard Response

a. Pendent and Upright chrome Tyco TY-B (UL and FM approved). K-Factor = 5.6.
b. Horizontal Sidewall: Tyco TY-B (UL and FM approved) chrome. K-Factor = 5.6.
c. Fully Concealed: Tyco RF II, white or custom color as selected by Architect coverplate. Coordinate with Architect for quantity of custom colors required and location of custom color coverplates (UL approved). K-Factor = 5.6.
d. Recessed, chrome: Tyco TY-B (UL and FM approved). K-Factor = 5.6.

B. Pendent heads in ceilings and horizontal sidewall heads shall have one-piece, non-adjustable escutcheons. Two-piece or slip type escutcheons shall not be accepted. This does not apply to recessed heads. Escutcheon shall be approved for use and supplied by the sprinkler manufacturer.

C. Sprinkler body shall be integrally cast with a hex-shaped wrench boss to reduce the risk of damage during installation. Wrenches shall be provided by the sprinkler manufacturer which directly engages the wrench boss.

D. Provide sprinkler cabinet equal to Tyco with spare sprinkler wrench.

2.5 SWITCHES

A. Water Flow Switch: System Sensor Model WFD or Notifier Model No. WFD-60 24 VDC vane type flow switch with pneumatic retard adjustable from 0 to 70 seconds, complete with two sets of single pole, double throw micro feature. Coordinate final voltage with Division 26.

B. Tamper Switches: System Sensor PIBV2(A) or Notifier Model No. PIBV2(A) for 4" and larger, Potter Model No. OSYSU-2 **24 VDC** for pipe size less than 4", tamper switch double pole, double throw micro feature for ½-inch to 12-inch valves. Coordinate final voltage with Division 26.

2.6 WATER FLOW ALARMS

A. Water Motor Alarm: Hydraulically operated impeller type alarm with 8" round aluminum alloy red enameled gong and motor housing, nylon bearings, and inlet strainer. Tyco Model: WMA-1 or engineer approved equal.

B. Electric Alarm: Electrically operated 24 VDC red enameled 10" round gong with pressure alarm switch. Coordinate final voltage with Division 26. Notifier MB-G10 or approved equal.

C. Contractor Option: Contractor has option of providing water motor alarm in lieu of electric bell. Contractor shall provide all piping, retarding chamber, valves, etc. As required for a functioning system at no additional cost to Owner.

2.7 WET ALARM CHECK VALVES AND ACCESSORIES

A. Wet Alarm Check Valve and Accessories – Electric Bell

1. Alarm check valve shall be equal to Tyco CV-1FR with resilient elastomer seal facing on the spring-loaded clapper.
2. Provide trim package to control include as a minimum as follows:

    a. Main drain valve.
    b. Pressure gauges (system and supply).
    c. All installed components shall be replaceable without removing the valve from the installed position.

3. Provide waterflow switch connected to electric bell and fire alarm system.

B. "Shot-gun" riser assembly are not allowed on the project.

2.8 INSPECTOR TEST AND DRAIN

A. Where indicated on drawings (riser or remote location), Inspector test and equal to AGF3011ASG. Inspector test and drain shall have:

1. Body Material: Bronze body, brass stem, steel handle, chrome-plated bronze ball, virgin Teflon valve seat. Sight Glass: Bronze housing with viewing window.
2. Components: A tamper resistant test orifice and a tapped port for system access.
3. Pressure Relief Valve and Drainage Piping: AGF Model 7000.

    a. Pressure Rating: Factory rated at 175 psi.
    b. Body Material: Bronze body and stainless steel spring.
    c. Components: Nylobraid flexible tube, two 1/2" NPT by barbed 90 degree elbows, external identification plate and integral flushing handle to remove debris.
    d. 1/2 inch MIPT inlet, 1/2 inch FIPT outlet.
    e. Relief pressure shall be factory set to project specifications.
    f. Relief valve shall operate to the OPEN position between 90% and 105% of the set pressure.
    g. Relief valve shall reseat or CLOSE at a minimum of 80% of set pressure.

4. Test Orifice Size: Normal 3/8" (2.8K), as required by NFPA 13, latest edition.
5. Size: F.I.P.T., same as connected piping.
6. Inlet and Outlet: Threaded.

2.9 FIRE HYDRANTS

A. Fire hydrants shall be of the dry-barrel, compression type and shall conform to applicable requirement of AWWA C502, latest edition. Fire hydrants shall be cast iron, bronze mounted, suitable for a working pressure of 150 psi. Name of the manufacturer and size of the main valve shall be cast upon the hydrant in raised letters.

B. Hydrants shall be constructed in a manner that will permit withdrawal of internal working parts without disturbing the barrel or casing. Valve shall be compression type, opening against pressure and so constructed that the main valve will remain closed should the hydrant be broken off by traffic accident. Valve opening shall be at least 5-1/4 inches in diameter and shall have a net area of waterway at the smallest part of not less than 120 percent of the valve opening when the valve is wide open. There shall be no chattering or water hammer under any conditions of operation.

C. Barrel shall be made in two pieces with flanged joint above the finished grade or ground line. Lower barrel shall be fluted for strength and tapered to prevent frost heave. Ground line flange shall be of the break-away type. Two positive acting, bronze fitted drain valves shall be provided in the hydrant shoe automatically to open and provide rapid and complete drainage of the hydrant barrel when the main valve is closed.

D. Hydrant bonnet shall be designed to protect the operating head against rust, corrosion, and dirt. The stuffing box shall have bronze glands and O-ring seal. Suitable means shall be provided for lubricating the stem threads, O-ring, and bearing surfaces in the bonnet.

E. The main valve rod shall be of steel and shall be bronze sheathed where it passes through the stuffing box. Stem shall be equipped with a two-piece safety or breakable stem coupling to prevent damage to the stem when hydrant is hit by a vehicle. A positive stop shall be provided to permit full opening of the valve and prevent over-travel of the stem.

F. Direction of opening shall be counterclockwise and shall be cast on the head. Operating nut shall be National Standard, 1-1/2 inch, pentagon shaped.

G. Two 2-1/2 inch hose nozzles and one 4-1/2 inch pumper nozzle shall be provided on each hydrant. Hose and pumper nipples shall be of bronze or non-corrosive metal, and threads shall be National Standard in accordance with NFPA Standard No. 194. Nipple caps shall be securely chained to the barrel with galvanized, non-kinking chains.

H. Hydrants that are to be connected to cast iron pipe shall be equipped with mechanical joint inlet with gland, gaskets, bolts, and nuts. Suitable ring-tight or fluid-tight inlets shall be provided on hydrants that are to be connected to cement asbestos pipe. Inlet bell shall have two lugs for harness restraint.

I. After fabrication, all exterior aboveground ferrous surfaces shall be blast-cleaned and painted at the shop with one coat of zinc chromate primer conforming to Federal Specification TT-P-636 and one coat of compatible alkyd enamel. Color shall be fire hydrant red all interior and belowground, non-machined ferrous surfaces shall be blast-cleaned and painted at the shop with two coats of asphaltic varnish conforming to Federal Specification TT-V-51c.

J. Contractor shall furnish the Owner with two (2) heavy-duty operating wrenches for use with the hydrants. Wrenches shall fit operating nut, hose nozzle caps, and pin type hose couplings. Cost of wrenches shall be included in the price bid for furnishing and installing fire hydrants, and no separate payment will be made therefore.

K. Fire hydrants shall be as manufactured by Mueller Model Super Centurion A-423, M&H (Dresser) Model 929, Kennedy Guardian K-81, or approved equal.]

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate installation with other Divisions to ensure there are no conflicts. Fire protection piping shall not take priority in routing over HVAC ductwork.

3.2 PIPE INSTALLATION

A. Connect to water main as shown on drawings.

B. Install underground piping to provide a minimum cover of 2.5 feet over the top of the pipe. Provide 3 feet of cover under roads and driveways.

C. Install underground service utility tape approximately 18 inches above pipe.

D. Attach hangers to structural steel work as specified above, except that structural work shall not be drilled and punched. Wherever necessary, furnish, install, and securely anchor to or between building members suitable angle iron or other steel members to support sprinkler work.

E. Provide support for grooved piping in conformance with requirements of MSS-SP-69, "Pipe Hangers and Supports - Selection and Application". In addition to these requirements, leave no horizontal pipe unsupported between any two couplings nor shall any pipe be left unsupported whenever a change in direction of flow takes place. Provide supports meeting the requirements stated above, but ensure that the distance between supports does not exceed the following:

PIPE SIZE	MAXIMUM SPAN BETWEEN HANGERS
1 Inch	8 Feet
1-1/4 through 2 Inch	10 Feet
2-1/2 through 4 Inch	12 Feet
5 through 8 Inch	14 Feet
10 through 12 Inch	15 Feet

F. Support vertical piping at every other floor or every other pipe length, whichever is most frequent. Set the base of the riser or base fitting on a pedestal or foundation.

G. Piping Above Grade:

1. In areas with no ceilings, run piping as high as possible. Minimum head room shall be 10'-0".
2. Grooved joint shall be installed in accordance with the manufacture's written recommendations. Grooved ends shall be clean and free from indentations, projections or roll marks. The gasket shall be molded and produced by the coupling manufacturer of an elastomer suitable for the intended service. The coupling manufacturer's factory trained representative shall provide on-site training for the Contractor's field personnel in the use of grooving tools and installation of product. The representative shall periodically visit the job site to ensure the best practices in grooved product installation are being followed. (A distributor's representative is not considered qualified to conduct the training.

H. Underground Pipe

1. Underground pipe and fittings shall be listed in the Underwriters' Laboratories approved fire protection equipment list.
2. All underground piping for fire mains shall be installed, clamped and anchors, flushed and hydrostatically pressure tested according to the requirements of the Authorities Having Jurisdiction and NFPA 13 and 24.
3. Trench and excavation work of the depth required by the Authorities and/or Agencies Having Jurisdiction for the proper installation of underground piping and valve shall be furnished by the sprinkler contractor.
4. Trench and excavation work shall include excavating, cutting of holes through foundation walls and floors, preparing of trenches, backfilling as specified.

I. Provide section valves where shown on drawings, complete with tamper switch, water flow alarm, and drain connections. Provide sight-glass where inspector's test discharge cannot be readily seen when operating valve.

J. All control valves and indicating valves shall be chained into the open position and equipped with remote or central station signaling devices per 2013 NFPA 13 – 8.16.1.1.2.1.

K. All metallic sprinkler piping, including but not limited to, all risers, cross mains, drains, and branches are to be primed with at least one coat of rust inhibitive primer before installation. (Except where stainless steel or chrome plated piping is used.)

L. All sprinkler piping shall be hydrostatically tested at 200 psi and shall maintain that pressure with no loss for 2 hours or as required by NFPA 13 for normal pressure in excess of 150 psi.

M. Provide drain valves, pipes and test connections as required by NFPA 13. Pipe drain lines and test connections to outside building as shown on the drawings and details. Test lines must originate from the most hydraulically remote point of each sprinkler zone. All drain piping and fittings shall be galvanized coated, no exception.

N. Cross mains and feed mains shall not pass through electrical rooms or similar spaces. Only the branch line serving such spaces shall be permitted within the boundaries of these rooms.

O. Drain plugs shall be installed on trapped sections of piping between 5 and 50 gallons. Auxiliary drain valves, 1 inch or larger, shall be installed on trapped sections of pipe greater than 50 gallons, and piped to an accessible location.

3.3 SPRINKLERS

A. Install sprinkler heads and required piping in areas such as concealed spaces, and spaces as required by NFPA 13, NFPA 101, applicable state and local codes.

B. Install sprinkler heads centerline of corridors and locate in the center of the ceiling tiles. Install sprinkler heads in other designated spaces in the center of the ceiling tiles and symmetrically locate with other heads within the ceiling. (Refer to Architectural reflected ceiling plans.) Do not install sprinkler heads in other locations any closer than six (6) inches to any ceiling grid or wall.

C. Pendant sprinklers below ceiling shall be in alignment and parallel to ceiling features, walls, etc.

D. When the light fixtures extend below the ceiling, the sprinklers shall be spaced so that the sprinkler spray pattern is not obstructed. Refer to electrical plans for light fixture layout and types.

E. Provide guards on sprinkler heads where within 7’-6” of finished floor or wherever sprinklers may be subject to mechanical injury.

F. Do not install sprinklers which have been dropped, damaged or show a visible loss of fluid. Never install sprinklers with cracked bulb.

G. Furnish one sprinkler cabinet complete with 12 sprinklers of assorted temperature ratings of the type necessary and in use throughout the installation, including one sprinkler wrench. Locate and mount adjacent to riser.

3.4 MATERIAL AND TEST CERTIFICATE

A. Provide copy of Contractor’s Material and Test Certificate for [underground and] above ground piping as required by NFPA 13 [and NFPA 24] in Owners O&M Manual.

3.5 OWNER’S INFORMATION CERTIFICATE

A. Before commencing work, the sprinkler contractor shall obtain from the Owner, or his Agent, an Owner’s Information Certification containing the elements outlined in 2013 NFPA 13 – 4.3.

B. The Contractor shall provide a copy of the Owner’s Certificate to the Engineer.

3.6 GUARANTEE

A. The fire protection installation, as specified under this section of the specifications, shall be guaranteed for one year against defective equipment, materials, and workmanship.

B. Guarantee shall not be construed as requiring the sprinkler contractor to render service or maintenance required in the normal operation of the equipment or to make repairs that may be needed due to normal wear and tear or the Owner's negligence, abuse, or breakage.

3.7 INSPECTION SERVICE

A. After completion of the fire protection installation and at the start of the guarantee year, the Contractor shall execute the National Fire Sprinkler Association., Standard form of "Inspection Agreement," without charge to the Owner, calling for four inspections of the sprinkler system during the guarantee year. These inspections will, at a minimum, comply with the provisions and requirements of NFPA 25. During the guarantee year, the inspections shall be made as per the inspection agreement, plus the following maintenance to be performed during the course of the fourth inspection.

B. Operation of all control valves.

C. Lubrication of operating stems of all interior control valves.

D. Operation of water motor gong and/or electric alarms.

E. Cleaning of alarm valves.

F. Cleaning of dry pipe valves.

G. Lubrication of Fire Department Connection inlets.

H. The Standard Form of the National Fire Sprinkler Association., "Report of Inspection" shall be filled out in triplicate after each inspection and the copies sent to the Owner, Insurance Carriers, Fire Department, or other authorities that the Owner may designate.

3.8 FIRE HYDRANTS

A. Fire hydrants shall be isolated from the water supply main with a buried gate valve not less than 6 inches in size. Hydrants shall be installed in a suitable rock drain and anchored against thrust as shown on drawings. Upper barrel joint shall be located approximately 2 inches above ground level. Barrel extensions shall be furnished as necessary.

END OF SECTION

SECTION 22 01 00 - PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide all labor, materials, tools, and services for a complete installation of equipment and systems contained in contract documents.

B. Principal features of work included are:

1. Plumbing system.
2. Natural Gas/Propane system.
3. Demolition of existing equipment, and piping.

1.2 RELATED WORK

A. Electrical power and interlock and control wiring and conduit.

1.3 GENERAL

A. The contract documents form a guide for a complete system. Provide all items necessary to provide a complete system but not specifically mentioned, such as hangers, transitions, offsets, and drains.

B. Layouts indicated on drawings are diagrammatical only. Coordinate exact location of equipment, ductwork, and piping to eliminate conflict with other divisions. Designer reserves right to make reasonable changes in location of equipment, ductwork, and piping prior to construction.

C. Should Contractor find during progress of work that in his judgment existing conditions make desirable a modification, report such item promptly to Designer for instructions. Do not make deviations from contract documents without review of Designer.

D. Supervise all work with a competent mechanic specifically qualified in mechanical discipline.

E. All products used for dispensing potable drinking water must be lead free and meet the requirements of NSF 61 and NSF 372 test standards via third party testing and certification.

1.4 PERMITS

A. Secure and pay for permits, licenses, and inspections for work under this Division, including water and sewage connections.

1.5 CODES

A. Comply with all pertinent local, state, and national codes.

1.6 STANDARDS

A. Comply with all pertinent standards. This list is provided as a convenience to Contractor and is not to be considered all inclusive.

1. American Gas Association (AGA).
2. CISPI Standard 301.
3. ASTM A 74.

1.7 SUBMITTALS

A. Submit for review complete brochures and shop drawings for materials and equipment proposed.

1. Brochures: Submit complete descriptions, illustrations and specification data for materials and equipment proposed. Clearly indicate proposed items when other items are shown on same sheet. Submit samples on request and/or set up for inspection. Samples will be returned to Contractor.
2. Submittals shall be submitted in line by line format. Each submittal shall be provided with a cover letter and supporting documentation indicating how the submittal meets each line of the referenced specification section. All discrepancies between the construction documents and the submitted product shall be clearly identified for engineer evaluation.
3. If a product other than the basis of design is rejected by the engineer for any reason, the Contractor shall provide the basis of design product at no additional cost to the Owner.
4. Shop Drawings:

a. Complete equipment and piping systems in equipment rooms.
b. Complete equipment and piping systems in **entire building**.
c. Owner furnished equipment rough-in layouts.
d. Kitchen equipment rough-in layouts.
e. Laboratory equipment rough-in layouts.
f. Firestop systems.

1.8 PROJECT MAINTENANCE MANUALS

A. Prior to final acceptance of project, provide Owner with bound maintenance manuals.

1.9 PROJECT TECHNICAL INSTRUCTION

A. Prior to final inspection of project, provide technical instruction to Owner as follows:

1. Field Instruction: Provide explanation of how systems and equipment are to operate during each season and during emergencies.

2. Field Demonstration: Demonstrate operation and routine maintenance for systems and equipment.
3. Videotape: Provide videotape or DVD of field instruction and demonstration to Owner at completion.

1.10 CONSTRUCTION RECORD DOCUMENTS

A. Provide construction record documents. Keep at the project one set of drawings and daily record changes at the time they are made. Give drawings to Owner at project completion.

1.11 EXISTING SERVICES

A. Maintain existing services in operation during construction. Coordinate and schedule all service interruptions with Owner.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Provide materials and equipment of domestic manufacturer bearing the U.L. label when such label is available.

B. Cast Iron Soil Pipe and Fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute ® and listed by NSF® International.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate locations of equipment and piping to eliminate conflict with other divisions.

B. Carefully examine contract documents to be thoroughly familiar with items which require plumbing or mechanical connections and coordination.

C. Provide proper chases and openings. Place sleeves and supports prior to pouring concrete or installation of masonry.

3.2 CUTTING AND PATCHING

A. Repair or replace routine damage caused by cutting in performance of contract.

B. Correct unnecessary damage caused due to installation of plumbing work.

C. Perform repairs with materials that match existing in accordance with the appropriate section of these specifications.

3.3 FLASHING, COUNTERFLASHING, AND SEALING

A. Flash, counterflash, and seal piping at penetrations of roofs and outside walls.

3.4 TRENCHING, EXCAVATION AND BACKFILLING

A. Excavate to a depth at least 6" below bottom of pipe and a minimum of 36" above top of pipe. Fill below pipe, around pipe, and minimum of 12" above pipe with sand or Class "B" crushed stone tamped firm and even. Provide topsoil for final layer of dirt (12" minimum). Provide 6" spacing between pipes and between pipe and trench sides. Hand-grade with batterboards placed every 25'. Backfill by hand. Do not use rock or stone above sand or Class "B" crushed stone.

3.5 CONNECTION TO EQUIPMENT

A. Rough-in and connect to sterilizers, lab equipment, kitchen equipment, and Owner furnished equipment and provide a shutoff valve and union at each connection. Operating valves and/or controls for this equipment will be provided as an integral part of the equipment. Do not rough-in until shop drawings showing rough-in locations have been reviewed by Designer.

3.6 FOUNDATIONS AND PADS

A. Provide foundations, pads, and bases required for equipment. Concrete to be in accordance with concrete division of specifications.

B. Coordinate proper sizes and locations of foundations, pads, bases, anchors, supports, and other items to be built into structure.

3.7 IDENTIFICATION

A. Identify exposed or accessible piping with stenciling contents indicating pipe contents and direction of flow on piping not more than 20 feet apart, at valves, at access panels, and at least once above each space.

B. Contractors option to identify exposed or accessible piping with snap-on or strap-on type markers. Color code markers in accordance with ANSI. Indicate pipe contents and direction of flow on marker. Install markers on piping not more than 20 feet apart, at valves, at access panels, and at least once above each space.

C. Include design operating pressures in psig for compressed air services.

D. Sanitary waste, storm and buried lines need not be marked.

E. Identify all equipment with engraved brass, aluminum, or stainless steel nameplates or tags. Use equipment names and numbers appearing in schedules on drawings. Fasten nameplates to equipment using screws. Glue or adhesive is not acceptable. Fasten tags to equipment using brass, aluminum or stainless steel chains.

F. Identify each valve with engraved brass, aluminum, or stainless steel identification tag indicating valve service and sequential identification number. Attach tag to valve handle with brass, aluminum or stainless steel chain. Provide two bound manuals to Owner listing each valve sequentially and indicating valve manufacturer, style, size, service, normal position, and specific location for each valve.

3.8 CLEANING

A. Repair damaged factory finishes covering all bare places and scratches.

B. Cleaning Domestic Water System: Flush domestic water system progressively by opening building outlets and permitting flow to continue from each until water runs clear. Sterilize system in accordance with requirements of State Department of Public Health by the following method or other method acceptable to local authorities:

1. Introduce chlorine or a solution of calcium or sodium hypochlorite, filling lines slowly and applying sterilizing agent at a rate of 50 ppm of chlorine as determined by residual chlorine tests at ends of lines. Open and close all valves while the system is being chlorinated.
2. After sterilizing agent has been applied and left standing for 24 hours, test for residual chlorine at ends of lines. If less than 25 ppm is indicated, repeat sterilizing process.
3. After standing for 24 hours and tests show at least 25 ppm of residual chlorine, flush out system until all traces of chemical used are removed.

3.9 TESTING

A. Test all installed equipment and systems and demonstrate proper operation. Correct and retest work found defective when tested.

B. Thoroughly check piping system for leaks. Do not add any leak-stop compounds to the system. Make repairs to piping system with new materials. Peening, doping, or caulking of joints or holes is not acceptable.

C. Test hot and cold domestic water piping systems upon completion of rough-in and before connection to fixtures at a water pressure of 125 psig for two hours without leaks.

D. Test Natural Gas/Propane piping installations per the requirements of NFPA 54 National Fuel Gas Code.

E. Test drainage and venting system with necessary openings plugged to permit system to be filled with water and subjected to a minimum water pressure of 10 feet head at top of system. System to hold water for two hours without a water level drop greater than 4" in a 4" standpipe and without visible leakage. Test system in sections if minimum head can be maintained in each section.

F. Conduct air or smoke test if in opinion of Designer reasonable cause exists to suspect leakage or low quality workmanship.

G. Test foundation drain system in sections of 100 foot lengths before and after backfilling. Pass plumbers tape or Roto-Rooter through drain sections to ensure there are no restrictions to water flow.

H. Test gas piping and compressed air piping with Nitrogen at 100 psi for two hours without leaks.

I. Test flush valves for proper operation.

END OF SECTION

SECTION 22 07 19 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Contractor shall provide all necessary labor, materials, tools, and equipment to perform work required on the drawings and specified herein.

B. Certain equipment and/or systems to be factory insulated by manufacturer. Factory insulation materials to be as specified in applicable sections of the specifications.

C. All pipe fittings, valves and strainers in insulated pipe systems to be insulated.

D. Thermal resistance "R" values used herein are expressed in units of "Hour, Degrees F., Sq. Ft./BTU per Inch of Thickness" on a flat surface at a mean temperature of 75 degrees F.

E. Note that where electric cable wrap is called for, insulation is to be applied over cable.

F. "Contractor's Option" referred to in Materials below indicates optional materials which may be used as equals.

1.2 DEFINITIONS

A. "Exposed" equipment, and piping are areas which will be visible without removing ceilings or opening access panels.

B. Outdoors is considered exposed to the weather.

C. Underground is buried, whereas in a trench below grade is considered concealed.

1.3 CERTIFICATION/QUALITY ASSURANCE

A. Products shall meet applicable national, state, and local building codes and be U.L. (or other recognized testing lab) listed for intended service.

B. All insulations, jackets, adhesives, coatings, sealers, and tapes shall have a flame spread rating of 25 or less and smoke development rating of 50 or less when tested in accordance with ASTM E-84, NFPA 225, U.L. 723, and further must meet the requirements of NFPA 90-A and applicable building, and plumbing, codes.

C. All insulation materials shall be delivered and stored in manufacturers’ containers and kept free from dirt, water, chemical, and mechanical damage.

D. Insulation shall be applied in a workmanlike manner by experienced, qualified tradesmen.

E. Insulation shall not be applied until all pressure testing has been completed, inspected, and released for insulation application.

F. Surfaces shall be clean and dry.

G. Insulation joints shall be butted firmly together and all jackets and tapes shall be smoothly and securely installed.

H. Insulation for duct, pipe, and equipment for above grade exposed to weather outside building shall be certified as being self-extinguishing for 1" thickness in less than 53 seconds when tested in accordance with ASTM D-1692.

1.4 APPLICABLE CODES AND STANDARDS

A. ASTM E-84.

B. U.L. 723.

C. State of Mississippi Energy Code.

PART 2 - PRODUCTS

2.1 MATERIALS FOR PIPE AND EQUIPMENT

A. Materials for Pipe and Equipment: Provide factory pre-molded or shop or site mitered segment type insulation for pipe, pipe fittings, and valves. Fitting insulation to be of same thickness and material as adjoining pipe insulation. All insulation and related materials such as tape and mastic to meet applicable building code requirements for fire and smoke development.

1. Flexible Tubular: Provide 25/50 rated, closed-cell, flexible tubular rubber type pipe insulation. Product to have continuous operational temperature limit of 200 degrees F. and a minimum "R" value of 3.6 per inch (K=0.28) at 100 degrees F mean temperature. Product to be Armstrong AP Armaflex or approved equal pipe insulation. Use flexible tubular for the following services:

a. Horizontal runs of waste lines carrying cold condensate from air conditioning equipment: 1" thick.
b. Horizontal runs of rainwater leaders, overflow leaders, and roof drain bodies (contractor option): 1" thick.
c. Domestic cold water piping 2" and under (contractor option): 1/2" thick.
d. Domestic hot water supply without recirculating system (contractor option): 1-1/4" and under - 1" thick; 1-1/2" and greater – 1-1/2" thick.
e. Domestic hot water supply and recirculating return piping (contractor option): All sizes – 1-1/2” thick.

2. Fiberglass: Provide factory-formed, factory-jacketed fiberglass piping insulation. Product to be Manville "Micro-Lok 650" with "Type AP-T" jacketing or equivalent product manufactured by CertainTeed, Knauf, or Owens-Corning. Product to have continuous operational temperature limit of 850 degrees F and a minimum "R" value of 3.6 per inch (K=0.28) at 100 degrees F mean temperature. Jacket to be fiberglass reinforced kraft paper with aluminum foil and pressure sensitive closure system. Vapor-barrier mastic for application to below ambient pipe insulation shall be fungus resistant per ASTM D 5590 with 0 growth rating; Water based; Permeance per ASTM E 96, Procedure B, 0.013 perm or less at 43-mil dry film thickness suitable for indoor and jacketed outdoor use. Products: Foster 30-80 AF. Color: White. A breather mastic for application to above ambient pipe insulation (fittings, tees, valves, etc.) shall be water based Foster 46-50 mastic or Childers CP-10 / CP-11. Use fiberglass piping insulation for the following services:

   a. Domestic hot water supply without recirculating system: 1-1/4" and under - 1" thick; 1-1/2" and greater – 1-1/2" thick.
   b. Domestic hot water supply and recirculating return piping: 1-1/4 and under – 1” thick, 1-1/2” and greater 1-1/2 thick.
   c. Domestic cold water piping: 1/2" thick.
   d. Horizontal rainwater leaders, overflow leaders, and roof drain bodies: 1" thick.

2.2 MATERIALS FOR FITTINGS, VALVES, AND SPECIAL COVERINGS

A. Provide coverings and finishes for specific items hereinafter specified.

   1. Use pre-molded insulation fabricated by the manufacturer of insulation material or shop or site mitered segment type insulation for all pipe fittings, elbows, tees, valves, and couplings.
   2. PVC fitting covers over blanket fiberglass are NOT acceptable.
   3. Contractor's option to provide factory pre-molded one-piece PVC insulated fitting covers, precut fiberglass insulation inserts, and necessary installation materials for all pipe fittings. Materials to be equal to Manville Zeston white, U.V. resistant, 25/50 rated, 20 mil thickness insulated PVC fitting covers and insulation inserts.

B. For any service, when below grade direct buried, cover straight pipe and fitting insulation with equivalent of Pittsburgh Corning "Pittwrap", Foster C.I. Wrap 50 mil or "Pittwrap SS11" jacketing. Valves in systems operating above 60 degrees F. and installed in valve boxes shall not be insulated; however, the valves shall be painted with a rust resistant product equivalent to Rustoleum.

C. For flexible tubular pipe and fitting insulation when exposed-to-view inside building or exposed to the weather, finish with two coats of paint, custom color blended to match surrounding surfaces.

D. When specifically approved by designer, when it is impossible to completely insulate pipe, fittings, or valves with specified insulation, Armstrong Armaflex insulation tape may be used to prevent condensate drip on small piping. Use of cork insulation tape is prohibited.

PART 3 - EXECUTION

3.1 GENERAL

A. No insulation shall be cut where a hanger is located. If hangers have been installed by pipefitter tradesmen which violates this strict requirement, notify Designer immediately.

B. Piping systems shall be tested and found free of all leaks prior to installation of insulation covering.

C. All surfaces shall be clean and dry when covering is applied. Covering to be dry when installed and during application of any finish, unless such finish specifically requires a wetted surface for application.

D. All adhesives, cements, and mastics shall be compatible with materials applied and shall not attack materials in either wet or dry state.

E. Install insulation using professional insulators who have adequate experience and ability.

F. Exposed-to-view insulation shall have a well tailored appearance.

G. Treat insulated pipe in equipment rooms and where exposed to normal view, so surfaces may be painted with water base latex paint. Use of mastics, adhesives, or jacketing which cause "bleeding" is prohibited.

3.2 INSTALLATION OF PIPE AND EQUIPMENT COVERING

A. Where fiberglass or flexible tubular insulation is used on piping sized 2" and larger, insert a section of foamglass insulation at hanger or support points between pipe and metal shield for full length of shield to prevent crushing of insulation. Insulation thickness to be same as adjoining insulation. Where insulation passes through pipe hangers and across trapeze supports, 12" long metal saddles shall be used. On cold pipe, vapor barrier should be carried through the hanger and sealed.

B. Apply flexible tubular insulation to pipe and fittings using the slip-on method with all joints tightly fitted and sealed with Armstrong 520 adhesive or approved equal. Seal butt joints, miter joints and torn or damaged insulation with adhesive.

C. Apply insulated fitting covers and precut insulation inserts as follows:

1. Installation for hot systems:

a. Place the precut fiberglass insert around the fitting, positioning the points of the insert on the inside radius of the elbow.
b. Butt the ends of the fiberglass insert against the ends of the pipe covering. Tuck and fold the insulation so that it covers all bare surfaces. Keep the fiberglass fluffed up to the thickness of the adjacent pipe insulation to assure maximum thermal efficiency.

c. Insert two stainless steel serrated tacks approximately 1/4" from one of the lap edges of the fitting cover. Then snap the cover in place over the fiberglass insulation.
d. After the fitting cover is in position, push the tacks into the overlapping throat seam. Apply color-matched, pressure-sensitive tape to the butt joints.

2. Installation for cold systems:

a. Position, tuck, and fold the fiberglass insulation insert as described above in steps (a) and (b) for hot systems.
b. Apply a vapor barrier mastic around the edges of the adjoining pipe insulation. Apply the mastic along the inside of the fitting cover throat overlap seam.
c. Place the fitting cover over the insulation, lapping the mastic-covered edge over the other side of the throat seam.
d. Apply color-matched, pressure-sensitive tape over the circumferential joints. The tape should extend over the adjacent pipe insulation and overlap itself by at least 2" on the downward side of the lap.

END OF SECTION

SECTION 22 11 16 - DOMESTIC WATER PIPING AND VALVES

PART 1 - GENERAL

1.1 SYSTEM REQUIREMENTS

A. Submit pipe, valves, and fittings and have approved before starting installation. Pipe, valves, and fittings to be new, manufactured domestically, and marked clearly with manufacturers' name, weight, and classification or working pressure.

B. Piping to run approximately as shown on drawings or as structural and architectural conditions permit.

C. All products used for dispensing potable drinking water must be lead free and meet the requirements of NSF 61 and NSF 372 test standards via third party testing and certification.

PART 2 - PRODUCTS

2.1 PVC PIPE

A. Provide PVC water main pipe and fittings conforming to AWWA C900, Class 200 PSI, as manufactured by Johns Mansville, Certainteed, or equivalent, from 5'-0" outside building to connection to water main.

B. Fittings to match piping system. Fittings to have manufacturer's trademark permanently identified in accordance with MSS-SP-25. Supplier to include with submittal data certification that fittings and flanges have met requirements.

C. Joints for piping to be made with tetrahydrofuron solvent cement. Joints to be in accordance with manufacturer's recommendations.

D. Pipe, fittings, and cement to all be supplied by single manufacturer for entire project.

E. All solvent cements shall be low emitting VOC at 510 g/L or less.

F. All exterior site piping shall be buried with a standard, permanent, bright colored, continuous printed plastic tape. Tape shall be intended for direct burial service and buried directly above the service line. The tape shall be 6 inches by 4 mils thick minimum. Tape shall be printed with proper identification of the service located below it.

2.2 CROSS-LINKED POLYETHYLENE (PEX) TUBING

A. Domestic hot and cold water piping inside of building; not permitted in return air plenums.

B. Manufacturer: Zurn PEX or approved equal.

C. Install PEX tubing in accordance with tubing manufacturer's recommendations.

D. Tubing:
1. Cross-linked polyethylene (PEX) manufactured by the Silane method
2. Non-barrier type
   a. Shall have a pressure and temperature rating of 160 PSI at 73°F, 100 PSI at 180°F and 80 PSI at 200°F
   b. Tubing shall have a minimum of 6 months UV protection
3. Manufactured in accordance with ASTM F876 and ASTM F877 and tested for compliance by an independent third-party agency
4. Must have PEX 5306 chlorine designation for hot water recirc
5. Plenum tested in accordance with ASTM E84
6. Fittings must be brass (F1807) in compliance with NSF-Annex "G" for no lead or engineered polymer (F2159) (Acudel) corrosion resistant type.
7. Must have a 25-year non-prorated warranty.
8. Copper Crimp Rings must have positioning cap to ensure proper crimping position.

E. Fittings:
1. Fittings shall be manufactured by Zurn PEX Inc, identified by the letters "Q" or "Z".
2. Manufactured in accordance with ASTM F1807 or ASTM F2159 and/or comply with ASTM F877 system standard as identified on the fitting.

F. Crimp Systems:
1. Qickclamp: Listed to ASTM F877, identified as a Zurn PEX Inc, Qickclamp by the "Qickclamp" and "Q" marking.
2. Copper Crimp Ring: Listed to ASTM F1807 and/or ASTM F877, black in color and identified as a Zurn PEX Inc, ring by the letter "Q".

G. Tools:
1. Qickclamp tools shall be supplied by the PEX tubing manufacturer, identified by the name "Zurn" on the tool.
2. Copper Crimp Ring tools shall be supplied by the PEX tubing manufacturer or approved by the PEX tubing manufacturer for use.

H. Manifold:
1. QickPort Preassembled Manifold
2. Copper Manifold System
3. CR Manifold

4. Multi Port Fittings
5. Copper Manifold Header

I. Valves shall be of the plastic or metal type, meeting the requirements of ASTM F877, identified as such with the appropriate mark on the product.

2.3 VALVES

A. Valves are specified by Manufacturer and Model Numbers to establish quality levels unless otherwise noted. Crane, Milwaukee, Hammond, Nibco, Stockham, Centerline, Apollo, Kitz, or Watts are considered equal manufacturers. Provide clamp lock hand lever operators on valves less than 8 inches. Provide hand wheel and closed housing worm gear on valves 8 inches and larger unless indicated otherwise below. Provide chain operators for all equipment room and powerhouse valves 4 inch and larger which are located over 6 feet 6 inches above the finish floor. All valves shall meet NSF-61 requirements.

1. Gate Valves:
   a. Gate valves for 2-1/2" and larger steel piping systems to be Class 125, cast iron body, bronze mounted, flanged ends, Nibco F-607-RW. Valves to have solid wedge disc, outside stem and yoke with rising stem, and bolted bonnet. Provide dielectric bolt protectors at all flanges when connecting dissimilar metals.
   b. Gate valves for copper piping 2” and smaller systems to be Class 125, bronze body, solder ends, Nibco S-113 LF. Valve to have either solid or split wedge disc, inside screw, non-rising stem, and screwed bonnet.
2. Globe Valves:
   a. Globe valves 2-1/2" and larger to be Class 150, cast iron body, bronze mounted, flanged ends, Watts M6115-74 lead free. Valves to have renewable seat and disc, outside stem and yoke with rising stem, and bolted bonnet.
   b. Globe valves 2" and smaller to be Class 150, bronze body, screwed ends, Apollo 121T-LF. Valve to be plug type with renewable seat and disc, rising stem, and union bonnet.
3. Ball Valves:
   a. Ball valves for copper water piping systems 2" O.D. and smaller to be equal to Apollo "3" S-585-66LF, solder ends, and for 2-5/8" thru 3-1/8" O.D. to be equal to Nibco T T-585-66LF, threaded ends. Valves to have bronze body, chromium plated bronze ball, PTFE seats, stuffing box ring and seals, and quarter turn on-off. Valves to be rated for 400-psi WOG at 200 degrees F. Install threaded end valves with lead free brass adapters.

4. Butterfly Valves: Butterfly valves for steel water piping systems to be Crane Centerline Series 200, or approved equal industrial quality lug type with threaded holes. Valves to provide bubble-tight shut-off at 150 psi working pressure and 200 degrees F. Valves to have ductile iron body, "EPT" seats and stem seals, 316 stainless steel or bronze disc, 316 or 304 stainless steel stems. Valves 4" and larger to have weatherproofed sealed gear operator consisting of fully enclosed worm, worm gear, and worm shaft with handwheel to provide necessary torque for close-off and infinite throttling positions. Valves 3" and smaller to have 10 position lever lock handle suitable for on-off and manual throttling service. All operators to have valve position indicator and memory stop.
5. Check Valves:
   a. Check valves for copper water piping systems to be swing type, Class 125, bronze body, screwed ends, Nibco T-413-Y-LF.
   b. Check valves for steel water piping systems to be Nibco-910 LF Silent Check Valve. Body to be iron with bronze disc plates. Stem to be 316 stainless steel, seat to be EPT. Valve to be suitable for 200 psi working pressure at 200 degrees F.
6. Flow balancing valves for domestic hot water service shall be Bell & Gossett lead free Circuit Setter Plus or approved equal. Valve shall provide flow balancing, flow measuring, and positive shutoff service. Provide valve with memory stop, capped differential pressure readout ports with internal check valves and preformed insulation. Valve construction to be bronze body and brass ball rated for 200 psig at 250 degrees F.
7. Thermostatic Balance Valve: Valves to be CircuitSolver Thermostatic Balance Valve, models CSUA as manufactured by ThermOmegaTech or approved equal.
   a. The valve shall be certified lead free according to NSF/ANSI 61 standards
   b. The valve body shall be constructed out of stainless steel.
   c. The valve shall be rated for 200 PSIG working pressure and 250°F max. temperature.
   d. The valve shall have a fixed, non-adjustable (tamper proof) temperature setpoint; temperature setpoints range from 80°F to 170°F in 5°F increments.
   e. The valve shall have a temperature accuracy of ±3.0°F.
   f. The valve shall have a wax thermostatic element.
   g. The valve shall come in 6 sizes: ½”, ¾”, 1”, 1-1/4:, 1-1/2”, 2”.

2.4 STRAINERS

A. Provide cleanable "Y" type strainers in pump suction lines. Strainers to have iron body with screwed bronze or bolted iron cap. Strainer baskets to be brass. Water strainers to be Monel 20 mesh screen. Strainers to be line size complete with blow-down hose bibbs. When Suction Diffusers are specified for end suction pumps, strainers are not required. Strainers to be as follows: Flanged 125# - Watts LFS 77F-D1-125.

2.5 HANGERS

A. Non-insulated steel piping 1/2" thru 24" with no longitudinal movement to be Grinnell Figure 260, MSS SP-69 Type 1, adjustable clevis hanger.

B. Insulated steel piping 1/2" thru 24", galvanized piping 1/2" thru 24", copper piping 1/2" O.D. thru 4" O.D., with no longitudinal movement to be Grinnell Figure 260, MSS SP-69 Type 1, adjustable clevis hanger with Figure 167, MSS SP-69 TYPE 40, galvanized steel insulation protection shield sized for maximum 10' span on 4 psi compressive strength insulation.

C. Non-insulated copper tubing 1/2" O.D. thru 4" O.D. with no longitudinal movement to be Grinnell Figure CT-99C, MSS SP-69 TYPE 9, plastic coated adjustable tubing ring hanger.

D. Insulated steel piping 1" thru 30" with longitudinal movement to be Grinnell Figure 171, MSS SP-69 TYPE 41, pipe roll complete with Figure 160, MSS SP-69 TYPE 39A or 39B, pipe insulation protection saddle sized for proper pipe size and insulation thickness.

E. Insulated copper piping 1/2" O.D. thru 2-1/8" O.D. with longitudinal movement to be Grinnell Figure 171, MSS SP-69 TYPE 41, pipe roll complete with Figure 167, MSS SP-69 TYPE 40, galvanized steel insulation protection shield sized for maximum 10' span on 4 psi compressive strength insulation.

F. Support copper pipe risers by Grinnell Figure CT-121C, MSS SP-69 TYPE 8, plastic coated riser clamps at floor penetrations.

G. Support steel pipe risers by Grinnell Figure 261, MSS SP-69 TYPE 8, riser clamps at floor slab penetrations.

H. Support three or more parallel lines by trapeze hangers utilizing Unistrut channel or equal in bottom mounting arrangement with rod hanging support.

I. Adequately size hangers on insulated piping for insulation to pass continuously through hangers. Insulated piping to be supported outside insulation covering.

J. Provide concrete inserts, Grinnell Figure 282, MSS SP-69 TYPE 18, universal concrete insert, for attaching hangers to building structure. Inserts to be adequately sized and correctly positioned to support piping, valves, etc., when full of water and system is in operation.

K. Provide C-clamps with locknut, Grinnell Figure 86, MSS SP-69 TYPE 23, where piping is to be hung from steel beams. Welding hanger rods to steel members is not permitted. Provide malleable beam clamps, Grinnell Figure 218, MSS SP-69 TYPE 30, with extension piece, Grinnell Figure 157, where piping is hung from bar joist.

L. Support all piping by heavy steel, adjustable hangers, or brackets suitably fastened to structural portion of building. Place hangers in accordance with following tables.

STEEL PIPE SUPPORTS	
SIZE (IN.)	DISTANCE BETWEEN SUPPORTS (FT.)
4 - 6	14
8 - 12	16
14 - 24	20

COPPER TUBING SUPPORTS	
SIZE (IN.)	DISTANCE BETWEEN SUPPORTS (FT.)
5/8	6
7/8 - 1-1/8	8
1-3/8 - 2-1/8	10
2-5/8 - 5-1/8	12
6-1/8 - 8-1/8	14

M. Perforated metal, strap iron, or band iron hangers are not permitted. Offsets in hangers are not allowed. Pipe risers to be supported at regular intervals in pipe shafts within the limits of good practice.

N. See Insulation Section for requirements at pipe hangers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install piping not to interfere with opening of doors or other moving parts. Do not install piping near or directly over any portion of electrical equipment.

3.2 FIRE-RATED PARTITIONS

A. Provide permanent firestop system at all piping penetrations of fire-rated walls and floors. The firestop system shall have been tested and approved in accordance with ASTM E119 and U.L. 1479 (ASTM E814) and classified for up to 2 hours fire rating. Firestop system to be 3M, Hilti, Nelson, Johns Manville, or Specified Technologies. Firestop system shall be installed in strict accordance with published U.L. approved installation instructions. Submit U.L. approved installation drawing for each type of penetration prior to construction.

3.3 NON-RATED PARTITIONS

A. Piping to pass through the walls insulated or non-insulated as specified. Wall should be finished to fit neatly around the piping. Firestopping is not required at non-rated partitions.

3.4 PIPE SLEEVES

A. Pipe sleeves shall be provided at non-rated partitions and floor penetrations. Pipe sleeves to be Schedule 40 or 18 gage steel. Sleeves to extend 1-1/2" in excess of partition depth on each side. Sleeves penetrating floors in wet areas, including all mechanical rooms, shall extend a minimum of 1 inch above the floor.
   1. Piping requiring sleeves: Copper pipes thru masonry walls

B. Provide chromium-plated escutcheon plates for exposed uninsulated pipes projecting through floors or walls in finished spaces. Mechanical rooms and janitor closets are not considered "finished" spaces.

C. Hang piping so equipment, flanges, and connections do not bear weight of piping.

D. Adequately support vertical lines at their bases or by a suitable hanger placed in horizontal line near riser or by a base fitting set on pedestal.

E. Pipes not to be hung or supported by pumps. No torque to be applied to pumps by connecting pipes. After final pipe adjustments and initial operation of the pumps, this Contractor to recheck alignment of pumps and realign as required.

F. Run piping in straight lines; riser lines to be plumb with such offsets only as indicated or necessary. No sagging of lines permitted.

G. Unless otherwise shown on drawings, lines to be installed to drain to sumps or sewer.

H. Ream pipe after cutting to full bore. Remove foreign matter from inside of pipe before installing. Keep installed piping free from dirt and scale and protect open ends from foreign matter. Use temporary plugs or other approved methods of open end closure.

I. Threads to be right-hand, pipe standard, clean cut, full depth, and tapered. Joints to be made tight without caulking. Approved pipe joint lubricant to be used, applied in thin layer to the male thread only.

J. Install copper fittings with suitable flux and silver solder with a melting temperature of at least 1000 degrees F. Type K copper pipe to be joined by means of suitable flux and silver or phos-copper.

K. Piping to have sufficient number of flanges or unions for convenient installation and removal of piping and equipment.

L. Remake or replace defective, leaking, or otherwise unsatisfactory joints or material. Peening, caulking, or doping of piping is not permitted.

M. Install piping to prevent stresses and strains to piping and hangers from expansion or contraction. Provision for proper loops, offsets, or expansion joints to be responsibility of Contractor. Make provision for servicing and removal of equipment without dismantling piping.

3.5 PIPING IN TRANSFORMER, ELECTRICAL, AND ELEVATOR EQUIPMENT ROOMS

A. Refer to drawings. No water piping permitted in transformer, electrical, or elevator equipment rooms.

3.6 VALVE ACCESS

A. Locate all shutoff and control valves for easy access and operation. Where valves must necessarily be located in enclosed spaces, they shall be provided with access panels of sufficient size for operation. Furnish these access panels to proper trades for installation.

END OF SECTION

SECTION 22 11 19 - DOMESTIC WATER BACKFLOW PREVENTERS, TRAP PRIMERS, AND SHOCK ABSORBERS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This section includes requirements for:

1. Backflow preventers.
2. Shock absorbers.
3. Trap primers.
4. Equipment connection backflow device.
5. Vacuum breakers.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Acceptable manufacturers are indicated in subsequent paragraphs.

B. All products used for dispensing potable drinking water must be lead free and meet the requirements of NSF 61 and NSF 372 test standards via third party testing and certification.

2.2 BACKFLOW PREVENTERS

A. Acceptable Manufacturers: Apollo, Febco, Cla-Val, Wilkins, or Watts.

B. Product must meet NSF-61.

C. Provide completely automatic, unit, fitted with tight closing shut-off valves and test cocks at each end.

D. Construct such that all parts are replaceable without removing unit from line.

E. Design such that total pressure drop through complete backflow preventer does not exceed 12 PSI at rated flow. Certified U.S.C. flow curves shall be provided for each device as part of the submittal package.

2.3 SHOCK ABSORBERS

A. Acceptable Manufacturers: Josam, Wade, J.R. Smith, Precision Products, Zurn, or Sioux Chief.

B. Refer to drawings for placement and size of shock absorbers.

C. Access Covers: Minimum size 12” x 12” located for access to shock absorbers.

2.4 TRAP PRIMERS

A. Acceptable Manufacturers: Josam, Zurn, Wade, J.R. Smith or Precision Plumbing Products.

B. Construct trap primer valve of all bronze, chrome plated with removable operating parts, integral vacuum breaker, and gasketed access cover.

C. Access Covers: Minimum size 12” x 12” located for access to trap primers.

2.5 EQUIPMENT CONNECTION BACKFLOW DEVICE

A. Acceptable manufactures: McCann Engineering ASSE 1022 Backflow Preventer.

B. Must meet ASSE 1022

C. Provide the above referenced backflow device if beverage equipment does not have integral backflow device.

2.6 VACUUM BREAKERS

A. Wilkins model 420

PART 3 - EXECUTION

3.1 INSTALLATION AND TESTING

A. Backflow Preventers:

1. Pipe relief through fixed air gap and discharge to sewer.
2. Install adjacent to wall and/or floor utilizing stand-off brackets, angle frame, and/or concrete piers.
3. Test unit for leaks and pressure drop. Clean and/or replace soiled strainer media.
4. Provide dual parallel reduced pressure backflow preventers on the main domestic water entrance to the facility.
5. Provide backflow prevention vacuum breaker on any water line feeding any piece of equipment which could cause back siphonage such as mechanical equipment, trap primer lines, etc.

B. Shock Absorbers:

1. Install shock absorbers above ceiling, outside wall so access and maintenance can be performed without disturbing walls and non-liftouts ceilings.
2. Install shock absorbers on all flush valves, solenoid valves and quick closing devices.
3. Test and certify shock absorbers by plumbing and drainage institute.

C. Trap Primers: Trap primers to have approval of plumbing and drainage institute.

D. Equipment Connection Backflow device: Provide on all water lines feeding coffee makers, ice machines and beverage dispensers.

E. Vacuum Breakers: Provide on water lines feeding equipment to protect against back siphonage of contaminated water.

END OF SECTION

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Submit pipe and fittings and have approved before starting installation. Pipe and fittings to be new, manufactured domestically, and marked clearly with manufacturers' name, weight, and classification or working pressure.

B. Piping to run approximately as shown on drawings or as structural and architectural conditions permit.

PART 2 - PRODUCTS

2.1 PVC PIPE

A. Schedule 40 PVC DWV pipe, ASTM D-2665 solid wall Type 1, Grade 1. Schedule 40 DWV waste and drainage piping below grade and inside building.

B. TYPE PSM SDR-35 PVC sewer pipe with gasket slip joints, ASTM D-3034. Outside gravity, underground sanitary sewer drainage, from 5'-0" outside building to connection to local sewer.

C. Fittings to match piping system. Fittings to have manufacturer's trademark permanently identified in accordance with MSS-SP-25. Supplier to include with submittal data certification that fittings and flanges have met requirements.

D. Joints for piping to be made with tetrahydrofuron solvent cement. Joints to be in accordance with manufacturer's recommendations.

E. Pipe, fittings, and cement to all be supplied by single manufacturer for entire project.

F. All solvent cements shall be low emitting VOC at 510 g/L or less.

2.2 HANGERS

A. Non-insulated steel piping 1-1/2" and smaller with no longitudinal movement to be Grinnell Figure 260, MSS SP-69 Type 1, adjustable clevis hanger.

B. Non-insulated cast iron soil pipe thru 8" to be Grinnell Figure 104, MSS SP-69 TYPE 6, adjustable swivel ring, split ring type, and pipe 10" thru 15" Grinnell Figure 260, MSS SP-69 TYPE 1, adjustable clevis hanger.

C. Non-insulated PVC pipe 1/2" O.D. thru 4" O.D. with no longitudinal movement to be Grinnell Figure CT-99C, MSS SP-69 TYPE 9, plastic coated adjustable tubing ring hanger.

D. Support PVC pipe risers by Grinnell Figure CT-121C, MSS SP-69 TYPE 8, plastic coated riser clamps at floor penetrations.

E. Support steel pipe risers by Grinnell Figure 261, MSS SP-69 TYPE 8, riser clamps at floor slab penetrations.

F. Support three or more parallel lines by trapeze hangers utilizing Unistrut channel or equal in bottom mounting arrangement with rod hanging support.

G. Adequately size hangers on insulated piping for insulation to pass continuously through hangers. Insulated piping to be supported outside insulation covering.

H. Provide concrete inserts, Grinnell Figure 282, MSS SP-69 TYPE 18, universal concrete insert, for attaching hangers to building structure. Inserts to be adequately sized and correctly positioned to support piping, valves, etc., when full of water and system is in operation.

I. Provide C-clamps with locknut, Grinnell Figure 86, MSS SP-69 TYPE 23, where piping is to be hung from steel beams. Welding hanger rods to steel members is not permitted. Provide malleable beam clamps, Grinnell Figure 218, MSS SP-69 TYPE 30, with extension piece, Grinnell Figure 157, where piping is hung from bar joist.

J. Support all piping by heavy steel, adjustable hangers, or brackets suitably fastened to structural portion of building. Place hangers in accordance with following.

1. PVC and Cast Iron Supports: Support each fitting, at intervals of not more than 5 feet, and at least at each joint.

K. Perforated metal, strap iron, or band iron hangers are not permitted. Offsets in hangers are not allowed. Pipe risers to be supported at regular intervals in pipe shafts within the limits of good practice.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install piping not to interfere with opening of doors or other moving parts. Do not install piping near or directly over any portion of electrical equipment.

3.2 FIRE-RATED PARTITIONS

A. Provide permanent firestop system at all piping penetrations of fire-rated walls and floors. The firestop system shall have been tested and approved in accordance with ASTM E119 and U.L. 1479 (ASTM E814) and classified for up to 2 hours fire rating. Firestop system to be 3M, Hilti, Nelson, Johns Manville, or Specified Technologies. Firestop system shall be installed in strict accordance with published U.L. approved installation instructions. Submit U.L. approved installation drawing for each type of penetration prior to construction.

3.3 NON-RATED PARTITIONS

A. Piping to pass through the walls insulated or non-insulated as specified. Wall should be finished to fit neatly around the piping. Firestopping is not required at non-rated partitions.

B. Provide chromium-plated escutcheon plates for exposed uninsulated pipes projecting through floors or walls in finished spaces. Mechanical rooms and janitor closets are not considered "finished" spaces.

C. Hang piping so equipment, flanges, and connections do not bear weight of piping.

D. Adequately support vertical lines at their bases or by a suitable hanger placed in horizontal line near riser or by a base fitting set on pedestal.

E. Pipes not to be hung or supported by pumps. No torque to be applied to pumps by connecting pipes. After final pipe adjustments and initial operation of the pumps, this Contractor to recheck alignment of pumps and realign as required.

F. Run piping in straight lines; riser lines to be plumb with such offsets only as indicated or necessary. No sagging of lines permitted.

G. Unless otherwise shown on drawings, lines to be installed to drain to sumps or sewer.

H. Ream pipe after cutting to full bore. Remove foreign matter from inside of pipe before installing. Keep installed piping free from dirt and scale and protect open ends from foreign matter. Use temporary plugs or other approved methods of open end closure.

I. Threads to be right-hand, pipe standard, clean cut, full depth, and tapered. Joints to be made tight without caulking. Approved pipe joint lubricant to be used, applied in thin layer to the male thread only.

J. Piping to have sufficient number of flanges or unions for convenient installation and removal of piping and equipment.

K. Remake or replace defective, leaking, or otherwise unsatisfactory joints or material. Peening, caulking, or doping of piping is not permitted.

L. Install piping to prevent stresses and strains to piping and hangers from expansion or contraction. Provision for proper loops, offsets, or expansion joints to be responsibility of Contractor. Make provision for servicing and removal of equipment without dismantling piping.

3.4 PIPING IN TRANSFORMER, ELECTRICAL, AND ELEVATOR EQUIPMENT ROOMS

A. Refer to drawings. No water piping permitted in transformer, electrical, or elevator equipment rooms.

3.5 GRADES AND ELEVATIONS

A. Uniformly grade sanitary drainage lines to elevations shown. If no elevations are given, pitch sewers not less than 1/8" per foot.

END OF SECTION

SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This section includes requirements for:

1. Cleanouts.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Acceptable manufacturers are indicated in subsequent paragraphs.

2.2 CLEANOUTS

A. Acceptable Manufacturers: Josam, Wade, J.R. Smith, or Zurn. The following model numbers listed are Zurn.

B. Exterior: ZN-1402-BP-HD cast iron cutoff ferrule with round nickel bronze scoriated frame and cover, secured.

C. Finished Concrete Floor: ZN-1400-HD-BP inside caulk round nickel bronze scoriated frame and cover.

D. Resilient Tile Floor: ZN-1400-X-BP inside caulk round nickel bronze scoriated frame and cover, secured.

E. Carpet: ZN-1400-CM-BP inside caulk round nickel bronze scoriated frame and cover; provide carpet marker and permanent marker in ceiling above.

F. Wall: ZN-1441-BP cast iron cleanout with bronze plug and round stainless steel cover.

G. Wall: Z-1446-BP cast iron cleanout with bronze plug and round stainless steel cover.

H. Access Covers: Minimum size 12" x 12" located for access to valves, shock absorbers, trap primers, wall cleanouts, etc.

I. Furnish cleanouts occurring in waterproof floors with clamping devices.

PART 3 - EXECUTION

3.1 INSTALLATION AND TESTING

A. Cleanouts:

1. Locate line size cleanouts, except 4" largest required, at base of all soil and waste stacks, at all changes in direction and in straight runs. Ensure spacing in straight runs does not exceed 50 feet inside building and 100 feet outside the building.
2. Extend inaccessible cleanouts up through floor and/or wall provided easy accessibility cannot be obtained otherwise.
3. Construct manholes per detail on drawings.

END OF SECTION

SECTION 22 15 13 - GENERAL SERVICE NATURAL GAS PIPING AND VALVES

PART 1 - GENERAL

1.1 SYSTEM REQUIREMENTS

A. Submit pipe, valves, and fittings and have approved before starting installation. Pipe, valves, and fittings to be new, manufactured domestically, and marked clearly with manufacturers' name, weight, and classification or working pressure.

B. Piping to run approximately as shown on drawings or as structural and architectural conditions permit.

C. All piping is to be installed, inspected and tested prior to operation in strict conformance with NFPA 54. Inspection and Testing is to be witnessed by general contractor's field superintendent with documentation of appropriate measures, test results, parties witnessing and completing work close out documentation provided to Owner.

PART 2 - PRODUCTS

2.1 STEEL PIPES

A. Butt welded, electric resistance welded, or seamless black steel pipe, ANSI B 36.10, ASTM A-53, Grade "B" or "A", Schedule 40 for piping 10" and smaller, 0.375 wall thickness for piping 12" thru 24" diameter, for the following services:

1. Gas piping.
2. Mill wrap all uninsulated underground steel pipe with Republic X-Tru-Coat or equal.

2.2 STEEL PIPE FITTINGS

A. Flanges, fittings, unions and other products recognized as regularly available products to be marked in accordance with MSS SP-25. Markings on products of small size or shape may be omitted in the sequence allowed by MSS SP-25, except manufacturers' name or trademark.

B. Fittings 2-1/2" and larger to be standard weight, carbon steel, buttwelding fittings conforming to ASTM A-234 and ANSI B16.9.

C. Branch connections from mains or headers 2-1/2" or larger to be welded tees or welding outlets. Outlets to be equal to Weldolets or Threadolets manufactured by Bonney Forge. Forged outlets to be used only if branch line is at least one pipe size smaller than main or header. Stub-in welded piping is not acceptable.

D. Fittings 2" and smaller to be threaded, Class 150, standard, malleable iron fittings, conforming to ANSI B16.3 and ASTM A-197

E. Flanges to be 150 lb. carbon steel conforming to ASTM A-105, ASTM A-181, and ANSI B16.5.

F. Unions to be Class 150 malleable iron with bronze-to-iron ground joint conforming to ANSI B16.39, ANSI B1.20.1, and ASTM A-197

G. Bolting materials to be semi-finished carbon steel bolts and hex nuts conforming to ASTM A-307. Threads and dimensions to be in accordance with ANSI B1.1 and B18.2.

H. Thread lubricant to be Crane "Formular 425" or equal. Approved Teflon tape may be used at Contractor's option.

I. Gaskets to be 1/8" thick "Cranite", "Sepco" or equal.

2.3 VALVES

A. Valves are specified by Stockham model numbers to establish quality levels unless otherwise noted. Crane, Milwaukee, Hammond, Nibco, Stockham, Centerline, Apollo, Kitz, or Watts are considered equal manufacturers. Provide clamp lock hand lever operators on valves less than 8 inches. Provide hand wheel and closed housing worm gear on valves 8 inches and larger unless indicated otherwise below. Provide chain operators for all equipment room and powerhouse valves 4 inch and larger which are located over 6 feet 6 inches above the finish floor.

B. Gate Valves:

1. Gate valves for 2-1/2" and larger steel piping systems to be Class 125, cast iron body, bronze mounted, flanged ends, Stockham Figure G623. Valves to have solid wedge disc, outside stem and yoke with rising stem, and bolted bonnet.
2. Gate valves for 2" and smaller steel piping systems to be Class 125, bronze body, screwed ends, Stockham Figure B105. Valve to have solid disc, rising stem, and union bonnet.

C. Ball Valves:

1. Ball valves for copper water piping systems 2-1/8" O.D. and smaller to be equal to Apollo "3" Figure 82-200, solder ends, and for 2-5/8" thru 3-1/8" O.D. to be equal to Apollo Figure 70-100, threaded ends. Valves to have bronze body, chromium plated bronze ball, teflon seats, stuffing box ring and seals, and quarter turn on-off. Valves to be rated for 400-psi WOG at 200 degrees F. Install threaded end valves with brass adapters.

D. Plug Valves: Plug valves shall be lubricated cylindrical plug valves constructed of ASTM A-126, grade B semi-steel and rated for 150 psig working pressure. Square head shall move from fully opened to fully closed with quarter turn of plug. Plug shall float in lubricant. Teflon head seat gasket shall be backed by lubricant reservoir. Valves 2" and smaller shall have screwed ends, 2-1/2" and larger to be flanged. Provide one wrench per valve size and mount on rack in equipment room. Homestead #611 for valves 2" and smaller, Homestead #612 for valves 2-1/2" through 6", Homestead #612-GW for valves 8" and larger. Valves to be factory pre-lubricated with Homestead #204.

2.4 GAS SHUTOFF VALVES

A. Shutoff valves shall be provided at each piece of equipment and shall be Class 125 gas line cocks with cast iron body, bronze plug and washer, and iron nut, Crane Figure 324.

2.5 HANGERS

A. Non-insulated steel piping 1/2" thru 24" with no longitudinal movement to be Grinnell Figure 260, MSS SP-69 Type 1, adjustable clevis hanger.

B. Support steel pipe risers by Grinnell Figure 261, MSS SP-69 TYPE 8, riser clamps at floor slab penetrations.

C. Support three or more parallel lines by trapeze hangers utilizing Unistrut channel or equal in bottom mounting arrangement with rod hanging support.

D. Provide concrete inserts, Grinnell Figure 282, MSS SP-69 TYPE 18, universal concrete insert, for attaching hangers to building structure. Inserts to be adequately sized and correctly positioned to support piping, valves, etc., when full of water and system is in operation.

E. Provide C-clamps with locknut, Grinnell Figure 86, MSS SP-69 TYPE 23, where piping is to be hung from steel beams. Welding hanger rods to steel members is not permitted. Provide malleable beam clamps, Grinnell Figure 218, MSS SP-69 TYPE 30, with extension piece, Grinnell Figure 157, where piping is hung from bar joist.

F. Support all piping by heavy steel, adjustable hangers, or brackets suitably fastened to structural portion of building. Place hangers in accordance with following table:

STEEL PIPE SUPPORTS	
SIZE (IN.)	DISTANCE BETWEEN SUPPORTS (FT.)
3/4 - 1-1/4	8
1-1/2 - 2-1/2	10
3	12
4 - 6	14
8 - 12	16
14 - 24	20

G. Perforated metal, strap iron, or band iron hangers are not permitted. Offsets in hangers are not allowed. Pipe risers to be supported at regular intervals in pipe shafts within the limits of good practice.

H. Support horizontal piping across roof in accordance with Specification Section.

PART 3 - EXECUTION

3.1 COORDINATION

A. Install piping as shown on coordinated shop drawings not to interfere with opening of doors or other moving parts. Do not install piping near or directly over any portion of electrical equipment.

3.2 FIRE-RATED PARTITIONS

A. Provide permanent firestop system at all piping penetrations of fire-rated walls and floors. The firestop system shall have been tested and approved in accordance with ASTM E119 and U.L. 1479 (ASTM E814) and classified for up to 2 hours fire rating. Firestop system shall be type detailed on drawings or intumescent type capable of expanding up to 8 times its original volume. Firestop system to be 3M, Hilti, Nelson, Johns Manville, or Specified Technologies. Firestop system shall be installed in strict accordance with published U.L. approved installation instructions. Piping to pass through the fire-rated partition insulated or non-insulated as specified and detailed. Submit U.L. approved installation drawing for each type of penetration prior to construction.

3.3 NON-RATED PARTITIONS

A. Piping to pass through the walls insulated or non-insulated as specified. Wall should be finished to fit neatly around the piping. Firestopping is not required at non-rated partitions.

3.4 PIPING PROJECTING THROUGH FINISHED SYSTEMS

A. Provide chromium-plated escutcheon plates for exposed uninsulated pipes projecting through floors or walls in finished spaces. Mechanical rooms and janitor closets are not considered "finished" spaces.

3.5 QUALITY AND ADJUSTMENT

A. Hang piping so equipment, flanges, and connections do not bear weight of piping.

B. Adequately support vertical lines at their bases or by a suitable hanger placed in horizontal line near riser or by a base fitting set on pedestal.

C. Run piping in straight lines; riser lines to be plumb with such offsets only as indicated or necessary. No sagging of lines permitted.

3.6 PIPING IN TRANSFORMER, ELECTRICAL, AND ELEVATOR EQUIPMENT ROOMS

A. Refer to drawings. No piping permitted in transformer, electrical, or elevator equipment rooms.

3.7 METHODS AND ASSEMBLY

A. Ream pipe after cutting to full bore. Remove foreign matter from inside of pipe before installing. Keep installed piping free from dirt and scale and protect open ends from foreign matter. Use temporary plugs or other approved methods of open end closure.

B. Threads to be right-hand, pipe standard, clean cut, full depth, and tapered. Joints to be made tight without caulking. Approved pipe joint lubricant to be used, applied in thin layer to the male thread only.

C. Piping to have sufficient number of flanges or unions for convenient installation and removal of piping and equipment.

D. Remake or replace defective, leaking, or otherwise unsatisfactory joints or material. Peening, caulking, or doping of piping is not permitted.

E. Install piping to prevent stresses and strains to piping and hangers from expansion or contraction. Provision for proper loops, offsets, or expansion joints to be responsibility of Contractor. Make provision for servicing and removal of equipment without dismantling piping.

F. Pressure test as required by Section 23 01 00. Coordinate witnessing of testing with general contractor and/or commissioning agent.

3.8 VALVE ACCESS

A. Locate all shutoff and control valves for easy access and operation. Where valves must necessarily be located in enclosed spaces, they shall be provided with access panels of sufficient size for operation. Furnish these access panels to proper trades for installation.

END OF SECTION

SECTION 22 42 13 - COMMERCIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.1 MANUFACTURERS

A. Provide plumbing fixtures and drains as listed on drawings and described herein. Fixture numbers are Kohler products. Equal fixtures by Zurn, American Standard, Crane or Sloan will be considered equivalents.

B. All drainage products to be Josam, Zurn, J.R. Smith, MIFAB, Wade or Watts. All drains installed above slab to be complete with clamping device.

C. Stainless steel sinks shall be Just, Elkay, or Kohler.

D. Flush valves shall be Zurn-AV or Sloan Royal, no exceptions.

E. Pressure balancing shower valves shall be Symmons, Leonard (Pam II), or Powers Hydro Guard T/P 700 series.

F. Commercial or public faucets shall be Zurn, Chicago Faucets, Symmons, Kohler, American Standard, or Speakman.

G. Gooseneck faucets shall be Zurn, Chicago Faucet, T & S, Kohler, American Standard, or Speakman.

H. Fixture supplies, stops, and traps to be commercial grade McGuire, E.B.C., Zurn, or approval equal. Traps to be 17 gauge with wall flange. Supplies and stops to be heavy pattern with wheel handle unless noted otherwise.

I. Water closet seats shall be Bemis, Church, Kohler, Beneke, or Olsonite.

J. Thermostatic mixing valves shall be Symmons, Holby, Powers, or Leonard.

K. China or enamel fixtures to be white color, unless otherwise noted.

L. All wall-mounted lavatories shall be capable of supporting a minimum vertical load of 250 pounds. Install wall-mounted lavatories with floor-anchored carriers which fit in standard stud walls.

M. All products used for dispensing potable drinking water must be lead free and meet the requirements of NSF 61 and NSF 372 test standards via third party testing and certification.

PART 2 - PRODUCTS

2.1 FIXTURES

P-1 Water Closet - Public, Floor Mounted, Barrier-Free, 1.6 Gallon:
Kohler K-96057
Kohler K-4670-C seat
Zurn Z-6000-AV-WS1

P-2 Urinal, Barrier-Free:
Kohler K-4991-ET
Zurn Z-6003-AV-WS1
Install 17" from rim to finished floor

P-3 Lavatory, Wall Hung, Barrier-Free, Public:
Kohler K-2005
Symmons S-20 single lever faucet
Wilkins Model 38-ZW3870-XL-T mixing valve
Zurn Z8743 grid drain
Zurn ZH8822-XL-LR supplies
Zurn Z8700 p-trap
Zurn wall carrier

P-4 Shower, Tile:
Symmons C-96-1-X-231
Zurn ZN-415-5B

P-5 Service Sink:
Stern-Williams SBC-1500 BP (24"x 24"x12") with stainless steel caps, two tiling flanges, back panels (corner mounted sink).
Zurn Z843M1-XL faucet with vacuum breaker
Provide in-line spring-loaded check stops

P-6 Wall Hydrant, Exterior:
Zurn Z-1310, non-freeze with vacuum breaker and stainless steel face
Install 18" above finished grade

P-7 Floor Drain, 9” Mechanical Room:
Zurn ZN-508-P-Y, nickel bronze top, sediment bucket, trap primer

P-8 Floor Drain, Regular:
Zurn ZN-415-P-Y B strainer, nickel bronze top, trap primer, sediment bucket

PART 3 - EXECUTION

3.1 REQUIREMENTS

A. Water closets shall be installed complete with wall carriers, wax rings, bolt caps, and flush valves (or float valves).

B. Elevated vacuum breakers, where specified, shall be installed 7'-6" above the finished floor.

C. Countertop sinks shall be installed complete with required mounting rim or clips.

D. After installation, all fixtures shall be cleaned and labels removed. Where fixtures are in contact with walls, floors, or countertops, caulking shall be applied. Caulking shall be General Electric white silicon sanitary sealant.

E. Water closets identified on plans as barrier free fixtures shall have the flush valves installed per American Disabilities Act. Flush valves shall have the handle installed on the wide side of the stall. Coordinate with the architectural drawings.

F. Non pre-fabricated showers shall have chloraloy 240 brand non-plasticized chlorinated polyethylene concealed waterproofing membrane .040 inch thick. Installation shall be per manufacturers recommendations.

G. At each floor drain installed above slab on grade, install a 36" x 36" apron equal to chloraloy 240 brand non-plasticized chlorinated polyethylene concealed waterproofing membrane, .040 inch thick, waterproofing membrane to be installed per manufacturers recommendations.

END OF SECTION

SECTION 23 01 00 - GENERAL PROVISIONS OF HVAC SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide all labor, materials, tools, and services for a complete installation of equipment and systems contained in contract documents.

B. Principal features of work included are:

1. Heating, ventilating, and air-conditioning system.
2. Control system including line and low voltage control wiring and conduit.
3. Demolition of existing equipment, ductwork, and piping.
4. Seismic bracing and anchorage for equipment, ductwork, and piping.

1.2 RELATED WORK

A. Electrical power and interlock and control wiring and conduit.

B. Field painting of equipment, ductwork, and piping.

1.3 GENERAL

A. The contract documents form a guide for a complete system. Provide all items necessary to provide a complete system but not specifically mentioned, such as hangers, transitions, offsets, and drains.

B. Layouts indicated on drawings are diagrammatical only. Coordinate exact location of equipment, ductwork, and piping to eliminate conflict with other divisions. Designer reserves right to make reasonable changes in location of equipment, ductwork, and piping prior to construction.

C. Should Contractor find during progress of work that in his judgment existing conditions make desirable a modification, report such item promptly to Designer for instructions. Do not make deviations from contract documents without review of Designer.

D. Supervise all work with a competent mechanic specifically qualified in mechanical discipline.

1.4 PERMITS

A. Secure and pay for permits, licenses, and inspections for work under this division.

1.5 CODES

A. Comply with all pertinent local, state, and national codes. Refer to Division 01.

1.6 STANDARDS

A. Comply with all pertinent standards. This list is provided as a convenience to Contractor and is not to be considered all inclusive.

1. Sheet Metal and Air-Conditioning Contractors National Association (SMACNA).
2. American Gas Association (AGA).
3. Air Moving and Conditioning Association (AMCA).
4. Air-Conditioning, Heating and Refrigeration Institute (AHRI).
5. American Society of Mechanical Engineers (ASME).

1.7 SUBMITTALS

A. Submit for review complete brochures and shop drawings for materials and equipment proposed in accordance with Division 01.

1. Brochures: Submit complete descriptions, illustrations and specification data for materials and equipment proposed. Clearly indicate proposed items when other items are shown on same sheet. Submit samples on request and/or set up for inspection. Samples will be returned to Contractor.
2. Submittals shall be submitted in line by line format. Each submittal shall be provided with a cover letter and supporting documentation indicating how the submittal meets each line of the referenced specification section. All discrepancies between the construction documents and the submitted product shall be clearly identified for engineer evaluation.
3. If a product other than the basis of design is rejected by the engineer for any reason, the Contractor shall provide the basis of design product at no additional cost to the Owner.
4. Shop Drawings:

a. Control systems.
b. Complete equipment, ductwork, and piping systems in equipment rooms.
c. Complete equipment, ductwork, and piping systems in entire building.
d. Underground steam distribution and chilled water system.
e. Owner furnished equipment rough-in layouts.
f. Kitchen hood and grease exhaust ductwork systems.
g. Firestop systems.

1.8 PROJECT MAINTENANCE MANUALS

A. Prior to final acceptance of project, provide Owner with bound maintenance manuals in accordance with Division 01.

1.9 PROJECT TECHNICAL INSTRUCTION

A. Prior to final inspection of project, provide technical instruction to Owner as follows:

1. Field Instruction: Provide explanation of how systems and equipment are to operate during each season and during emergencies.
2. Field Demonstration: Demonstrate operation and routine maintenance for systems and equipment.
3. Video: Provide digital video of all field instruction and demonstration to Owner at completion.

1.10 PROTECTION

A. Protect all materials and equipment in accordance with Division 01.

B. The contractor must take appropriate precautions, during construction, to prevent unnecessary dust and debris from getting into air and water handling systems by covering equipment, controls and open-ended ducts and pipes as the installation progresses.

1.11 CONSTRUCTION RECORD DOCUMENT

A. Provide construction record documents in accordance with Division 01. Keep at the project one set of drawings and daily record changes at the time they are made. Give drawings to Owner at project completion.

1.12 EXISTING SERVICES

A. Maintain existing services in operation during construction. Coordinate and schedule all service interruptions with Owner.

1.13 OWNER NOTIFICATION

A. Notify Owner two weeks prior to activation of central chilled water and steam service to project.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Provide materials and equipment of domestic manufacture bearing the U.L. label when such label is available.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate work in accordance with Division 01. Coordinate locations of equipment, ductwork, and piping to eliminate conflict with other divisions.

B. Carefully examine contract documents to be thoroughly familiar with items which require plumbing or mechanical connections and coordination.

C. Provide proper chases and openings. Place sleeves and supports prior to pouring concrete or installation of masonry.

3.2 CUTTING AND PATCHING

A. Repair or replace routine damage caused by cutting in performance of contract.

B. Correct unnecessary damage caused due to installation of mechanical work.

C. Perform repairs with materials that match existing in accordance with the appropriate section of these specifications.

3.3 FLASHING, COUNTERFLASHING, AND SEALING

A. Flash, counterflash, and seal ductwork and piping at penetrations of roofs and outside walls.

3.4 TRENCHING, EXCAVATION AND BACKFILLING

A. Provide trenching, excavation, and backfilling necessary for performance of mechanical work accordance with Division 31.

B. Trenching and excavation of rock to be as described in Division 31.

C. Excavate to a depth at least 6" below bottom of pipe and a minimum of 36" above top of pipe. Fill below pipe, around pipe, and minimum of 12" above pipe with sand or Class "B" crushed stone tamped firm and even. Provide topsoil for final layer of dirt (12" minimum). Provide 6" spacing between pipes and between pipe and trench sides. Hand-grade with batterboards placed every 25'. Backfill by hand. Do not use rock or stone above sand or Class "B" crushed stone.

3.5 CONNECTION TO EQUIPMENT

A. Rough-in and connect to sterilizers, lab equipment, kitchen equipment, and Owner furnished equipment and provide a shutoff valve and union at each connection. Provide steam strainer and steam trap for steam equipment. Operating valves and/or controls for this equipment will be provided as an integral part of the equipment. Do not rough-in until shop drawings showing rough-in locations have been reviewed by Designer.

3.6 FOUNDATIONS AND PADS

A. Provide foundations, pads, and bases required for equipment. Concrete to be in accordance with concrete division of specifications.

B. Coordinate proper sizes and locations of foundations, pads, bases, anchors, supports, and other items to be built into structure.

3.7 IDENTIFICATION

A. Control compressed air and buried lines need not be marked.

B. Identify all mechanical equipment with engraved brass, aluminum, or stainless steel nameplates or tags. Use equipment names and numbers appearing in schedules on drawings. Fasten nameplates to equipment using screws. Glue or adhesive is not acceptable. Fasten tags to equipment using brass, aluminum or stainless steel chains.

C. Frame and mount control diagrams and sequences in each equipment room. Use non-fading black and white prints encased in aluminum frame with plexiglass cover.

3.8 CLEANING

A. Thoroughly clean ductwork and equipment casings before fans and filters are operated.

B. Repair damaged factory finishes covering all bare places and scratches.

3.9 TESTING

A. Test all installed equipment and systems and demonstrate proper operation. Correct and retest work found defective when tested.

B. Thoroughly check piping system for leaks. Do not add any leak-stop compounds to the system. Make repairs to piping system with new materials. Peening, doping, or caulking of joints or holes is not acceptable.

C. Conduct air or smoke test if in opinion of Designer reasonable cause exists to suspect leakage or low quality workmanship.

D. Test compressed air piping with Nitrogen at 100 psi for two hours without leaks.

E. Test HVAC systems water piping and steam supply and steam condensate return piping at a water pressure of 125 psig for two hours without leaks.

F. Vibration Tests:

1. Test vibration isolation system in accordance with methods and procedures described in the Testing, Adjusting, and Balancing Chapter in the latest edition of ASHRAE Applications Handbook.

2. Verify all vibration isolation systems are free floating and not short circuited by any connection between equipment and building structure.
3. Operate mechanical systems and verify visually and audibly that there is no excessive vibration or noise generated by the system.

3.10 SYSTEM TESTING, ADJUSTING, AND BALANCING (TAB)

A. Procure services of an independent testing, adjusting, and balancing agency to test, adjust, and balance mechanical systems. Submit TAB agency for review. Provide references of at least five completed projects of similar size and scope. TAB agency to be certified member of Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).

B. Begin TAB after system has been completed and is in full working order. Place mechanical systems into operation and continue operation during each working day of TAB. Work performed by TAB agency to be under direct supervision of qualified TAB technician. Accurately calibrate and maintain in good working order instruments used in performance of TAB.

C. Air System Testing, Adjusting, and Balancing:

1. Set controls so air terminal units are operating at maximum design airflow.
2. Verify proper fan rotation.
3. Adjust fan RPM to design requirements.
4. Record rated and actual motor full load amps.
5. Make pitot tube traverse of main ducts and obtain design CFM at fans.
6. Record system suction and discharge static pressures.
7. Adjust system for design CFM supply air.
8. Adjust system for design CFM return air.
9. Adjust system for design CFM outside air.
10. Adjust system for design CFM exhaust air.
11. Verify maximum and minimum supply cfm for each air terminal unit and adjust as required to design cfm.
12. Adjust each air device to within 10% of design cfm. Adjust air devices to minimize drafts and noise. Identify each air device location and area served.
13. After adjustment of air terminal units and air devices, recheck fan cfm, static pressures, and motor full load amps.
14. Record design, initial, and final readings for each fan, air terminal unit and air device.
15. As recommended by TAB agency, Contractor to make changes in fan drives and add balancing dampers at no additional cost to provide proper balance.

D. Perform work, record data, and submit complete TAB report to Designer for review upon completion.

E. Designer may request a recheck or resetting of any item listed in report. Provide tests Designer may request.

F. Designer will accept job on basis of tests and inspections. A representative of TAB agency and control system manufacturer is to be in attendance to assist final inspection. Furnish necessary mechanics to operate system, make any necessary adjustments, and assist with final inspection. In addition to requirements of Division 01, complete the following before requesting a final inspection.

1. Work required under this division of specifications.
2. System testing, adjusting, and balancing.
3. Control system commissioning.
4. Furnish required project maintenance manuals and control diagrams and sequences.

END OF SECTION

SECTION 23 05 13 - ELECTRIC MOTORS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide and install electric motors for mechanical and plumbing equipment.

1.2 SUBMITTALS

A. Submittal data is NOT required for products under this section as separate items. It is assumed they will be reviewed with appropriate equipment submittal.

PART 2 - PRODUCTS

2.1 MOTORS

A. Electric motors shall be new NEMA Standard, sized and designed to operate at full load and full speed continuously without causing noise, vibration, and temperature rise in excess of their rating.

B. Motors on belt driven equipment shall have slide rails with adjusting screws for belt tension adjustment. Motors exposed to the weather shall be weather protected.

C. High efficiency electric motors shall be provided for all motors 3 horsepower and greater. Any motor used with a variable speed motor controller shall be high efficiency type and VFD compatible.

D. High efficiency motors shall have efficiency and losses determined in accordance with the latest revisions of IEEE Standard 112. Polyphase squirrel-cage motors rated 1 through 125 horsepower shall be tested by dynamometer method B. The efficiency shall be determined using segregated losses in which stray load loss is obtained from a linear regression analysis to reduce the effect of random errors in the test measurements. Guaranteed minimum full load efficiency shall be as follows:

MINIMUM NOMINAL FULL-LOAD EFFICIENCY (%)		
	Open Motors	Enclosed Motors
Number of Poles	4	4
Synchronous Speed (RPM)	1750	1750
Motor Horsepower		
3	86.5	87.5
5	87.5	87.5
7.5	88.5	89.5
10	89.5	89.5
15	91.0	91.0
20	91.0	91.0
25	91.7	92.4
30	92.4	92.4
40 – 75	93.0	93.0
100 above	94.1	94.5
Refer to Latest Edition of ASHRAE 90.1 for other motor rpm and efficiencies.		

E. Motor sound power levels shall not be greater than recommended in NEMA M61-12.49.

F. Motors shall be provided with drive shafts long enough to extend completely through belt sheaves.

G. Motor characteristics shall be as follows:

1. 120V/1/60 Hz: Capacitor start, open drip-proof type, ball bearing, rated 40 degrees C. continuous rise.

PART 3 - PRODUCTS

3.1 INSTALLATION

A. Arrange and set motors.

B. Line up motors on direct drive equipment using dial type gauges.

C. Electrical Contractor to make connections and test motor for proper rotation/phasing.

3.2 ADJUSTMENTS

A. All motors together with driven equipment shall be statically and dynamically balanced by equipment supplier, start-up representative, or this contractor using approved balancing equipment. Fan vibration should be limited to manufacturers' recommendations, but should not exceed 2 mils in any case.

END OF SECTION

SECTION 23 05 49 - BASIC MATERIALS AND METHODS FOR HVAC

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Work required under this section of the specifications consists of basic materials and methods applicable to work under Division 23.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATION

A. Isolate equipment as shown on drawings and as specified herein with factory-fabricated vibration isolators in accordance with recommendations in the latest edition of ASHRAE Applications Handbook. Isolators shall be manufactured by Kinetics, Mason Industries, or approved substitute. Provide isolators by a single manufacturer. Provide isolators of proper sizes and weight loading to meet the requirements. Provide isolators as follows:

1. Floor-mounted fiberglass or neoprene rubber pads, Kinetics Model KIP.

2.2 V-BELT DRIVES

A. Provide all fan drives with V-belts rated for 150% of nameplate motor horsepower. Provide adjustable pitch motor sheaves for motor sizes through 20 hp. For motor sizes 25 hp and larger provide fixed pitch motor sheaves after balancing to within plus 5% of design air quantity. Select motor sheaves so centerline does not extend past end of motor shaft and such that motor bearing grease fitting and relief port is not obstructed.

B. Provide belt guards for all belt driven equipment. Provide expanded metal cover with access to driven shaft for tachometer.

2.3 FOUNDATIONS AND PADS

A. Provide foundations, pads, and bases required for equipment. Concrete to be in accordance with concrete division of specifications.

B. Coordinate proper sizes and locations of foundations, pads, bases, louvers, anchors, supports, and other items to be built into structure.

2.4 FASTENINGS TO STRUCTURES

A. Provide structural fastening devices for equipment, materials, piping and ductwork. Devices to be concrete inserts, expansion shields and lag bolts, and through bolts-washers-nuts. All bolted devices to use jamb nuts. Inserts to be continuous type as manufactured by Unistrut or approved substitute. Install per manufacturer's published installation instructions in lengths to suit specific application, complete with spring nuts, end caps, and plastic coated filler to prevent concrete seepage.

B. Use of power drive "shot-pins" is permitted only for ducts 20" in width and smaller and single pipes 1" and smaller.

PART 3 - EXECUTION - NOT APPLICABLE

END OF SECTION

SECTION 23 07 10 - INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Contractor shall provide all necessary labor, materials, tools, and equipment to perform work required on the drawings and specified herein.

B. Certain equipment and/or systems to be factory insulated by manufacturer. Factory insulation materials to be as specified in applicable sections of the specifications.

C. All pipe fittings, valves in insulated pipe systems to be insulated.

D. Thermal resistance "R" values used herein are expressed in units of "Hour, Degrees F., Sq. Ft./BTU per Inch of Thickness" on a flat surface at a mean temperature of 75 degrees F.

E. "Contractor's Option" referred to in Materials below indicates optional materials which may be used as equals.

1.2 DEFINITIONS

A. "Exposed" equipment, ducts, and piping are areas which will be visible without removing ceilings or opening access panels.

B. Outdoors is considered exposed to the weather.

C. Underground is buried, whereas in a trench below grade is considered concealed.

1.3 CERTIFICATION/QUALITY ASSURANCE

A. Products shall meet applicable national, state, and local building codes and be U.L. (or other recognized testing lab) listed for intended service.

B. All insulations, jackets, adhesives, coatings, sealers, and tapes shall have a flame spread rating of 25 or less and smoke development rating of 50 or less when tested in accordance with ASTM E-84, NFPA 225, U.L. 723, and further must meet the requirements of NFPA 90-A and applicable building, plumbing, and mechanical codes.

C. All insulation materials shall be delivered and stored in manufacturers' containers and kept free from dirt, water, chemical, and mechanical damage. Under no circumstances shall insulation applied to exterior ductwork be allowed to get wet prior to final material covering.

D. Insulation shall be applied in a workmanlike manner by experienced, qualified tradesmen.

E. Insulation shall not be applied until all pressure testing has been completed, inspected, and released for insulation application.

F. Surfaces shall be clean and dry.

G. Insulation joints shall be butted firmly together and all jackets and tapes shall be smoothly and securely installed.

H. Insulation for duct, pipe, and equipment for above grade exposed to weather outside building shall be certified as being self-extinguishing for 1" thickness in less than 53 seconds when tested in accordance with ASTM D-1692.

1.4 APPLICABLE CODES AND STANDARDS

A. ASTM E-84.

B. U.L. 723.

C. NFPA 90-A.

PART 2 - PRODUCTS

2.1 MATERIALS FOR PIPE AND EQUIPMENT

A. Materials for Pipe and Equipment: Provide factory pre-molded or shop or site mitered segment type insulation for pipe, pipe fittings, and valves. Fitting insulation to be of same thickness and material as adjoining pipe insulation. All insulation and related materials such as tape and mastic to meet applicable building code requirements for fire and smoke development.

1. Flexible Tubular: Provide 25/50 rated, closed-cell, flexible tubular rubber type pipe insulation. Product to have continuous operational temperature limit of 200 degrees F. and a minimum "R" value of 3.7 per inch (K=0.27) at 75 degrees F mean temperature. Product to be Armstrong AP Armaflex or approved equal pipe insulation. Use flexible tubular for the following services:

a. Moisture condensate drains: 1" thick.
b. Horizontal runs of waste lines carrying cold condensate from air conditioning equipment: 1" thick.
c. Refrigerant suction lines for split systems: 1" thick.
d. Provide multiple layers as required to obtain minimum thickness.

2.2 MATERIALS FOR DUCTS

A. Blanket Type Duct Insulation: Provide minimum 3/4 pound per cubic foot density, flexible blanket fiberglass duct insulation with FSKL aluminum foil vapor barrier facing and 2" tab. Insulation shall have minimum ‘R’ value of 3.4 per inch (K=0.29) at 75 degrees F mean temperature. Product to be Manville "Microlite" or equivalent standard duct wrap by CertainTeed, Knauf, or Owens-Corning. Use blanket type duct insulation for the following:

1. Unlined heating and/or cooling supply and return air ductwork concealed from view: 2" thick.
2. Unlined outside air ductwork concealed from view: 2" thick.
3. Unlined heating and/or cooling supply and return air ductwork located in attic: 2-1/2" thick.
4. Lined heating and/or cooling supply and return air ductwork located in attic: 2" thick.
5. Unlined return air ductwork located in attic: 2-1/2" thick.

B. Board Type Duct Insulation: Provide minimum 3 pound per cubic foot density, semi-rigid fiberglass duct insulation with FSKL aluminum foil vapor barrier facing. Insulation shall have a minimum 'R' value of 3.8 per inch (K=0.26) at 75 degrees F mean temperature. Product to be Manville "800 series Spin-Glas" or equivalent by CertainTeed, Knauf, or Owens-Corning. Use board type duct insulation for the following services:

1. Unlined exposed heating and/or cooling supply air ducts: 1-1/2" thick.
2. Unlined exposed outside air ducts: 1-1/2" thick.
3. Unlined exposed return ducts: 1-1/2" thick.

PART 3 - EXECUTION

3.1 GENERAL

A. No insulation shall be cut where a hanger is located. If hangers have been installed by pipefitter tradesmen which violates this strict requirement, notify Designer immediately.

B. Piping and ductwork systems shall be tested and found free of all leaks prior to installation of insulation covering.

C. All surfaces shall be clean and dry when covering is applied. Covering to be dry when installed and during application of any finish, unless such finish specifically requires a wetted surface for application.

D. All adhesives, cements, and mastics shall be compatible with materials applied and shall not attack materials in either wet or dry state.

E. Install insulation using professional insulators who have adequate experience and ability.

F. Exposed-to-view insulation shall have a well tailored appearance.

G. Stop all duct coverings, including jacket and insulation, at fire and smoke dampered penetrations of partitions. "Fan-Out" or extend jacketed insulation at least 2" beyond angle frames of dampers and secure insulation to partition. Maintain vapor barrier. Where insulated duct access door is not used, install covering over damper access panel so as to be readily removable and identifiable.

H. Treat insulated pipe and duct surfaces in equipment rooms and where exposed to normal view, so surfaces may be painted with water base latex paint. Use of mastics, adhesives, or jacketing which cause "bleeding" is prohibited.

3.2 INSTALLATION OF DUCT COVERING

A. Apply jacketed blanket type fiberglass covering to ducts pulled snug but not so tight as to compress corners more than 1/4". Use insulation having 2" tab, or cut insulation long enough to allow for "peel off" of insulation from jacket to effect a minimum overlap of 2". Secure 2" jacket laps using equivalent of Foster 85-75 or CP-82 adhesive and staple lap with flare type staples on 2" centers. Cover standing seams, stiffeners, and braces with same insulation blanket, using 2" jacket lap and staple lap as hereinbefore outlined. Cover and seal all staples with Foster 30/80 AF, fire resistant vapor barrier coating reinforced with glass cloth.

B. For duct 24" or wider, mechanically fasten insulation to duct bottom, using weld pins or nylon "stick-clip" base plates having self-locking coated metal or nylon discs. Locate fasteners on not over 12" centers laterally and longitudinally. Seal pins as above.

C. For ducts more than 20” deep, mechanically fasten insulation to duct sides, using one row of pins, plates, or discs located on not over 12" centers longitudinally and equidistant laterally between duct top and bottom. For ducts over 24" deep, apply fasteners as before only using minimum of two rows.

D. Apply jacketed board type fiberglass covering to ducts using weld pins or nylon "stick-clip" base plates having self-locking coated metal or nylon discs. Locate fasteners on not over 12" centers laterally and longitudinally. If insulation is grooved to fit around corners, in order to eliminate as many joints as possible, pin as required to hold insulation tight to duct, especially on bottom of duct. Seal pins and joints with Foster 30-80 AF reinforced with glass mesh.

E. Cover all joints, rips, tears, punctures, disc heads, staples, or breaks in vapor barrier jacket with 4" wide woven glass fabric tape embedded in Foster 30-80 AF fire resistant vapor barrier coating. PRESSURE SENSITIVE TAPE NOT ALLOWED.

3.3 INSTALLATION OF PIPE AND EQUIPMENT COVERING

A. Where fiberglass or flexible tubular insulation is used on piping sized 2" and larger, insert a section of foamglass insulation at hanger or support points between pipe and metal shield for full length of shield to prevent crushing of insulation. Insulation thickness to be same as adjoining insulation. Where insulation passes through pipe hangers and across trapeze supports, 12" long metal saddles shall be used. On cold pipe, vapor barrier should be carried through the hanger and sealed.

B. Apply flexible tubular insulation to pipe and fittings using the slip-on method with all joints tightly fitted and sealed with Armstrong 520, Foster 85-75, Childres CP-82 adhesive or approved equal. Seal butt joints, miter joints and torn or damaged insulation with adhesive.

END OF SECTION

SECTION 23 09 23 - DIRECT DIGITAL CONTROL/BUILDING AUTOMATION SYSTEM (DDC/BAS)

PART 1 - GENERAL

1.1 DESCRIPTION

A. Direct Digital Control/Building Automation Systems (DDC/BAS) shall be Johnson Controls, Siemens.

B. All new points are to be mapped back to and integrated with existing front end. Provide software upgrade to accept new controllers and graphics updates if required to integrate project.

C. The work specified under this section of the specifications includes furnishing, installing, programming, and placing into operation the DDC/BAS systems. Systems shall be furnished, installed, and warranted by the manufacturer.

D. The DDC/BAS systems shall be furnished and installed under this section of the specifications and shall consist of microprocessor based digital system controllers. The systems shall have the ability for extension to other buildings by web addressable server. The systems shall be complete in every respect, including all auxiliary and accessory items as required, and shall be thoroughly coordinated so as to provide a compatible and completely workable system.

E. Provide a complete control system including electrical interlocks, wiring, conduit, relays, switches, control transformers, and other devices as required to accomplish automatic control of the mechanical systems. Refer to drawings for details.

F. All systems shall be guaranteed against defects of any nature and to operate properly for a period of not less than 12 months after final acceptance of the job by the Owner. During this period, the BAS manufacturer shall service and adjust the systems as required for proper operation, replacing components as required.

G. Submit complete shop drawings, equipment and component brochures, list of control valve CV and pressure drops, list of control dampers, written sequences of operations, diagrams indicating panels, gauges, components, spring ranges, and setpoints, and complete composite wiring diagrams indicating all equipment interlocks for entire control system.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT DESCRIPTION

A. The building automation system shall consist of the following:

1. Stand-alone DDC panels.
2. Power Monitoring Station (Additive Alternate).

3. Gas Meter
4. Water Meter

B. The system shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, stand-alone DDC panels, and operator devices.

C. System architectural design shall eliminate dependence upon any single device for alarm reporting and control execution. Each DDC panel shall operate independently by performing its own specified control, alarm management, operator I/O, and historical data collection. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

D. Stand-alone DDC panels shall be able to access any data from or send control commands and alarm reports directly to any other DDC panel or combination of panels on the network without dependence upon a central processing device. Stand-alone DDC panels shall also be able to send alarm reports to multiple operator workstations without dependence upon a central processing device.

2.2 NETWORKING/COMMUNICATIONS

A. The design of the BAS shall network operator workstations and stand-alone DDC panels.

B. Local Area Network:

1. Workstation/DDC Panel Support: Operator workstations and DDC panels shall directly reside on a local area network such that communications may be executed directly between controllers, directly between workstations, and between controllers and workstations on a peer-to-peer basis.
2. Dynamic Data Access: All operator devices shall have the ability to access all point status and application report data, or execute control functions for any and all other devices via the local area network.
3. General Network Design: Network design shall include the following provisions:
   a. High speed data transfer rates. The minimum transfer rate shall be 100 Mb (Mb/s).
   b. Commonly available, multiple source, networking components and protocols shall be used to allow the BAS to coexist with other networking applications. MAP, ETHERNET, IBM Token Ring and ARCNET are acceptable technologies.
   c. Use of an industry standard IEEE protocol.
   d. Synchronization of the realtime clocks in all DDC panels shall be provided.
   e. Permit at least four simultaneous users to access the system over the LAN, based on password level. Users shall have access to monitor parameters, change set points, set up trends, or start/stop controlled equipment. A remote user shall have this capability without having the system data base loaded on his/her remote computer.
   f. Paging/Email feature shall be provided with capability to telephone/email selected facility maintenance personnel to notify them of critical BAS alarms.
   g. Dial-Up Communications: The system shall allow interface into network through the use of auto-answer/auto-dial modems over telephone link as a secondary means of communication.

2.3 STAND-ALONE DDC PANELS

A. General: Stand-alone DDC panels shall be microprocessor based, multi-tasking, multi-user, real-time digital control processors. Each stand-alone DDC panel shall consist of modular hardware with plug-in enclosed processors, communication controllers, power supplies, and input/output modules.

B. Memory: Each DDC panel shall have sufficient memory to support its own operating system and databases.

C. Point Types: Each DDC panel shall support the following types of point inputs and outputs:

1. Digital Inputs for status/alarm contacts
2. Digital Outputs for on/off equipment control
3. Analog Inputs for temperature, pressure, humidity, flow, and position measurements
4. Analog Outputs for valve and damper position control, and capacity control of primary equipment
5. Pulse Inputs for pulsed contact monitoring

D. Expandability: The system shall be modular in nature, and shall permit easy expansion through the addition of software applications, workstation hardware, field controllers, sensors, and actuators.

E. Serial Communication Ports: Stand-alone DDC panels shall provide at least two RS-232C serial data communication ports for simultaneous operation of multiple operator I/O devices such as industry standard printers, laptop workstations, PC workstations, and panel mounted or portable DDC panel operator's terminals. Stand-alone DDC panels shall allow temporary use of portable devices without interrupting the normal operation of permanently connected modems, printers, or network terminals.

F. Hardware Override Switches: The operator shall have the ability to manually override automatic or centrally executed commands at the DDC panel via local, point discrete, on-board hand/off/auto operator override switches for binary control points and gradual switches for analog control type points. These override switches shall be operable whether the panel is powered or not.

G. Hardware Override Monitoring: DDC panels shall monitor the status or position of all overrides and inform the operator that automatic control has been inhibited.

H. Local Status Indicator Lamps: The DDC panel shall provide local status indication for each binary input and output for constant, up-to-date verification of all point conditions without the need for an operator I/O device.

I. Integrated On-Line Diagnostics: Each DDC panel shall continuously perform self-diagnostics, communication diagnosis and diagnosis of all subsidiary equipment.

J. Surge and Transient Protection: Isolation shall be provided at all network terminations, as well as all field point terminations to suppress induced voltage transients consistent with IEEE Standard 587-1980. Isolation levels shall be sufficiently high as to allow all signal wiring to be run in the same conduit as high voltage wiring where acceptable by electrical code.

K. Powerfail Restart: In the event of the loss of normal power, there shall be an orderly shutdown of all stand-alone DDC panels to prevent the loss of database or operating system software. Non-volatile memory shall be incorporated for all critical controller configuration data, and battery back-up shall be provided to support the real-time clock and all volatile memory for a minimum of 72 hours. Upon restoration of normal power, the DDC panel shall automatically resume full operation without manual intervention.

2.4 Power Monitoring Station

A. Electrical meters and instrument transformers shall meet or exceed the following minimum requirements as indicated: however, new electric meters shall be the same type (or equivalent) as those presently on the site for any location where additional meters are listed to be furnished and installed according to the Building Lists.

B. Acceptable manufacturers:

1. E-Mon Class 5000
2. Schneider Ion 7550/7650

C. For EEDRS Operator Workstation (OWS) the following parameters are to be displayed:

1. Total net energy in KWhr, MWhr or GWhr
2. Total power in KW
3. Total power demand (over 15 minutes) in KW
4. Total power demand (peak) in KW
5. Total apparent power in KVA
6. Total Reactive Power in KVAR
7. Voltage in Volts
8. Current in Amps
9. Power factor “+” for lead “-“ for lag
10. Frequency in Hertz

2.5 NATURAL GAS METER

A. Provide gas meters for the natural gas service line to the building. Natural gas meters shall be the Diaphragm, Rotary, or for high volume applications Turbine type with pulse output chosen to meet the specific application. Temperature, pressure and heating value compensation must be made to measure actual amount and value of gas moving through a meter.

B. Diaphragm Gas Meters with flow rates less than 500 cubic feet per hour shall conform to AGA B109.1. Diaphragm Gas Meters with flow rates of 500 cubic feet per hour and higher shall conform to AGA B109.2. Rotary Type Gas Meters shall conform to AGA B109.3. Turbine Type Gas Meters shall conform to ASME MFC-4M. Meters shall be pipe or pedestal mounted and be provided with a strainer immediately upstream. Meters shall be provided with over-pressure protection as specified in ASME B31.8. Include tamper-proof protection, frost protection and fungus-proof protection as applicable. Meters shall be suitable for accurately measuring and handling gas at pressures, temperatures, and flow rates present. Meters shall have a pulse switch initiator capable of operating up to speeds of 500 pulses per minute with no false pulses and shall require no field adjustments or calibration. Initiators shall provide the maximum number of pulses up to 500 per minute that is obtainable from the manufacturer. The minimum pulse rate shall not be less than one pulse per 100 cubic feet of gas.

C. Valves and pressure regulators are necessary at all points where pressure reduction or regulation is required by the user. Install a shut-off valve upstream of the regulator and both upstream and downstream of the meter. Provide a gas meter bypass line with a lockable valve for buildings with critical service.

2.6 VALVES

A. Valves shall be suitable for shutoff or isolation service and shall conform to the following: Steel valves 1-1/2 inches and smaller installed above ground shall conform to ASME B16.34, carbon steel, socket weld or threaded ends with handwheel or wrench operator. Steel valves 2 inches and larger installed above ground shall conform to API Spec 6D, carbon steel, buttweld or flanged ends, with handwheel or wrench operator.

2.7 SERVICE LINE REGULATORS

A. Pressure regulators for individual service lines shall have ferrous bodies. Regulator shall be capable of reducing distribution line pressure to pressures required for users. Regulators shall be provided where gas will be distributed at pressures in excess of 10 inches of water column. Pressure relief shall be set at a lower pressure than would cause unsafe operation of any connected user. Regulator shall have single port with orifice diameter no greater than that recommended by the manufacturer for the maximum gas pressure at the regulator inlet. Regulator valve vent shall be of resilient materials designed to withstand flow conditions when pressed against the valve port. Regulator shall be capable of regulating downstream pressure within limits of accuracy and shall be capable of limiting the buildup of pressure under no-flow conditions to 50 percent or less of the discharge pressure maintained under flow conditions. Regulator shall have a self-contained service regulator. Regulator pipe connections shall not exceed 2 inch size.

2.8 WATER METER

A. Water Meters shall be the turbine, propeller, or displacement type with pulse output chosen to meet the specific application (pipe size, flow, pressure, etc.).

1. New Water Meters: New water meters shall have an encoded output which is capable of integration to a local totalization device with local display and EEDRS. The encoded output shall display the actual dial reading of the water meter.

B. Turbine Type Meters

1. Turbine type meters shall conform to AWWA C701 Class I or Class II depending on the application. The main casing shall be bronze or cast iron protected by corrosion resistant coating with stainless steel external fasteners. Registers shall be straight-reading type, shall be permanently sealed and shall read in U.S. gallons. Connections shall be suitable to the type of pipe and conditions encountered. Register type shall be a direct reading remote register designed in accordance with AWWA C706 or an encoder type remote register designed in accordance with AWWA C707 but must be compatible with the local Utility Monitoring and Control System. Meters shall comply with the accuracy and capacity requirements of AWWA C701.

C. Propeller Type Meters

1. Propeller type meters shall conform to AWWA C704. Registers shall be straight-reading type, shall be permanently sealed and shall read in U.S. gallons. Connections shall be suitable to the type of pipe and conditions encountered. Register type shall be a direct-reading remote register designed in accordance with AWWA C706 or an encoder-type remote register designed in accordance with AWWA C707 but must be compatible with the local Utility Monitoring and Control System. Meters shall comply with the accuracy and capacity requirements of AWWA C703.

D. Displacement Type Meters

1. Displacement type meters shall conform to AWWA C700. Registers shall be straight-reading and shall read in U.S. gallons. Meters in sizes 1/2 through 1 shall be frost-protection design as required by the local environmental conditions. Connections shall be suitable to the type of pipe and conditions encountered. Register type shall be a direct reading remote register designed in accordance with AWWA C706 or an encoder type remote register designed in accordance with AWWA C707 but must be compatible with the local Utility Monitoring and Control System. Meters shall comply with the accuracy and capacity requirements of AWWA C700.

E. Compound Type Meters

1. Compound type meters shall conform to AWWA C702 and shall be furnished with strainers. The main casing shall be bronze or cast iron protected by corrosion resistant coating with stainless steel external fasteners. The main casing shall be tapped for field testing purposes. Registers shall be straight-reading type, shall be permanently sealed and shall read in U.S. gallons. The meter shall be equipped with a coordinating register. Connections shall be suitable to the type of pipe and conditions encountered. Register type shall be a direct reading remote register designed in accordance with AWWA C706 or an encoder type remote register designed in accordance with AWWA C707 but must be compatible with the local Utility Monitoring and Control System. Meters shall comply with the accuracy and capacity requirements of AWWA C702.

F. Fire Service Type Meters

1. Provide Fire Service Type Meters as required by the Installation. Fire service type meters shall be proportional type or turbine type conforming to AWWA C703 and shall be furnished with strainers. The main casing shall be bronze or cast iron protected by corrosion resistant coating with stainless steel external fasteners. Any isolation valves installed as part of the meter assembly shall either have tamper switches or be position indicating valves in accordance with NFPA. Registers shall be straight-reading type, shall be permanently sealed and shall read in U.S. gallons. The meter shall be equipped with a coordinating register. Connections shall be suitable to the type of pipe and conditions encountered. Register type shall be a direct reading remote register designed in accordance with AWWA C706 or an encoder type remote register designed in accordance with AWWA C707 but must be compatible with the local Utility Monitoring and Control System. Meters shall comply with the accuracy and capacity requirements of AWWA C703. When turbine type main line meters are used, the meter shall be supplied with a separate check valve, as a unit.

G. Meter Boxes

1. Meter boxes shall be of cast iron, concrete, or plastic. The boxes shall be of sufficient size to completely enclose the meter and shutoff valve or service stop. Meter boxes set in paved areas subject to vehicular traffic shall be cast iron, or concrete with cast iron lid and cast iron meter reader lid suitable for vehicle wheel loads. Boxes set in sidewalks, not subject to vehicular traffic, shall be concrete with cast iron lid and cast iron meter reader lid. Plastic boxes and lids can be used in unpaved areas or grass areas not subject to vehicular traffic. Box height shall extend from invert of the meter to final grade at the meter location. The lid shall have the word "WATER" cast in it.

H. Dielectric Fittings

1. Dielectric fittings shall be installed between threaded ferrous and nonferrous metallic pipe, fittings and valves, except where corporation stops join mains. Dielectric fittings shall prevent metal-to-metal contact of dissimilar metallic piping elements and shall be suitable for the required working pressure.

I. Gate Valves Smaller than 3 Inch in Size

1. Gate valves smaller than 3 inch size shall meet MSS SP-80, Class 150, solid wedge, non-rising stem. Valves shall have flanged or threaded end connections, with a union on one side of the valve. Provide hand-wheel operators. Valves shall open by counterclockwise rotation of the valve stem.

J. Gate Valves 3 Inch Size and Larger

1. Gate valves 3 inch size and larger shall meet AWWA C500 or UL 262 and be of one manufacturer. Valves shall be AWWA C500, non-rising stem type with double-disc gates or UL 262, inside-screw type with operating nut, split wedge or double disc type gate, and designed for a hydraulic working pressure of 175 psi. Valves shall open by counterclockwise rotation of the valve stem.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Components:

1. Provide sensors, transmitters, controllers, actuators, valves, dampers, and related items, necessary to accomplish control sequence shown on drawings. Install all such devices except as noted herein to the contrary.
2. Deliver control valves to the job site to be installed by Mechanical Contractor.
3. Deliver automatic dampers to the job site to be installed by Mechanical Contractor.
4. Mechanical Contractor to install flow switches, immersion wells, pressure tapping, and all associated shut-off cocks required for control systems.
5. The control equipment and connecting piping shall be installed in a neat and workmanlike manner by trained mechanics in the direct employ of the control manufacturer.
6. All exposed tubing and conduit shall be run parallel to or at right angles to the building structure, and shall be concealed in all finished spaces. Tubing and conduit may be run exposed in mechanical rooms or areas where other piping is exposed.
7. Prepare coordinated composite wiring diagram showing all interlock wiring associated with starters, control panels, and controls.
8. Drawings and Layouts: The controls contractor shall provide to the mechanical contractor complete schematic drawings for the entire control system for submittal to the Designer for approval before work shall begin. Brochures describing each item of control equipment or component shall be included.
9. Provide sequence of operation written so that building engineer can read and understand control scheme.
10. As-built drawings to be framed under Plexiglas and placed in each respective equipment room area.

B. Electrical:

1. Division 23 Mechanical Contractor shall furnish and install low-voltage control wiring, including conduit, conductors, and terminations for same. Division 23 shall also furnish and install control components associated with the low-voltage control systems and shall wire and connect components in accordance with approved wiring diagrams.
2. Division 26 Electrical Contractor shall furnish and install power wiring including conduit, conductors, and terminations to motors, safety switches, starters, relays, valve and damper actuators, and other components requiring power as indicated on the electrical drawings, by the specifications, and in accordance with approved wiring diagrams. Division 26 Contractor shall also furnish and install starters as scheduled on the electrical drawings.
3. Division 23 Contractor] to furnish and install all local area network wiring, including conduit, conductors, and terminations for same. The local area network (LAN) shall be configurable as either a bus or a star, or a combination of the two. The LAN shall use twisted pair, coax, or fiber optic cable, or any combination of the three to meet noise immunity and/or distance requirements. The network design shall provide a high speed data transfer rate for alarm and report generation of no less than 100 Mb (Mb/s).

4. Division 23 Contractor to furnish all input and output control wiring, including conduit, conductors, and terminations for same. All input and output control wiring shall be #18 twisted and shielded cable. No input or output point shall be more than 250 feet from its respective panel. All shields to be grounded at the control panel. All shields at the sensors or transducers to be folded back and taped. All cable splices shall have joints soldered and taped including the shield. No mechanical connections will be acceptable. All connections within the panels must be made with connectors of appropriate size and design for the terminals being applied. All cables must be labeled and identified on corresponding termination drawings. A copy of the termination drawing shall be adequately protected and left in its respective panel.
5. Install all control wiring associated with DDC/BAS in minimum 1/2" size EMT. Provide all associated couplings, connectors, and fittings. No electrical wiring and polyethylene tubing may occupy the same conduit. Separate carriers are required.
6. All wiring shall be in accordance with local regulations and the National Electrical Code.

C. Air Piping:

1. The entire control system shall be designed so that the maximum pressure drop on any main and branch is 1/2 psig at maximum air consumption. All instrument air piping may be type M hard or soft temper copper tubing or polyethylene tubing. The tubing shall be provided as follows:
   a. Exposed: Hard copper tubing or polyethylene tubing in a protective raceway.
   b. Concealed in Walls or Above Rigid Ceilings: Hard or soft copper tubing or polyethylene tubing enclosed in a metal conduit.
   c. Concealed Above Lay-In Ceilings: Hard or soft copper tubing or polyethylene tubing.
   d. Concrete Buried: Hard or soft copper tubing or polyethylene tubing enclosed in a metal conduit.
   e. Inside Panels and Unit Enclosures: Polyethylene tubing.

2. Polyethylene tubing shall be manufactured from virgin stock and shall meet the following qualifications:

Density	=	0.92 Grams/cc
Melt Index	=	0.32 Decigrams/min.
Stress Crack Resistance	=	2000 hours min. per ASTM-D1693
Tensile Strength	=	2200 psi
Type		"FR" Fire Resistant

   a. Tubing shall be fastened so that contact with any heat source above 130 degrees F is impossible.
   b. Fitting connections for low-pressure tubing (25 psi or less) may be made with barbed push-on fittings. For high-pressure tubing (more than 25 psi), the connections shall be made with compression fittings.

3. Drip legs and drains to be installed at necessary points to prevent condensation pockets.
4. Entire system to be tested by placing under 30-pound pressure for 24 hours. During this time, pressure drop not to exceed 5 percent of system pressure.

D. Room Devices:

1. Room devices shall be mounted so that the top of the device is 48" above the floor and aligned with the top of the light switch plates and 8" from the light switch if shown on the drawings adjacent to the light switch.
2. Room device locations shall be coordinated with door swings, light switches, and other wall-mounted items.

E. Natural Gas Meters

1. A shutoff valve, meter set assembly, and service regulator shall be Installed on the service line outside the building, 18 inches above the ground on the riser. An insulating joint (dielectric connection) shall be installed on the inlet side of the meter set assembly and service regulator and shall be constructed to prevent flow of electrical current. A 3/8 inch tapped fitting equipped with a plug shall be provided on both sides of the service regulator for installation of pressure gauges for adjusting the regulator. All service regulator vents and relief vents shall terminate in the outside air in rain and insect resistant fittings. The open end of the vent shall be located where gas can escape freely into the atmosphere, away from any openings into the building and above areas subject to flooding.
2. Meters shall be installed in accordance with ASME B31.8. Permanent gas meters shall be installed with provisions for isolation and removal for calibration and maintenance, and shall be suitable for operation in conjunction with an energy monitoring and control system. Bypass valves and line shall be the same size as service line.
3. Contractor shall provide materials for the connections to the existing gas lines. Final connections and the turning on of gas shall be made by the utility. The Contractor shall notify the Contracting Officer, in writing, 10 days before final connections and turning on of gas lines. The Contractor shall make necessary arrangements with the Utility for tie in and activation of new gas lines. Only the Operating Agency/Utility Company may reactivate the system after tie in. The Contractor shall furnish a certification by the Operating Agency/Utility Company that all Utility work has been satisfactorily completed.
4. Provide the name and location of the utility or operating agency of the existing gas lines. Show on the drawings, the location of valves to be operated for existing system deactivation. The Contractor shall provide connections to the existing gas lines in accordance with approved procedures. Reactivation of any existing gas lines will only be done by the Government. The Contractor's Connection Plan shall be submitted and approved prior to making any connections to existing gas lines. This plan shall include the Operating Agency's required procedures which may be obtained from the Contracting Officer. The Contractor shall notify the Contracting Officer, in writing, 10 days before connections to existing lines are to be made.

5. Prior to returning the gas line back to service it shall be tested in accordance with ASME B31.8. Test pressures should recognize the weakest component of each system tested for the actual pressure, the maximum allowable operating pressure, and the gas supplier's maximum operating pressure. The test pressure will be 150 percent of the maximum operating pressure or 50 psig, whichever is greater. However, the maximum test pressure must not be more than three times the design pressure of the pipe. The service lines shall be tested after modifications and before being placed in service using air as the test medium. Prior to testing the system, the interior shall be blown out, cleaned and cleared of all foreign materials. All meters, regulators, and controls shall be removed before blowing out and cleaning and reinstalled after clearing of all foreign materials. Testing of gas service lines shall be done with due regard for the safety of employees and the public during the test. Persons not working on the test operations shall be kept out of the testing area while testing is proceeding. The test shall be made on the system as a whole or on sections that can be isolated. The test shall continue for at least 24 hours from the time of the initial readings to the final readings of pressure and temperature. The initial test readings of the instrument shall not be made for at least 1 hour after the pipe has been subjected to the full test pressure, and neither the initial nor final readings shall be made at times of rapid changes in atmospheric conditions. The temperatures shall be representative of the actual trench conditions. There shall be no indication of reduction of pressure during the test after corrections have been made for changes in atmospheric conditions in conformity with the relationship T(1)P(2)=T(2)P(1), in which T and P denote absolute temperature and pressure, respectively, and the numbers denote initial and final readings. During the test, the entire system shall be completely isolated from all compressors and other sources of air pressure. Each joint shall be tested by means of soap and water or an equivalent nonflammable solution prior to backfilling or concealing any work. The testing instruments shall be approved by the Contracting Officer. All labor, materials and equipment for conducting the tests shall be furnished by the Contractor and shall be subject to inspection at all times during the tests. The Contractor shall maintain safety precautions for air pressure testing at all times during the tests.
6. Gas distribution equipment shall be installed in accordance with all applicable federal, state and local codes and regulations. Gas distribution equipment shall be installed in conformance with the manufacturer's recommendations and applicable sections of ASME B31.8, AGA XR0104 and 49 CFR 192. Gas distribution equipment installed in areas where they will be subject to damage will be protected by appropriate physical barriers (i.e. bollards). The Contractor shall provide installation details including catalog cuts and installation drawings for each gas service to be modified for approval by the Contracting Officer or the Contracting Officer’s Representative.

F. Water Meters

1. Permanent water meters shall be installed with provisions for isolation and removal for calibration and maintenance. Bypass values and line shall be the same size as serve line. Water meters shall be suitable for operation in conjuction with an energy monitoring and control system.

2. Contractor shall provide materials for the connections to the existing water lines. Final connections and the turning on of water shall be made by the utility. The Contractor shall notify the Contracting Officer, in writing, 10 days before final connections and turning on of water lines. The Contractor shall make necessary arrangements with the Utility for tie in and activation of new water lines. Only the Operating Agency/Utility Company may reactivate the system after tie-in. The Contractor shall furnish a certification by the Operating Agency/Utility Company that all Utility work has been satisfactorily completed.
3. Provide the name and location of the utility or operating agency of the existing water lines. The Contractor shall provide connections to the existing water lines in accordance with approved procedures. The Contractor's Connection Plan shall be submitted and approved prior to making any connections to existing water lines. This plan shall include the Operating Agency's required procedures which may be obtained from the Contracting Officer. The Contractor shall notify the Contracting Officer, in writing, 10 days before connections to existing lines are to be made. Reactivation of any existing water lines will only be done by the Government.
4. Prior to disinfection, obtain Contracting Officer approval of the proposed method for disposal of waste water from disinfection procedures. Disinfect existing water piping affected by Contractor's operations in accordance with AWWA C651. Fill piping systems with solution containing minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Flush solution from the systems with domestic water until maximum residual chlorine content is within the range of 0.2 and 0.5 parts per million, or the residual chlorine content of domestic water supply. Obtain at least two consecutive satisfactory bacteriological samples from new water piping, analyze by a certified laboratory, and submit the results prior to the new water piping being placed into service. Disinfection of systems supplying non-potable water is not required.
5. Chlorinating materials shall conform to the following:
6. Chlorine, Liquid: AWWA B301.
7. Hypochlorite, Calcium and Sodium: AWWA B300.
8. Prior to hydrostatic testing, obtain Contracting Officer approval of the proposed method for disposal of waste water from hydrostatic testing. The Contracting Officer will conduct field inspections and witness field tests. The Contractor shall perform field tests, and provide labor, equipment, and incidentals required for testing, except that water and electric power needed for field tests will be furnished. The Contractor shall produce evidence, when required, that any item of work has been constructed in accordance with the approved Performance Work Statement.
9. Test water service lines in accordance with applicable requirements of AWWA C600 for hydrostatic testing. No leakage will be allowed at copper pipe joints, copper tubing joints (soldered, compression type, brazed), plastic pipe joints, flanged joints and screwed joints.
10. Prior to the pressure test, fill that portion of the pipeline being tested with water for a soaking period of not less than 24 hours. For pressure test, use a hydrostatic pressure 50 psi greater than the maximum working pressure of the system. Hold this pressure for not less than 2 hours. For leakage test, use a hydrostatic pressure not less than the maximum working pressure of the system. Leakage test may be performed at the same time and at the same test pressure as the pressure test.
11. Upon completion of the installation of water meters, all debris and surplus materials resulting from the work shall be removed.

3.2 QUALITY CONTROL

A. Control system to be set up and checked out by factory-trained competent technician skilled in the setting and adjustment of temperature controls used in this project. This mechanic to be experienced in type systems associated with this control system.

B. At time of final observation, Control Contractor to demonstrate the entire sequence of operation for the systems to the Engineer. At this time, Engineer to observe function of entire control system, observe temperature control operations, damper positions, necessary to assure that temperature control system is operating as intended by mechanical design.

C. Final acceptance of system not to occur until sequence of operation check has taken place and certified by Engineer's representative.

D. The Control Tradesman to be responsible for returning to job during the opposite season to verify operation of control system. Engineer to be given notice of this return and to accompany Control Tradesman to observe the sequence of operation.

3.3 INSTRUCTION AND ADJUSTMENT

A. On completion of the job, the controls contractor shall have completely adjusted the entire control system. He shall arrange to instruct the Owner's representative on operation of the control system and supply him with three (3) copies of the control operating and instruction manuals.

B. The Controls Contractor shall obtain from the Owner's representative a signed receipt that he has received the instruction manuals and complete instruction on the operation of the system.

C. Contractor Adjustment: At the completion of the job, the controls contractor must submit to the Architect a letter stating that he has made final calibrations and adjustments to the system and that the Owner's operating personnel have been instructed in its use.

3.4 WARRANTY SERVICE

A. Warranty servicing shall be for a period not less than 12 months after final acceptance of the job by the owner and include the following provisions:

1. Emergency maintenance service on regular working hour basis during warranty.
2. Replacing defective parts and components as required.
3. Servicing by factory trained and employed service representatives of system manufacturer.
4. Maintaining of system programming.

END OF SECTION

SECTION 23 09 35 - CONTROLS - ELECTRIC

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Room Thermostats.

B. Controllers.

C. Smoke Detector Installation.

D. Time Clocks.

E. Valve and Damper Actuators.

F. Control Panels.

G. Automatic Control Dampers.

1.2 SYSTEM DESCRIPTION

A. Provide a complete electric control system including electrical interlocks, low voltage wiring, conduit, relays, switches, and other devices as required to accomplish automatic control of the mechanical systems. Refer to drawings for details.

1.3 SUBMITTALS

A. Complete shop drawings of entire control system.

B. List of control valves, Cv and pressure drops.

C. Complete wiring diagrams indicating equipment interlocks, thermostats, controllers, panels, indicators, control ranges and set points.

D. List of control dampers, sizes and characteristics.

E. Written sequence of operation of each control system.

F. Equipment data sheets for all major control components including:

1. Control Valves.
2. Automatic Control Dampers.
3. Controllers.
4. Thermostats.

1.4 WARRANTY

A. At completion of final test of installation and acceptance by Designer, provide any service incidental to proper performance of control system for a period of one year.

B. Control system herein specified to be free from defects in workmanship and material under normal use and service.

C. If within one year from date of acceptance by Designer any equipment herein described is proven to be defective in workmanship or material, it shall be replaced or repaired free of charge to Owner.

D. The guarantee period shall not start until sequence of operation has been demonstrated to Designer and Owner's representative and certified as acceptable to Designer.

1.5 QUALITY CONTROL

A. All electrical devices to be UL listed.

PART 2 - PRODUCTS

2.1 ACCEPTABLE CONTROL MANUFACTURERS

A. Barber-Colman Co.

B. Honeywell.

C. Robertshaw.

D. Powers Controls.

E. Approved equal.

2.2 EQUIPMENT

A. Room Thermostat-2 Position, Heat Control:

1. Provide room type thermostat for direct control of electric heating equipment (non-inductive loads).
2. Double line break switch operated by bimetal element. One switch makes on drop in temperature.
3. Indicating thermometer.
4. Differential: 1 degrees F thermally, 2 degrees F mechanically.
5. Positive OFF position on adjustable dial.
6. Plastic guard.
7. Barber-Colman Model TA-121 or approved equal.

B. Room Thermostat-2 Pos, AC Unit Control:

1. Provide room type thermostat for low voltage control of heating and cooling unit.
2. Provide manual or automatic changeover as indicated on drawings with single or multiple stages.
3. Sealed mercury SPST switches by bimetal elements.
4. Adjustable heat anticipation, fixed cooling anticipation.
5. Indicating thermometer.
6. AUTO-ON fan switch. AUTO-HEAT-OFF-COOL system switch.
7. Thermal differential: 1.5 degrees F 1st stage, 2 degrees F other stages.
8. Thermal staging: 2 degrees F between stages.
9. Plastic guard.
10. Barber-Colman Model TA-133 1-stage cool/2-stage heat. TA-134 2-stage cool/2-stage heat or approved equal.

C. Actuator-2 Position, Spring Return:

1. For two position operation of dampers, valves, etc. with return to normal position upon power interruption.
2. Actuator shaft rotates CW 180 degrees upon application of power. Spring returns actuator shaft CCW to original position when de-energized.
3. Furnish with SPDT auxiliary end switch where required by application.
4. Provide mounting bracket, crank arm and linkage as required by application.
5. Two wire circuit. Refer to drawings for electrical requirements.
6. Select actuators for proper torque required by application.
7. Barber Colman Model MA-405, MA-418 or approved equal.

D. Actuator-2 Position, Non-Spring Return:

1. For two position operation of dampers, valves, etc. with return to normal position is not required.
2. Three wire control circuit positions unidirectional actuator.
3. Built-in cam operated, snap acting, adjustable SPDT auxiliary switch.
4. Provide mounting bracket, crank arm and linkage as required by application.
5. Refer to drawings for electrical requirements.
6. Select actuators for proper torque required by application.
7. Barber Colman Model MC-421 or approved equal.

E. Actuator-Proportional:

1. For proportional control of dampers, valves, and program switches in heating, ventilating and air conditioning applications.
2. Provide reversible proportional actuators which can stop at any point in the stroke when controlled from SPDT switch with neutral or floating position.
3. Provide spring return of actuator to original position where required by application.
4. Furnish with SPDT auxiliary end switch where required by application.
5. Provide mounting bracket, crank arm and linkage as required by application.
6. Refer to drawings for electrical requirements.
7. Select actuators for proper torque required by application.
8. Barber Colman Model P-300, 400, 2000, 4000 or approved equal.

F. Multi-step Compressor Controller:

1. Solid state type utilizing integrated circuits.
2. Provide two or four step units as required for application.
3. Provide cascaded units for applications requiring greater than four steps of control.
4. Unit to control chilled water supply temperature as a function return water temperature.
5. Integral rate and reset action to eliminate system offset.

G. Step Controllers:

1. For step control of refrigeration compressors, pumps, valves and electric heat elements. Actuator and switching components to be mounted on a common base.
2. SPDT snap-acting switches factory set for consecutive operation. Field adjustable.
3. Switch differential fixed with 5 angular degrees minimum.
4. Refer to drawings for required number of steps.
5. Barber Colman SP-10000 Series or approved equal.

H. Smoke Detectors:

1. Furnish and install Simplex Model 2098-9633 photoelectric type detectors suitable for duct mounting. Detectors shall be provided in the supply and return ducts to all fans above 2000 cfm and at other locations shown on the drawings.
2. Sampling tubes to have minimum length of 3/4 of duct width.
3. Locate sampling tubes a minimum of 6 duct widths downstream of any elbows or branch duct connections.
4. UL approved.

I. Time Clocks:

1. Seven day, 24-hour, fully programmable, electronic time clock with battery backup.
2. LED display of time and set points.
3. Provide Grasslin model Digi 127 or approved equal.
4. In addition furnish an electric, motor-driven override switch for the time clock with 0 to 3 hour adjustment. Override switch to be Eagle Signal series AB or approved equal.

J. Automatic Control Dampers:

1. Arrow Pin Lock No. OBDPL-507 opposed blade dampers by Arrow Louver and Damper Corporation, or approved equal by Ruskin.

K. EMT Conduit: Install all control wiring associated with DDC/BAS in minimum 1/2" size EMT. Provide all associated couplings, connectors, and fittings. No electrical wiring and polyethylene tubing may occupy the same conduit. Separate carriers are required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Components:

1. Provide thermostats, controllers, actuators, automatic dampers, damper motors of sufficient size and torque to operate dampers properly, modulating valves, damper control linkages, and related items, necessary to accomplish control sequence shown on drawings. Install all such devices except as noted herein to the contrary.
2. Deliver automatic valves to the job site to be installed by mechanical tradesman under supervision of Control Tradesman.
3. Deliver automatic dampers to job site to be installed by mechanical tradesman under supervision of Control Tradesman.

3.2 QUALITY CONTROL

A. Control system to be set up and checked out by factory-trained competent technician skilled in the setting and adjustment of temperature controls used in this project.

B. Mechanic to be experienced in type systems associated with this control system.

C. At time of final observation, Control Contractor to demonstrate the entire sequence of operation for the systems to the Designer.

D. At final observation, Designer to observe function of entire control system, temperature control operations, damper positions, and other functions necessary to assure that temperature control system is operating as intended by mechanical design.

E. Final acceptance of system not to occur until sequence of operation check has taken place and certified by Designer's representative.

F. The Control Tradesman to be responsible for returning to job during the opposite season to verify operation of control system.

G. Designer to be given notice of this return and to accompany Control Tradesman to observe the sequence of operation.

3.3 INSTRUCTION AND ADJUSTMENT

A. On completion of the job, the Controls Contractor shall have completely adjusted the entire control system.

B. Controls Contractor shall arrange to instruct the Owner's representative on operation of the control system and supply him with three (3) copies of the control operating and instruction manuals.

C. The Controls Contractor shall obtain from the Owner's representative a signed receipt that he has received the instruction manuals and complete instruction on the operation of the system.

D. At the completion of the job, the controls contractor must submit to the Designer a letter stating that he has made final calibrations and adjustments to the system and that the Owner's operating personnel have been instructed in its use.

END OF SECTION

SECTION 23 23 00 - REFRIGERANT PIPING SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Refrigeration piping, valves and fittings to connect remote condensers split system heat pump systems.

1.2 SAFETY CODE

A. Comply with the requirements of ANSI B9.1, Code for Refrigerant Systems.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Piping: Type "L" ACR hard copper, ASTM B88.

B. Fittings: Wrought copper.

C. Solder: Silver solder, or phos-copper solder having a melting point of 1125 degrees F. or higher.

2.2 EQUIPMENT

A. Service Valves: Henry valves or equal. Provide packed type receiver, purge, and gauge valves with valve stem seal cap ports.
   1. Valves up to 5/8" O.D.: Henry Figure 516 or equal, diaphragm type.
   2. Valves larger than 5/8" O.D.: Henry Figure 203 or equal.

B. Solenoid Valves: Manufactured by Sporlan Co., or equal, suitable for the type of refrigerant used, and of a type permitting manual lifting of stem for emergency operation. Size valves for pressure drop of 3 pounds at design flow.

C. Refrigerant Filter Dehydrator: Sporlan Co. Reversible Heat Pump Filter-Drier or equal sealed core type of size recommended by manufacturer for maximum design tonnage. For systems 20 nominal tons and larger, provide replaceable core filter driers.

D. Moisture Indicator: Sporlan Co. See-All type SA-125 or equal.

E. Pipe Supports:
   1. Pipes subject to vibration: Isolation type brackets.
   2. Pipes not subject to vibration: Grinnel No. CT-95 or equal.
   3. Riser clamps: Grinnel CT-121 or equal.

F. Escutcheons: Chrome plated escutcheons sized for pipe.

G. Insulation: Insulate piping as specified in Section 23 07 10.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Make solder joints with carbon dioxide or nitrogen passing through joints being soldered. Ensure a clean, tight system. Pull a clean rag through each piece of tubing after cutting or reaming.

B. Install pipe and hangers in accordance with hanger manufacturers' printed instructions.

C. Provide escutcheons at all visible wall penetrations in finished areas.

3.2 LEAK TESTING

A. Test for leaks by use of carbon dioxide or nitrogen and a liquid soapsuds solution. Correct leaks found.

B. Evacuate system to 20" vacuum and charge with refrigerant until a pressure of 15 psig is reached. Then test for leaks using a Halide leak detector. Correct leaks found.

C. Pressurize system, with carbon dioxide or nitrogen, to 300 psig on the high side, and 200 psig on the low side, and test for leaks. Correct leaks found.

3.3 SYSTEM DEHYDRATION

A. Dehydrate system by "Double Dehydration" method.

B. Use a suitable vacuum pump. Evacuate system to a vacuum of 0.2" Hg absolute and operate pump for eight hours when that pressure is reached.

C. After eight hours, admit dry nitrogen directly to the system, and then evacuate system to a vacuum of 0.2" Hg absolute and operate pump for four hours.

3.4 CHARGING SYSTEM

A. When system dehydration is complete and all leaks are corrected, charge system with refrigerant.

END OF SECTION

SECTION 23 31 10 - SHEET METAL DUCTWORK - LOW PRESSURE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Low pressure ductwork refers to systems operating at 2.00" w.g. total static pressure with velocities up to 2000 FPM. It is the intent of this specification to provide an installed duct system which will supply the air quantities indicated by the plans and have the lowest possible friction loss with the least possible leakage loss. Friction loss for each system shall not exceed that which is indicated in the A.C. unit schedule as external static pressure or in the fan schedule as static pressure and shall include the losses of all accessories. Friction losses shall be minimized by reduction in the number of offsets and elbows by pre-planning the duct system installation and coordination with other trades to prevent interferences. Access to all accessories requiring maintenance, service and inspection shall be maintained. Radius elbows are preferred for all turns to minimize friction, noise and vibration; and, especially, for sections having large volume or higher velocities and sections which may have turbulences.

B. The contractor shall provide and/or construct all materials, ductwork, joints, transitions, splitters, dampers, access doors, etc., as set forth in these specifications necessary to install the Low Pressure Sheet Metal Ductwork required by the Mechanical Drawings.

C. Low pressure ductwork shall be constructed to meet the following pressure class:

1. Supply ductwork downstream of terminal units: 1.0" pressure class.
2. Supply and return duct connections to fan coil units or single zone air systems (ESP ≤1.0"): 1.0" pressure class.
3. Supply and return duct connections to fan coil units or single zone air systems (ESP >1.0", ≤2.0"): 2.0" pressure class.
4. Exhaust and return ductwork (Fan ESP ≤2.0"): 2.0" pressure class.

1.2 QUALITY CONTROL AND REGULATORY STANDARDS

A. SMACNA Manual: Sheet Metal Tradesman is to have access on the construction site to the Latest Edition of SMACNA "HVAC Duct Construction Standards", (Metal and Flexible). The Manual is referred to in specifications for required construction methods and details. Contractor shall comply with provisions of the SMACNA Manual and more stringent requirements of this specification.

B. Quality control involves not only the general performance requirements for all air ducts, but also quality workmanship which includes layout preplanning so that offsets, rises, falls, elbows, fittings, etc., are minimized or eliminated. General performance requirements for all ducts include:

1. Dimensional stability (shape deformation and strength).
2. Containment of the air being conveyed (leakage control).
3. Vibration (fatigue and appearance).
4. Noise (generation, transmission or attenuation).

5. Exposure (to damage, weather, temperature extremes, flexure cycles, wind, corrosive atmospheres, biological contamination, flow interruption or reversal, underground or other encasement conditions, combustion, or other in-service conditions).
6. Support (alignment and position retention).
7. Thermal conductivity (heat gain or loss and condensation control).

C. Provide galvanized duct materials which meet applicable requirements of SMACNA manual and local and state codes, whichever is the most stringent.

D. Support ductwork in accordance with applicable requirements of SMACNA manual, local and state codes, and details on plans, whichever is the most stringent.

E. Emboss fittings with material gauge, manufacturer, and type material.

F. Materials used as sealers, pre-insulated jackets and flexible ducts shall comply with a flame spread rating of 25 or less and a smoke developed rating of not over 50.

G. Joint sealer shall meet the requirements of UL181A or UL181B as applicable.

H. Duct sealant classification: Seal all transverse joints, longitudinal joints and duct wall penetrations in accordance with SMACNA Class A.

1.3 SUBMITTALS AND SHOP DRAWINGS

A. Submit material/product data to designer for approval ONLY when it deviates from products specified in Part 2 herein.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Sheet Metal, Angles, Bar Slips, Hangers, and Straps: Galvanized steel.

B. Screws: Cadmium plated.

C. Joint Sealer: Manufactured by Hardcast, Inc., Two-Stage Sealant Process.

1. Stage 1: Apply fiber DT tape.
2. Stage 2: Brush on RTA-50 sealant over fiber tape.

2.2 FABRICATION

A. Provide a rectangular or round duct where required on drawings of prime quality galvanized steel sheets, thickness and reinforcement as required by the following schedule, SMACNA, or local and state codes, whichever is more stringent. When fabricating low pressure ductwork, largest duct dimension governs the entire duct and complete joint.

DUCTWORK GAUGE AND REINFORCEMENT SCHEDULE				
MAXIMUM DUCT DIMENSION (IN.)	DUCT GAUGE	SLIP GAUGE	STANDINGS	REINFORCEMENT
Up thru 18	24	24	- -	- -
19 - 30	24	24	1 x 24 ga.	No
31 - 42	22	22	1 x 24 ga.	No
43 - 54	22	22	1-1/2 x 20 ga.	1-3/8 x 1/8 Band Iron
55 - 60	20	20	1-1/2 x 20 ga.	1-3/8 x 1/8 Band Iron
61 - 84	20	20	1-1/2 x 18 ga.	1-1/2 x 1-1/2 x 1/8 Angle
85 - 96	18	20	1-1/2 x 18 ga.	1-1/2 x 1-1/2 x 3/16 Angle
Over 96	18	20	2 x 18 ga.	2 x 2 x 1/4 Angle

B. Duct dimensions shown on drawings indicate inside clear dimensions. Make allowances in sheet metal size for duct requiring internal duct liner to provide "inside clear" dimensions.

C. In addition to the requirements above, add supplemental bracing as necessary to prevent sagging, drumming, and vibration.

D. Round prefabricated 26 gauge slip joint duct may be used on exhaust and return duct 12" and smaller and for runout duct to boxes, diffusers, registers, and grilles.

1. Secure duct sections and fittings with sheet metal screws.
2. Make connections of round duct to rectangular duct using "spin-in" collars with manual volume damper.
3. Transverse and longitudinal slip joints shall be sealed with approved sealer.

E. Provide transverse joints of "s" and drive construction at least every eight feet on duct whose larger side is less than 18". Seal all transverse joints with joint sealant material.

F. Provide transverse joints, or equivalent supplemental angle reinforcing on 4 foot centers on duct whose larger side is greater than 18". At the contractor's option, duct mate or equal joint system may be substituted for "s" and drive construction. Seal all transverse joints with joint sealant material.

G. Longitudinal seams shall be Pittsburg Lock or grooved seams closed tightly and evenly. Button punch snap lock longitudinal seam construction shall not be allowed. Seal longitudinal joints which prove to leak with joint sealant material.

H. Cross break ductwork over 10" dimension, either side.

I. Do not exceed 20 degree angle of slope for increase-in-area transitions.

J. Do not exceed 20 degree angle of slope for decrease-in-area transitions.

K. Do not exceed 30 degrees on the entering side or 45 degrees on the leaving side for angle of transitions at connections to equipment without the use of approved vanes. 20 degree angle is preferred and should be used space permitting.

L. Provide Ells fabricated to one of the following specifications in order of preference (SMACNA Figures 4-2 through 4-4 and Figure 4-9 and Chart 4-1):

1. Unvaned elbow with the throat radius equal to 3/4 of the width of the duct and with a full heel radius.
2. Six inch throat radius with full radius, single thickness vanes and full heel radius. Maximum unsupported length of vanes shall be 36". Vanes shall be securely fastened to runners. All vanes shall be secure and stable in installed operating position. Construct vane edges to project tangents parallel to duct sides.
3. Square elbows with single thickness turning vanes. Maximum unsupported length of vanes shall be 36". Vanes shall be securely fastened to runners. All vanes shall be secure and stable in installed operating position. Construct vane edges to project tangents parallel to duct sides.
4. Radius elbows are the preferred fitting. Square elbows are to be used only when available space prevents the use of radius elbows.

M. Provide offsets as necessary in accordance with SMACNA Figure 4-7.

N. Make branch connections and tees in one of the following manners:

1. Converging radius elbow with MVD. (SMACNA Figure 4-5).
2. 45-degree entry with MVD. (SMACNA Figure 4-6).
3. Round spin-in fitting with MVD.

O. Space duct joints to avoid cutting them for branch take offs and outlet collars.

2.3 INTERNAL DUCT LINER

A. Liner: 1" thick (unless otherwise indicated on drawings), UL listed, neoprene coated, mat faced, flexible fiberglass of one pound per cubic foot density.

B. Provide liner that complies with UL 181 Erosion Test and has a flame spread rating of 25 or less and a smoke developed rating of 50 or less.

C. Adhere liner to the duct with a continuous coating of approved adhesive and with adhesive clips or welded studs on 16" centers.

D. Provide coating of CP30 low odor on air entering side and seal other joints with metal or fiberglass cloth so that liner will be smooth to air flow.

PART 3 - EXECUTION

3.1 INSTALLATION, APPLICATION, ERECTION

A. Support ductwork on each side of the duct with suitable sheared strips of galvanized metal or 1" x 1/8" galvanized steel band iron hangers.

B. Attach hangers to the ductwork using sheet metal screws.

C. Secure hangers to concrete structure with approved anchor shields and to steel structure by means of C-clamps.

D. Space hangers approximately eight feet along the duct.

E. Obstructions shall not be located within ducts.

F. Do not exceed 45 degrees for easement transition angle.

G. Seal all transverse joints with approved sealer in accordance with manufacturers' directions. Also, seal longitudinal joints which prove to leak.

H. Insulation: Where drawings and insulating specifications indicate that ducts are to be insulated make provisions for neat insulation finish around damper operating quadrants, splitter adjusting clamps, access doors, and similar operating devices. Metal collar equivalent in depth to insulation thickness and of suitable size to which insulation may be finished to be mounted on duct.

I. Counterflashing: Counterflash all ducts where they pierce the roof.

J. Pitot Ports: Pitot ports for measuring airflow to be located in each main duct at the downstream end of the straightest run of the main and before the first branch take-off. Pitot ports to be formed by drilling 7/16" holes in the duct, lined up perpendicular to airflow on maximum 8" centers and at least three to a duct, evenly spaced. Holes to be plugged with plastic plugs. Provide access to these for future rebalancing.

3.2 CLEANING

A. Clean ductwork thoroughly to assure all foreign matter, dirt, etc. is removed.

END OF SECTION

SECTION 23 33 10 - SHEET METAL SPECIALTIES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Specialties to be submitted and approved before starting installation.

B. Items to be installed approximately as shown on drawings taking into account differences in mechanical equipment submitted and that shown on contract documents. Each item to be installed so that it is readily accessible for maintenance, repair, and/or setting and balancing.

C. Diffusers, registers, and grilles to have ratings certified by Air Diffusion Council and tested per ADC Equipment Test Code 1062R2 and ASHRAE Standard 36B-63.

D. Refer to drawings for diffuser, register, and grille sizes and number of airflow directions.

PART 2 - PRODUCTS

2.1 FIRE DAMPERS

A. Fire dampers to be U.L. listed in accordance with UL-555. Fire dampers to be held in an open position with a 165 degree F fusible link and arranged to lock in position on closure.

B. Fire dampers for rectangular duct to be type "B" (Blades out of air stream) and for round duct to be Type "C" (Blades and frame out of air stream). Fire dampers located behind sidewall registers and grilles and others specifically indicated on drawings to be Type "A" (Frame and Blades in air stream). Fire dampers to be multi-leaf type with spring closing for horizontal mounting and weighted-gravity closing for vertical mounting. Dampers to be steel construction with rust resistant finish and provided with a factory-installed mounting sleeve suitable for structure. Mount per manufacturer's published U.L. approved installation instructions. Manufacturer models which provide square to round or round oval transitions are acceptable.

C. See Architectural drawings for hour-rating of walls and/or floors. Dampers to be compatible with hour ratings.

D. Fire dampers to be Ruskin Model IBD2 Curtain Type Static Fire Dampers.

2.2 DAMPERS

A. Manual Volume Dampers (MVD): Manual volume dampers to be hand-operated type dampers constructed of galvanized steel, minimum 22-gauge for duct widths 18" and less, minimum 16-gauge for duct widths greater than 18". Dampers for ducts to 12" height and 12" diameter to be single blade carried on a 3/8" round steel rod mounted inside of duct without frame and fitted with locking type quadrant and brass end bearing plate accurately drilled and secured to duct. Dampers for ducts greater than 12" height to be multi-blade type, 12" maximum blade width up to 30" blade length and 10" maximum blade width over 30" blade length. Blades to be mounted on frame with brass sleeve bearings interconnected for operation from one locking type hand quadrant. Round pivot rods to have section faced flat to receive locking setscrew in locking quadrant. Refer to SMACNA manual Figures 2-14 and 2-15.

B. Backdraft Dampers (BDD): Backdraft dampers to be Ruskin Model BD2-A2 or approved equal low-leak backdraft dampers. Dampers to be heavy-duty type suitable for air velocities to 2500 fpm with all extruded aluminum construction, minimum 0.81" thick frame, and minimum .050" thick blades on maximum 4" centers. Provide blades with vinyl edge seals. Provide dampers with aluminum linkage and corrosion resistant type bearings.

2.3 SQUARE CEILING DIFFUSERS

A. Provide Titus TDC or approved equal round or square neck, louvered face ceiling diffusers at all locations designated by schedule on drawings. Diffusers to be all aluminum construction. Frame to be flush mount for diffusers in "hard" ceilings and lay-in T-bar mount for diffusers in lay-in ceilings. Finish to be baked-on, off-white enamel.

2.4 SIDEWALL SUPPLY REGISTERS

A. Provide Titus 1707 or approved equal at all locations designated by "SAR". Registers to be all aluminum construction complete with removable and rotating fixed horizontal blade core, and attached rear set of individually adjustable vertical blades. Finish to be baked-on, off-white enamel. Border to be curved, Titus Type C.

2.5 CEILING RETURN & EXHAUST REGISTERS

A. Provide Titus Model 50-F or approved equal at locations designated by schedule on drawings. Registers to be complete with 1/2" cube egg-crate aluminum grid. Finish to be baked-on, off-white enamel. Border to be flush mounted frame style.

B. BLANK-OFF PANELS

1. Diffuser manufacturer shall furnish perforated blank-off panels identical in appearance to the panel diffusers where indicated on the drawings and where columns may penetrate the ceiling or where interstitial access is required. Panel to have solid plate installed behind perforated plate, providing a seal between the room and interstitial space. The installing contractor shall cut all fill-in panel(s) for the surgical light column(s) and medical gas column(s) as required after this equipment located.

2. Acceptable model and manufacturers: PFP Series by Precision Air Products Company, Price Industries or approved equal.

2.6 AIR LOUVERS

A. Air louvers shall be stationary horizontal, wind driven rain, extruded aluminum blades equal to Greenheck model EHH-601. The louvers shall be AMCA Certified. Louvers to be have minimum 0.081" thick aluminum frame and blades. Louver depth to be 6" with blades on approximate 2" spacing. Blade construction to be horizontal rain resistant style. Finish shall be baked enamel color selected by Architect. Manufacturer will submit metal color chip to Architect as part of the submittal approval. Louver shall be rated at: the beginning point of water penetration (0.01 oz. of water (penetration) per sq. ft. of louver free area is above 1,250 fpm, minimum 46% free area, 0.21" S.P. resistance at 1,000 fpm. Provided 1/2" mesh expanded aluminum screen with removable frame mounted on inside face of louver. Provide minimum 10 year finish warranty.

2.7 BRICK VENTS

A. Brick vents to be constructed of heavy extruded aluminum frames and blades. Blades to be supported on vertical aluminum rods. Vent to include continuous overhanging weather-guard visor at top of frame to prevent water from running down wall into face of vent. Vent to include continuous overhanging weather-guard sill at bottom of frame to drain water out and away from wall below. Bottom frame member to include integral water stop. Finish shall be primer, suitable for painting. Provide extruded aluminum birdscreen mounted on inside face of vent.

2.8 DOOR GRILLES

A. Door grilles to be Titus T-700 steel construction with channel border for wood door construction and with flanged and auxiliary borders for metal door construction. Finish to be prime coated steel. Deliver door grilles to the Millwork Tradesman to install.

2.9 FLEXIBLE CONNECTORS

A. Install UL listed flexible duct connectors between duct and fan/equipment connections. Flexible duct connectors to be made of 28-ounce, heavy glass fabric double coated with neoprene.

2.10 FLEXIBLE DUCT

A. Flexmaster Type 1M Acoustical Attenuating or Approved equal. Submit acoustical performance of any alternate product for prior approval.

1. Characteristics of flexible duct:

a. Approved as UL-181 Class 1 air duct.
b. Flame spread rating less than 25 and smoke developed rating less than 50.

c. Rated for 6" w.g. positive pressure, 4" w.g. negative pressure, and 5000 fpm air velocity.
d. Tear and puncture resistant reinforced CPE inner liner mechanically locked together with a corrosive resistant galvanized steel helix.
e. Insulated with minimum 1/2" thick fiberglass insulation with vapor barrier jacket.

B. Seal off the insulation jacket at its ends and at joints with mastic, Hardcast, or similar material. Replace flexible duct if jacket is punctured.

C. Flexible duct is NOT to be used for runouts where it must pass through walls or through smoke or fire partitions. Flexible duct is not to be used in exposed application. Flexible duct lengths shall not exceed 6 feet at each connection.

D. No bends shall be made in flexible duct with the center line radius less than one and one-half duct diameter and only one bend may occur per 6 foot length of duct material.

2.11 DUCT ACCESS DOORS

A. Duct access doors to be provided for access to all coils, fire, fire/smoke, and smoke dampers, automatic and backdraft dampers, duct smoke detectors, static pressure and air volume sensing devices, and other equipment installed in ducts and at other points indicated on drawings.

B. Access door construction and airtightness must be suitable for the duct pressure class used (low, medium, or high).

C. Access doors to be double-panel, galvanized steel construction with minimum 1" rigid insulation between panels. Access doors in exhaust duct and unlined return duct may be uninsulated single panel, galvanized steel construction. Doors to mount in rigid frame constructed of formed galvanized steel. Angle iron bracing to be used as required to provide rigid assembly. Doors to hinge on one side with door latch on opposite side.

D. Access doors in ductwork shall fully comply with Figure 7-2, 7-3 and 7-2M of SMACNA manual. Casing access doors shall fully comply with Figure 9-15 and 9-16 of SMACNA manual. Minimum size shall be 12” x 12” per NFPA 80.

E. Doors to close against gasket seal.

F. Access doors for fire dampers, fire/smoke dampers, and smoke dampers shall be permanently identified on the exterior by a label having letters not less than 0.5 inches in height reading: “Fire Damper” “Fire/Smoke Damper” or “Smoke Damper” as required by 2012 International Mechanical Code.

2.12 PERFORATED PLATE

A. Construct plate of 1/16" thick galvanized steel with 1/2" diameter holes staggered 5/8" center to center, with minimum free area of 70 percent. Anchor plate to the sheet metal with angle iron as required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation to be in accordance with manufacturers' published installation instructions as well as applicable sections of SMACNA manual.

B. Provide all screws, bolts, nuts, and inserts required for attaching sheet metal specialty items to ducts, walls, floors and ceilings.

END OF SECTION

SECTION 23 34 50 - SQUARE CENTRIFUGAL IN-LINE FANS

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Certify fan performance in accordance with AMCA Certified Air and Sound Rating Criteria.

B. Fans shall be UL or ETL listed.

1.2 REQUIREMENTS

A. Select fans such that fan BHP does not exceed motor nameplate horsepower at scheduled conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Greenheck, Acme, Cook, or approved substitute.

2.2 EQUIPMENT

A. Non-overloading, backward inclined, aluminum centrifugal fan wheel.

B. Variable pitch V-belt drive or direct drive as scheduled.

C. Heavy gauge aluminum or galvanized steel housing with duct connection at fan inlet and outlet and removable access panels to access all interior components without removing ductwork or wiring.

D. Permanently lubricated, ball bearing fan motor.

E. Electrical junction box.

2.3 ACCESSORIES

A. Gravity backdraft damper.

B. Disconnect switch on single-phase fans.

C. Belt guard/motor cover.

D. Internally insulated housing when scheduled on drawings.

E. Solid state variable speed controller when scheduled on drawings.

F. Vibration isolators when scheduled on drawings.

G. Epoxy coating when scheduled on drawings.

H. See fan schedule on drawings for other required accessories.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fans in accordance with manufacturers' published instructions.

B. Connect ducts to fans to allow for straight and smooth airflow.

C. Provide flexible connections between fans and ducts.

D. Install fans level.

E. Check fan alignment and balance. Correct improperly aligned or vibrating fans.

F. Final installation to be free of leaks.

G. Ensure fans are interlocked with appropriate systems and/or controls.

END OF SECTION

SECTION 23 63 13 - AIR-COOLED CONDENSING UNITS

PART 1 - GENERAL

1.1 CERTIFICATION

A. Units to be AHRI certified and UL listed.

1.2 MANUFACTURERS

A. Manufacturers to review the allowable space for the condensing units considering service access, airflow clearances, and refrigerant piping to ensure adequate clearance exists for their units prior to submitting bid. Contractor shall not be allowed an extra should the low bidder prove to have unacceptable clearance.

PART 2 - PRODUCTS

2.1 CONDENSING UNITS TO INCLUDE THE FOLLOWING COMPONENTS

A. Copper tube, aluminum fin condenser coil.

B. Compressor.

C. Direct drive propeller type condenser fan with permanently lubricated motor.

D. Fully weatherproof galvanized steel casing with rust resistant baked enamel finish.

E. Indoor fan relay.

F. Compressor current and thermal overload protection.

G. High and low refrigerant pressure switches.

H. Internal spring vibration isolation.

I. Liquid line filter dryer.

J. Crankcase heater.

K. Solid brass service valves.

L. Screen or louvered coil guards.

M. Five-year compressor warranty.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install condensing unit on 4" high concrete pad allowing recommended area for service, maintenance and airflow requirements.

END OF SECTION

SECTION 23 81 40 - AIR-COOLED SPLIT SYSTEM HEAT PUMP

PART 1 - GENERAL

1.1 WORK INCLUDED

A. System to consist of fan-coil indoor unit in combination with direct-expansion air-to-air electric heat pump outdoor unit. Both indoor and outdoor unit to be UL listed and AHRI certified.

B. Manufacturers to review the allowable space for the indoor and outdoor units considering service access, filter access, airflow clearances, and refrigerant and condensate piping to ensure adequate clearance exists for their units prior to submitting bid. Contractor shall not be allowed an extra should the low bidder prove to have unacceptable clearance.

PART 2 - PRODUCTS

2.1 INDOOR UNIT

A. Indoor unit cabinet to be constructed of heavy gauge galvanized steel internally insulated with 1" thickness, minimum 3/4 lb. density fiberglass insulation. Indoor unit cabinet to be phosphatized and finished with baked-on enamel paint.

B. Construct coil with aluminum plate fins mechanically bonded to copper tubing with brazed joints. Coil to be 3-row minimum.

C. Drain pan to be welded galvanized steel and insulated.

D. Fan to be statically and dynamically balanced, forward curved centrifugal type. Fan motor to be permanently lubricated and include internal overload protection. Provide fans with drive necessary to satisfy static pressure requirements.

E. Provide throwaway type filter, clean and unused at the time building is turned over to Owner. Provide one spare set of filters to Owner at job completion.

F. Provide auxiliary electric resistance heater.

2.2 OUTDOOR UNIT

A. Outdoor unit to contain compressor with crankcase heater, automatically reversible oil pump, suction line accumulator, and internal and external motor protection.

B. Outdoor unit fan to be vertical discharge propeller type direct driven by factory-lubricated motor.

C. Outdoor unit coil to be constructed of aluminum fins mechanically bonded to copper tubing with brazed joints.

2.3 CONTROLS AND PROTECTIVE DEVICES

A. Controls to include a high pressure switch, low pressure switch and pressure relief device. Compressor motor to have thermal and current sensitive overload devices. Outdoor unit to incorporate positive acting timer to prevent compressor short cycling. Device shall prevent compressor from restarting for a 5-minute period. Automatic defrost control to sense frost accumulation and defrost when necessary. A 24-volt transformer to be factory installed and wired on outdoor units for external control circuit.

B. System control accessories shall include the following:

1. Start capacitor and relay.
2. Manual changeover heating/cooling thermostat with 2-stage heating (second stage heat to be electric heat) and fan auto/on switch.

2.4 SYSTEM ACCESSORIES SHALL INCLUDE THE FOLLOWING

A. Solid brass service valves.

B. Bi-flow liquid line filter drier.

C. Outdoor unit coil guard (louvered unit casing).

2.5 WARRANTY

A. Provide unit with minimum 5-year compressor warranty.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate indoor and outdoor unit where shown on drawings.

B. Install indoor fan-coil unit on neoprene or fiberglass pad vibration isolators and attach to system duct with flexible connectors.

C. Locate outdoor unit so as to provide recommended airflow, service and maintenance clearance and mount on a 4 inch high (4 inch above grade) concrete pad.

END OF SECTION

SECTION 26 01 00 - GENERAL PROVISIONS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Secondary power wiring and distribution system.

B. Fire alarm and smoke detection system.

C. Lighting control equipment.

D. Electrical control systems and interlock wiring.

1.2 RELATED WORK

A. Foundations and pads required for equipment furnished under this division of the specifications.

B. Field painting, except such painting as is required to maintain shop coat painting and factory finish painting.

C. Electrical control systems and interlock wiring as required by mechanical drawings, specifications or manufacturer's schematics.

D. Flashing of conduits into roofing and outside walls.

E. Heating, ventilating, and air conditioning equipment.

F. Plumbing equipment.

1.3 QUALITY ASSURANCE

A. Comply with applicable local, state and federal codes.

B. Comply with applicable requirements of recognized industry associations which promulgate standards for the various trades.

C. Employ only qualified journeymen for this work. Employ a competent qualified electrician to supervise the work.

1.4 STANDARDS

A. Perform work specified in Division 26 in accordance with standards listed below including amendments or revisions. When these specifications are more stringent, they take precedence. In case of conflict, obtain a decision from the Designer.

B. National Fire Codes (NFPA) including, but not limited to following:

1. NFPA-70 - National Electrical Code 2011 Edition.
2. NFPA-72 - National Fire Alarm Code. 2010 Edition.

C. Applicable Codes:

1. International Building Code. 2012 Edition.
2. Applicable State Energy Code.

D. Should any work be construed as being contrary to or not conforming to aforementioned codes, such alleged confliction to be brought to attention of Architect in writing ten (10) days prior to bid date for review so that such point in question may be resolved. All work to be installed in strict conformity with applicable codes without additional cost to Owner.

E. Contractor to submit and/or file with proper authorities all necessary specifications and drawings as required by governing authorities.

1.5 DESIGN REQUIREMENTS

A. Complete Short Circuit, Protective Device Coordination, and Arc Flash Study to meet requirements of NFPA 70 [and NFPA 70E]. ARC Flash Study to include new panels and existing equipment being modified.

1. Arc Flash Study: Perform Arc Flash Analysis to include the following at each distribution bus:

a. Bolted fault current.
b. Arc fault current.
c. Protective device characteristic and arc fault duration.
d. System voltages and equipment class.
e. Working distances.
f. Calculated incident energy.
g. Calculated arc flash protective boundary.

B. Arc Flash Sign Installation: Implement the Arc Flash sign installation requirements for electrical equipment as specified in NEC Article 110.16 Flash Protection and NFPA 70E.

1.6 SUBMITTALS

A. Within fifteen (15) days after contract has been awarded, Contractor to submit to Designer for review a complete list of materials, equipment, and accessories proposed for use, listing the item and manufacturer's name only.

B. Based upon aforementioned approved listing, Contractor to submit One (1) electronic PDF copy of COMPLETE BROCHURES AND SHOP DRAWINGS OF ALL MATERIALS, FIXTURES, AND EQUIPMENT that he proposes to use giving the names of manufacturers, trade name and specific catalog numbers.

C. Brochures to be submitted in time to allow fifteen (15) days from date of receipt in Engineer's office before final approval or disapproval is required to meet construction schedule. Submittals to bear Contractor's stamp of approval evidencing he has examined and checked same and information contained therein is in accordance with contract requirements, and any deviations to be clearly marked. Approval of shop drawings not to be construed as permitting departure from the contractual documents.

D. Above-mentioned brochures to be submitted and approved before any materials are ordered.

E. In the event that within time stated above contractor fails to submit complete list of materials, equipment and accessories in proper form, the Designer reserves the right to select a full line of materials, fixtures, and equipment, which shall be binding upon Contractor for these materials, fixtures, and equipment as the case may be and which shall be used in his work.

F. Brochures: Submit complete descriptions, illustrations, specification data, etc. of all materials, fittings, devices, fixtures, special systems, etc., including the following:

1. Panelboards.
2. Wiring devices and plates.
3. Motor starters and contactors.
4. Disconnect switches.
5. Enclosed circuit breakers.
6. Lighting, including lamps.
7. Arc flash printout of labels.

G. Proposed items to be clearly indicated when other items are shown on same sheet. When proposing items other than those specified, brochures to contain both specified item sheets and proposed item sheets for ease of comparison. On request from Designer, samples shall be submitted and/or set up, as directed, for inspection and approval. Samples will be returned to Contractor.

H. Shop Drawings: Submit specific shop drawings for major materials including the following:

1. Fire alarms and smoke detection systems, including point-to-point wiring diagrams.
2. Distribution switchboards.
3. Dimensional layout of all electrical rooms, drawn to scale, with equipment location shown therein. Clearances to be in accordance with NEC and local codes.

1.7 OPERATING AND MAINTENANCE MANUALS

A. Prior to final acceptance of the project, furnish to Owner complete bound sets of operation and maintenance manuals of instructions for operation and maintenance of all pieces of equipment and systems provided under this division of specifications.

B. Manuals to also include all submittal data on all materials and equipment. Clearly indicate items provided on this project. A list giving name and address of nearest supply house carrying spare parts and name of Installation Contractor to be given to Owner.

C. Verbally instruct Owner's representatives. Contractor to obtain letter signed by the owner's representative indicating that the in-service training has been completed.

D. Three sets of the following data are required:

1. Operating and maintenance instructions.
2. Spare parts lists.
3. Copies of approved submittal data.

E. Arrange each set of data in an orderly way, and bind each set in a separate 3-ring, hard-cover binder.

F. As soon as data accumulates, prepare one of the sets and deliver to the Owner's Representative, continuously updating this set as additional data is obtained.

G. At completion of work, submit two complete sets of data to the Owner's Representative for distribution to the proper parties.

H. Short Circuit, Protective Device Coordination and Arc Flash Study.

1.8 DELIVERY AND STORAGE

A. Insofar as possible, deliver items in manufacturers' original unopened packaging. Where this is not practical, cover items with protective materials, to keep them from being damaged. Use care in loading, transporting, unloading, and storage to keep items from being damaged.

B. Store items in a clean dry place and protect from damage.

C. All damaged painted surfaces of equipment to be touched up to match original paint.

1.9 RECORD DRAWINGS

A. Keep a set of blueline prints at the job site exclusively for recording deviations from the drawings.

B. Record locations and depths of buried and concealed conduits from fixed easily identifiable objects, such as building walls. Where conduits are concealed in walls, indicate distances off of building corners or other building features not likely to be disturbed by future alterations.

C. Mark deviations in colored pencils so that work of various systems can be easily identified.

D. When work is completed, record all deviations on clean sepia copies of drawings.

E. Submit three sepia copies of completed "record drawings" to Owner's Representative for distribution.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. All materials and equipment used in carrying out these specifications to be American made unless approved otherwise by the Owner and to be new and have UL listing, or listing by other recognized testing laboratory when such listings are available. Specifications and drawings indicate name, type, and catalog numbers of materials and equipment to be used as "standards" shall not be construed as limiting competition. Contractor may at his option, use materials and equipment when, in the judgment of the Designer, they are equivalent to that specified.

PART 3 - EXECUTION

3.1 COORDINATION

A. Intent:

1. These sections of specifications and drawings form a complete set of documents for the electrical work of this project. Neither is complete without the other. Any item mentioned in one shall be as binding as though mentioned in both.
2. The intent of these specifications and drawings is to form a guide for a complete electrical installation. Where an item is reasonably necessary for a complete system but not specifically mentioned, such as pull boxes, fittings, expansion fittings, support hangers, etc., provide same without additional cost to Owner.
3. Electrical layouts indicated on drawings are diagrammatical only. Exact location of outlets to be governed by project conditions. The Designer reserves the right to make any reasonable changes (approximately 6 feet) in location of junction boxes, or equipment prior to roughing-in of such without additional cost to Owner.

B. Deviations:

1. No deviations from specifications and drawings to be made without full knowledge and consent of Designer.
2. Should Contractor find during progress of work that existing conditions make desirable a modification of the requirements of any particular item, report such item promptly to Designer for his decision and instructions.

C. Insofar as it is possible to determine in advance, leave proper chases and openings. Place all outlets, anchors, sleeves, and supports prior to pouring concrete or installation of masonry work. Should contractor neglect doing this, any cutting and/or patching required to be done is at this contractor's expense.

D. Visit site and be informed of conditions under which work must be performed. No subsequent allowance will be made because of error or failure to obtain necessary information to completely estimate and perform work involved.

E. Designer to be mediating authority in all design related deviations and disputes arising on the project.

F. Coordinate to assure that proper points of service transformer locations, voltage characteristics and capacity of service are in accordance with contract drawings.

3.2 CUTTING AND PATCHING

A. Repair or replace routine damage caused by cutting in performance of this contract.

B. Correct unnecessary damage caused due to installation of electrical work, brought about through carelessness or lack of coordination.

C. Holes cut through existing floor slabs to be core drilled with drill designed for this purpose. All openings, sleeves and holes in slabs between floors to be properly sealed, fire proofed and water proofed.

D. Repairs to be performed with materials which match existing materials and to be installed in accordance with appropriate sections of these specifications.

3.3 TRENCHING, EXCAVATION, BACKFILLING, AND REPAIRS

A. Provide trenching, excavation, and backfilling necessary for performance of electrical work.

B. Trenching and excavation to be unclassified. No extra will be paid in event that rock is encountered.

C. Backfilling to be carefully done using only clean earth thoroughly tamped and compacted below and above embedded items.

3.4 FOUNDATIONS AND PADS

A. Provide foundations and pads required for equipment provided under this division of specifications. Coordinate proper size and location of foundations, pads, anchor bolts, and other items to be built into structure.

B. Concrete to be in accordance with concrete division of these specifications.

3.5 TESTS

A. On completion of work, installation to be entirely free from grounds, short circuits, and open circuits. Perform a thorough operational test in presence of Owner or his representative. Balance all circuits so that feeders to panels be not more than 10% out of balance between phases with all available load energized and operating. Furnish all labor, materials and instruments for above tests.

B. Furnish Owner, as a part of closing file, a copy of such tests including identification of each circuit and readings recorded. Test information to be furnished to Owner includes ampere readings of all panels and major circuit breakers, insulation resistance reading of motors and transformers.

C. Prior to final observation and acceptance, test, leave in satisfactory operating condition all electrical systems and equipment including but not limited to the following:

1. Electrical distribution system.
2. Ground fault protection system.
3. Emergency power generation system.
4. Transformers.
5. Fire alarm and smoke detection system.
6. Electric motors for all equipment.
7. Electric safety devices.

3.6 INSPECTION FEES AND PERMITS

A. Obtain and pay for all necessary permits and inspection fees required for electrical installation.

3.7 IDENTIFICATION OF EQUIPMENT

A. Properly identify all starters, contactors, relays, safety switches and panels with permanently attached black (normal power) or red (essential systems) phenolic plates with 1/4" white engraved lettering on the face of each attached, with two sheet metal screws. Starters and relays connected by the electrical tradesman to be identified by him whether furnished by him or others.

3.8 TEMPORARY LIGHTS AND POWER

A. Provide a temporary electrical lighting and power distribution system of adequate size to properly serve the following requirements, including adequate feeder sizes to prevent excessive voltage drop. Temporary work to be installed in a neat and safe manner in accordance with the National Electrical Code, Article 590, and as required by OSHA or applicable local safety codes.

B. Provide one pigtail socket with 150 watt lamp for every 1000 square feet of floor area, evenly distributed throughout building and with minimum of one pigtail socket per room.

C. Provide one duplex power outlet for every 1,500 square feet of floor area, evenly distributed throughout the building. Power outlets to be 20 amp, single phase located as directed by the contractor.

D. Check with contractor prior to installation to determine if any lighting or power outlets over the maximum quantity noted above are required.

E. Provide service and panelboards required for above lighting and power outlets.

F. Check with the Contractor prior to installation to determine whether single phase or three phase service is desired.

G. Contractor to maintain the existing lights and power during normal regular hours as directed by Owner. Any interruption of power must be approved by and coordinated with Owner's representative.

3.9 DEMOLITION

A. Contractor shall visit the site before submitting a bid to acquaint himself with existing conditions.

B. Work in existing buildings shall be scheduled well in advance with the Owner. Work shall be performed at such times and under such conditions as suit the convenience of the Owner. Plan the work to minimize disruption of formal operations.

C. In renovated areas, remove wiring devices, fixtures, components, electrical equipment, conductors, boxes, and conduits not required to remain in service when this project is complete.

D. Remove existing conduit and wire from areas to be remodeled, back to panelboard, cabinet or junction box.

E. Where a circuit is interrupted by removal of a device or fixture from that circuit, the contractor shall install wire, conduit, etc., as required to restore service to the remaining devices and fixtures on that circuit.

F. Lighting fixtures, wiring devices, panelboards, and conductors removed shall be offered to the Owner. If he chooses to retain these items or a part of these items, turn those chosen over to him. Items rejected by the Owner shall be removed from the project site by the contractor.

3.10 OBSERVATIONS

A. When field observation services are a part of the project scope, Engineer's office will provide periodic observation of the progress of work specified herein. Purpose of the observation is to ensure compliance of Contractor's work with specifications and drawings. Engineer's office will also observe tests required of Contractor as called for in other sections of specifications.

B. Specifications and drawings represent work to be done in view of total project requirements. Final location of conduits, fixtures, panels, switchboards, etc., to eliminate possible conflict with other trades is responsibility of Contractor. Contractor to provide all supervision required for his personnel to ensure that installation is made in accordance with specifications and drawings and all safety rules and regulations are observed. In event of conflicts of work on project with other trades, Contractor to make every reasonable effort to resolve conflict through meetings and discussions with other parties involved, by preparation of drawings or other appropriate action. Only after this has been done shall the Engineer's assistance be requested.

C. When Engineer is requested to visit project to aid in resolution of conflicts or for witnessing tests, he shall be given a minimum of 48 hours’ notice prior to time his presence is required at job site.

D. Cost of Engineer's time for general observation or test observance as described herein is to be borne by Engineer except in those cases where Engineer has been requested to visit project and upon visiting finds Contractor has caused Engineer an unnecessary visit. It shall be deemed an unnecessary visit in the following circumstances.

1. Due to lack of supervision on Contractor's part.
2. Test is not ready for observation.
3. Engineer is placed in role of determining reason system or equipment is not operating properly, only to find that Contractor has not fulfilled his responsibility in troubleshooting, etc.
4. Contractor requests a trip to check off final punch list items and it is found that no attempt has been made by Contractor to correct previous punch list items.
5. Contractor will be billed for Engineer's time for making unnecessary visit at the rate of $400 per day plus mileage and living expenses.

3.11 WARRANTY-GUARANTEE

A. Designer reserves right to accept or reject any part of installation which does not successfully meet requirements as set out in these specifications.

B. Contractor shall and hereby does guarantee all work installed under this division shall be free from defects in workmanship and materials for a period of one year from date of final acceptance, whichever is earliest. The above parties further agree that they will repair and replace any defective material or workmanship which becomes defective within the terms of this warranty-guarantee.

END OF SECTION

SECTION 26 05 01 - ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, equipment, materials and supplies necessary for and reasonably incidental to demolition of work hereinafter specified, indicated on drawings, required or intended for completion of the work.

B. Items included under demolition work include but are not limited to power, wiring devices, lighting devices and controls and all associated electrical equipment, conduit, wire and materials.

C. Repair those areas damaged under demolition work once new services and systems have been installed.

1.2 JOB CONDITIONS

A. Provide adequate protection to persons and property. Execute work in such a manner as to avoid interference with required operations and use of or passage to and from adjoining buildings and facilities.

B. Demolition work of equipment necessary for the operation of the power and communication systems to be coordinated with the installation of new equipment. The demolition and installation work is to be done as quickly as possible to minimize any burdens on the Owner.

1.3 CONDITION OF EXISTING FACILITIES

A. Contractor shall verify the areas, conditions and features necessary to tie new work into existing construction. This verification shall be done prior to submittal of shop drawings, fabrication of erection, construction or installation. The Contractor shall be responsible for the accurate tie-in of the new work to existing facilities.

PART 2 - PRODUCTS - NOT APPLICABLE.

PART 3 - EXECUTION

3.1 SCHEDULES

A. Schedule all demolition work as to cause minimal interference with plant operations and to comply with provisions of Section 01 10 00 - Summary of Work.

B. Obtain prior approval of the Owner at least seven days in advance before starting demolition of any equipment. Under no circumstances will demolition work be approved until new equipment is ready for installation.

3.2 PREPARATION

A. Disconnect or arrange for disconnection of utility service connections to equipment and areas to be demolished before starting demolition.

B. Preserve in operating condition all active utilities transversing the project site. Protect all equipment that remains (electrical and mechanical) during demolition, and repair all damage caused by this work to satisfaction of Designer.

3.3 APPLICATION

A. Maintain the continuity of the existing branch circuits serving all existing light fixtures that are to remain, whether indicated or not on the drawings.

B. All existing walls, ceilings, floor slabs, etc., being cut or damaged under this contract to be patched back to match existing by General Contractor.

C. All existing switchgear, lighting fixtures, receptacles, control equipment and switches being removed to be cleaned and turned over to the Owner.

D. Remove exposed ground conductor back to source or point of contact with slab. Cut conductor off below slab and abandon with hole being patched back to match existing surface (floor, wall or ceiling). If reusable, simply disconnect ground conductor.

E. Conduits, wire and wood products that are not salvageable shall be disposed of legally.

F. Primary work shall be completed with all facilities kept in service or with short periods of scheduled momentary outages.

G. Holes in slabs or into classified areas to be patched to provide a gas, vapor and watertight barrier.

3.4 STORAGE AND HANDLING

A. The Owner reserves the right to save materials that are a part of the demolition work, and the Contractor shall turn over and store any such materials at the Owner's direction.

B. All materials not turned over to Owner shall become property of Contractor and removed promptly from plant site at no additional cost to the Owner. Any permits or fees for disposal shall be the responsibility of the Contractor.

3.5 CLEANUP

A. Burn no materials or debris on premises.

B. Remove from site rubbish and debris found thereon and, except as otherwise specified, materials and debris resulting from work of demolition. Leave site in safe and clean condition.

END OF SECTION

SECTION 26 05 19 - CONDUCTORS - 600 VOLT AND BELOW

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide a complete system of conductors for lighting, power, and controls throughout building.

B. Refer to drawings for sizes of conductors.

PART 2 - PRODUCTS

2.1 CONDUCTORS - POWER AND LIGHTING

A. Provide 98% conductivity copper conductors with 600-volt insulation.

B. Interior conductors shall be Type THHN-2/THWN-2 insulation.

C. 600-volt insulation for conductors installed in underground raceways shall have XLP (cross-linked polyethylene) insulation, Type XHHW-2.

D. For feeder and branch circuit conductors No. 12 AWG and No. 10 AWG, provide solid type.

E. For all control and motor circuits, and all conductors No. 8 AWG and larger, provide stranded type.

F. Conductors shall be manufactured by Triangle, Phelps Dodge, Southwire, or approved substitute.

G. Provide white or gray colored neutral conductors; provide black or color-coded phase conductors.

H. Provide No. 14 AWG stranded type THHN fixture conductors, for conductors entering fixtures and in stems of pendant fixtures.

I. Provide type THHN stranded conductors, 90 degrees C for conductors running through continuous rows of fluorescent fixtures.

2.2 CONDUCTORS - CONTROLS

A. Single Conductor

1. Class B stranded soft-drawn copper with 600 volt thermoplastic insulation.
2. Size 14 AWG.
3. Type THHN/THWN.

B. Multiconductor

1. 600 Volt insulated Type TC
2. 16 AWG stranded (7x24) copper
3. PVC insulation – unshielded
4. 90 º C rating

2.3 DATA CONNECTIONS

A. Ethernet shall be CAT-5e manufacturer's rated cable.

1. Industrial Ethernet cable with 300 volt PVC jacket
2. RJ-45 Compatible
3. Gigabit Ethernet, Ethernet I/P compliant
4. Temperature Rating: 75 degrees C.

B. Ethernet Fiber Optic cable shall be multimode with the following features.

1. Fiber Type: 62.5/125/250 Micron
2. 12 Fiber unless specifically detailed on plans
3. Gigabit Ethernet compatible.
4. TIA/EIA 455 certified for crush and impact resistance.
5. 300 volt PVC insulated.
6. Temperature Rating: 70 degrees C.

C. Serial RS-485 cable shall be 22 gauge twisted, shielded pairs (2-pair).

1. 100% foil covered.
2. 65% braid.
3. 120 ohm characteristic impedance.
4. 11 pF/ft conductor to conductor and 20.9 pF/ft conductor & shield.
5. 300 volt, 60°C PVC jacket.

2.4 ACCEPTABLE MANUFACTURERS AND TYPES - CONTROLS, INSTRUMENTATION, DATA CONNECTIONS AND THERMOCOUPLE

A. Use Belden or approved substitute.

B. Control Wiring: Belden 27618A multiconductor cable

C. Ethernet Cable: Belden DataTuff 7923A cable

D. Ethernet Fiber: Belden I60xx55 Fiber cable where x = number of fibers

E. RS – 485 Cable: Belden 3107A cable

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install pull boxes in circuits or feeders over 100' long.

B. All conductors shall be continuous from origin to panel or equipment termination without splices where possible. Where splices and taps are necessary or are required, they shall be made in splice boxes with suitable connectors.

C. Make all splices or connections only at outlet, pull or junction boxes.

D. Use pulling compound to pull.

E. Install instrument and data connection conductor in separate raceways from all other conductors. Separate control wiring from power wiring in separate raceways. Separation distances shall be as specified by control system manufacturer or as listed in IEEE Standard 518, whichever is greater.

F. Bend radius on conductors shall be less than the limitations listed by the cable manufacturer.

G. Deliver all conductors to job site new and in original wrapping, package or reel.

H. All conductors and connections shall test free of grounds, shorts, and opens.

I. For 20-amp, 120-volt branch circuits, provide No. 10 wire in lieu of No. 12 wire for any branch circuit in excess of 90 linear feet to prevent excessive voltage drop. Where branch circuit exceeds 175 linear feet, use No. 8 wire.

J. Use Ideal wing nuts, Scotchlok Type Y, R, G, or B, or approved equivalent connectors for fixture connections at outlet boxes.

K. Make feeder taps and joints with OZ type T, PT, PM or PTS, or approved equivalent clamp connectors as manufactured by Kupler, or with approved compression sleeves. Wrap connectors with No. 10 electro-seal or approved equivalent plastic filler and vinyl tape.

L. Leave a minimum of 8" slack wire in every outlet box whether it be in use or left for future use.

M. Color code conductors as follows:

CONDUCTOR COLOR CODE	
	120/208 Volt
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green

N. Use factory color coded conductors where commercially available. If not, use black wire and band with color tape.

END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The entire system of raceways and equipment to be grounded in accordance with Article No. 250 of latest edition of National Electrical Code and any local regulation or governmental governing authority.

PART 2 - PRODUCTS

2.1 EQUIPMENT REQUIREMENTS

A. Main service panelboard shall be bonded to street side of first flange or coupling of incoming main water line serving project with heavy-duty ground clamp in accordance with Article 250.104 of N.E.C. The grounding electrode conductor shall be sized in accordance with Table 250.66 of N.E.C. An additional ground wire of same size shall be run to a tripod grounding rod system driven in ground outside foundation of building. This system shall consist of three 3/4" x 10' copperweld ground rods driven in ground in an equilateral triangular configuration with a minimum of 15' spacing between each. Connection of each ground rod to one another shall be made using a conductor of same size as being run for main service ground. Building steel shall be connected to ground bus on main service with a conductor the same as required on the service. This ground will be in addition to the previously specified grounds.

2.2 GROUND CLAMPS

A. OZ Electrical Manufacturing Company, Steel City, Appleton, or approved substitute.

B. Feeder circuits to panels, motor control centers, etc., shall have a separate green grounding conductor in conduit sized in accordance with Table 250.122 of N.E.C.

C. All branch circuits shall have a separate green grounding conductor installed in same conduit as phase and neutral conductor from panel ground bus to device. The grounding conductor shall be sized in accordance with Table 250.122 of N.E.C.

D. Flexible conduit will not be approved as achieving continuity of ground. All flexible conduit shall have a jumper wire sized to ampacity of branch breaker and shall be connected to conduit system on both ends; this applies to fixtures, motors, controls, etc.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Effectively bond all grounding conductors to grounding electrodes, equipment enclosures and ground busses.

B. Provide a shunt path around main water meter by bonding around both sides of meter to assure continuity.

C. Locate all grounding attachments away from areas subject to physical damage. Provide protective covering as required.

D. Clean all non-conductive surfaces on equipment to be grounded, to assure good electrical continuity.

E. Ground on main service shall be tested to obtain no greater than 10 ohms using 3-Point Fall of potential test. Test data shall be submitted to Engineer for review and such test data shall become a part of the final brochure.

END OF SECTION

SECTION 26 05 29 - SUPPORTING DEVICES AND HANGERS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide a system of supporting devices and hangers to ensure secure support or bracing for conduit, electrical equipment, including safety switches, fixtures, panelboards, outlet boxes, junction boxes, cabinets, etc.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Provide appropriate supporting devices and hangers as manufactured by Erico Products, Inc., Steel City, Rayco, or approved substitute:

1. Vertical flange clamps (beam clamps).
2. "Z" purlin clips.
3. Conduit clips.
4. Universal clamps (Beam clamps).
5. Beam clamps (set screw type).
6. Combination push-in conduit clips.
7. Combination conduit hanger clamps.
8. Flexible conduit clips.
9. Special combination conduit clips.
10. One-hole steel straps.
11. Minerallac conduit hangers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Secure conduits to within 3' of each outlet box, junction box, cabinet, fitting, etc., and at intervals not to exceed ten feet (10') for EMT and IMC conduit and in accordance with Table 344.30 (B) (2) for Rigid Steel conduit.

B. Install clamps secured to structure for feeder and other conduits routed against the structure. Use drop rods and hangers or racks to support conduits run apart from the structure.

C. Furnish and install suitable angle iron, channel iron or steel metal framing with accessories to support or brace electrical equipment including safety switches, fixtures, panelboards, outlet boxes, etc.

D. Paint all supporting metal not otherwise protected, with rust inhibiting primer and then with a finish coat if appropriate to match the surrounding metal surfaces. (Prepainted or galvanized support material is not required to be painted or repainted.)

E. Use of chains, perforated iron, bailing wire, or tie wire for supporting conduit runs will not be permitted.

F. For support of low voltage wiring not required to be in conduit, Contractor shall bundle cables together in a neat manner using approved nylon tie wraps. Bundled cables shall be supported with "J" hooks on telephone type bridle rings, a minimum of 6 feet on centers. Contractor shall clearly identify all differing types of cables being run and tag them with tape tags reading “data”, etc., for the appropriate system cables. Identification tape shall be provided at minimum intervals of 25 feet on center and within each building space.

END OF SECTION

SECTION 26 05 34 - RACEWAYS AND CONDUIT SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide a complete conduit system with associated couplings, connectors, and fittings.

B. Conduits shall be mechanically and electrically continuous from outlet to outlet and from outlets to cabinets, pull or junction boxes.

1.2 SUBMITTALS

A. Submittal for products furnished under this section is not required.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. IMC, RGS and EMT conduit shall be hot-dip galvanized, or electrogalvanized steel by Triangle, Raco, Allied, or approved substitute. Catalog numbers used below are those of Raco and shall be considered as standards.

B. Erickson couplings, Raco 1502-1516 for IMC and RGS, shall be used where neither length of conduit can be rotated.

C. IMC/RGS conduit connectors from 1/2” to 4” trade sizes shall use compression type, Raco 1802-1816.

D. EMT conduit connectors from 1/2” to 4” trade sizes shall use compression type, Raco 2902-2946.

E. Grounding bushings shall be Raco 1212-1296.

F. Insulated bushings shall be Raco 1402-1416.

G. Weatherproof hub shall be Raco 1702-1716, complete with sealing "O" ring or sealing locknuts.

H. Provide polyvinyl chloride (PVC) conduit, Type 40, and associated couplings, connectors, and fittings. PVC conduit shall be UL listed and 90 degrees C UL rated.

2.2 ELECTRICAL METALLIC TUBING (EMT)

A. Use Electric Metallic Tubing (EMT) for:

1. Branch circuits installed overhead, both exposed and concealed, installed more than 6 feet above finished floor.
2. Branch circuits originating from isolated panels.

2.3 INTERMEDIATE METAL CONDUIT (IMC)

A. Use Intermediate Metal Conduit (IMC) for:

1. Panelboard feeders.
2. Branch circuits installed in hazardous areas.
3. Branch circuits and feeders installed in concrete slabs at ground floor.
4. Branch circuits installed exposed below 6 feet above finished floor.
5. Branch circuits installed in wet locations.
6. Pendant drops.

2.4 RIGID GALVANIZED STEEL (RGS)

A. Conduit Use:

1. Interior and exterior exposed primary service conduit.
2. Interior and exterior exposed secondary service conduit.
3. Exterior exposed branch circuits.

2.5 POLYVINYL CHLORIDE (PVC)

A. Use PVC for:

1. Service entrance conduits for power encased in concrete.
2. Service entrance conduits for telephone.
3. Exterior feeders encased in concrete.
4. Exterior underground branch circuits.
5. Primary power conduits encased in concrete.

B. PVC conduit shall not be used for feeders or branch circuits inside the building.

2.6 FLEXIBLE METAL CONDUIT

A. Provide a flexible metal conduit system for the termination points at equipment that may possibly vibrate such as motors, welders, etc. The length shall not exceed 6 feet.

B. Conduit shall be electrically continuous from outlet or conduit end to the utilization equipment.

C. The total length of flexible conduit in any circuit shall not exceed 6 feet.

D. Where exposed to continuous or intermittent moisture, conduit shall be liquid tight flexible type, U.L. Type EF.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Minimum size of conduits shall be 1/2 inch.

B. Conduit joints shall be cut square, threaded, reamed smooth, and drawn up tight so conduit ends will butt in couplings, connectors, and fittings.

C. Make bends or offsets with standard ells or field bends with an approved bender.

D. Run conduits concealed in floor slabs, below slabs, or in walls in direct line with long sweep bends or offsets. Run exposed conduits and conduits run above lay-in ceilings parallel to and at right angles to building lines. Group multiple conduit runs in banks.

E. Secure conduits to all boxes and cabinets with two locknuts and bushings so system will be electrically continuous from service to all outlets.

F. Cap ends of conduits to prevent entrance of water and other foreign material during construction.

G. Complete conduit systems before pulling conductors.

H. Provide cable supports in conduits rising vertically in accordance with the National Electrical Code, Article 300-19.

I. Provide nylon pull cord in all empty conduits. Steel wire not acceptable as pull wire.

J. Conduits which pass through floor slabs (except ground floor) shall be sealed with concrete grout. Seal around conduits or other wiring materials passing through partitions, which extend to the underside of the slab above, and those passing through smoke partitions and fire-rated walls. Refer to appropriate details on architectural and mechanical drawings.

K. Conduits which enter crawl space, tunnels, and basements from outside the building shall be grouted-in to prevent entry of gases, vapors, insects, or rodents to these spaces from street mains.

L. Conduit not serving elevator equipment shall not be permitted to pass through elevator shafts or elevator equipment rooms.

M. Where IMC or RGS conduit is installed in a cabinet, junction box, pull box, or auxiliary gutter, conductors shall be protected by an insulated bushing. Locknuts shall be installed on conduit outside and inside enclosure.

N. In areas where enclosed and gasketed fixtures and weatherproof devices are specified, where rigid conduit enters a sheet metal enclosure, junction box and outlet box, and not terminated in a threaded hub, a steel, or malleable iron nylon insulated hub, complete with recessed sealing "O" ring or sealing locknut shall be used.

O. Where conduits stub up in conduit space beneath switchgear and do not connect directly to equipment enclosures, use malleable iron nylon insulated ground bushing with a lay-in lug design complete with bonding screw, Raco 1212-1296.

P. Provide seal-off fitting in all conduits entering hazardous areas and any conduits entering a cold temperature area such as freezers and dry refrigerators.

Q. In concrete slabs, block up conduit from forms and securely fasten in place. All conduits in slabs shall have a minimum of 1-1/2 inches concrete coverage above and below.

R. Encase in 4 inches of 1:2:4 mix concrete on all sides all feeder conduits laid below ground outside building foundation line.

S. Where conduits running overhead pass through building expansion joints they shall be connected by flexible metal conduit of same size with sufficient slack to allow conduits on either side of expansion joint to move a minimum of 3 inches in any direction. Provide supports as required on each side of expansion joint.

T. Conduits for feeders and branch circuits shall be terminated directly into panelboard enclosure without the use of pull boxes, junction boxes, wireways, or auxiliary gutters, unless the panelboard enclosure does not provide sufficient surface area for all conduits. Where such cases exist, the contractor shall notify the Designer. In no case will splices in such boxes, wireways, etc., be permitted.

U. Failure to route conduit through building without interfering with other equipment and construction shall not constitute a reason for an extra charge. Equipment, conduit, and fixtures shall fit into available spaces in building and shall not be introduced into building at such times and manner as to cause damage to structure. Equipment requiring servicing shall be readily accessible.

V. No conduit shall be installed in elevated slabs.

3.2 EMT

A. Do not use electric metallic tubing in cinder concrete or cinder fill where subject to permanent moisture unless protected on all sides by a layer of noncinder concrete at least 2 inches thick or unless the EMT is at least 18 inches under the fill. Use of set-screw fitting is not acceptable in concrete or in fill under slab.

3.3 PVC

A. Use threaded fittings for all connectors and adapters.

B. Provide code sized ground conductors in all power conduit runs.

C. Provide 1/4-inch nylon pull rope in all primary power and incoming telephone service entrance conduits.

D. Encase all PVC conduit in reinforced concrete with a minimum of 4-inch encasement on all sides except exterior branch circuits.

E. No PVC shall emerge from the ground or the concrete slab or encasement. PVC shall convert to galvanized rigid metal prior to its emergence.

F. Make bends with standard ells or with an approved heat bender.

3.4 FLEXIBLE METAL CONDUIT

A. Flexible metal conduits shall be 1/2 inch minimum size.

B. Where fittings for liquidtight flexible conduit are brought into an enclosure with a knock-out, a gasket assembly, consisting of one piece "O" ring, with Buna-N sealing material, Raco Series 3500, shall be installed on outside of box. Fittings shall be made of either steel or malleable iron only, and shall have insulated throats or insulated bushings.

C. In dry locations, where final connections to motors and other equipment may be made with flexible metal conduit, fittings shall be of steel or malleable iron only with insulated throats or insulated bushings, and shall be of wedge and screw type having an angular wedge fitting between convolutions of conduit.

D. An additional copper ground wire shall be installed inside of flexible conduit and bonded at each end to assure continuity of ground to lighting fixtures, controls, and other utilization equipment.

E. All recessed lighting fixtures shall be connected with flexible metallic conduit from outlet box to fixture. Rigid conduit connections to lighting fixtures are not acceptable.

F. Install liquidtight flexible conduit in such a manner as to prevent liquids from running on the surface toward fittings.

G. Allow sufficient slack conduit to reduce the effect of vibration.

END OF SECTION

SECTION 26 05 37 - OUTLET BOXES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide each fixture, switch, receptacle, communication devices, and other wiring devices with a galvanized outlet box of appropriate size and depth for its particular location and use unless indicated otherwise.

1.2 SUBMITTALS

A. Submittals are not required for items furnished under this section.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Outlets and junction boxes shall be Steel City or approved substitute.

B. Provide 4" square x 1-1/2" deep boxes for switches and receptacles in drywall partitions. Use square cut plaster rings of proper gauge and depth.

C. Provide 4" x 1-1/2" octagonal boxes for ceiling outlets. For increased cubic capacity provide 4" x 2-1/8" octagonal, 4" x 1-1/2" square or 4" x 2-1/8" square boxes for ceiling outlets.

D. Provide 2-1/2" x 3-3/4" one gang masonry boxes for switches and receptacles installed in concrete block walls not plastered. For increased cubic capacity provide 3-1/2" x 3-3/4" one gang masonry boxes. Where more than two conduits enter the box from one direction, provide 4" square boxes with square cut device covers not less than 1" deep specifically designed for this purpose. Use round edge plaster rings only if the block walls are to be plastered. Use sectional or gangable type outlet boxes only in dry wall construction.

E. For all systems boxes, provide 4-11/16" square outlet boxes with square cut device corners for block walls. Single gang device boxes are not acceptable.

F. Permanent barriers shall be furnished in multi-gang boxes if the voltage between adjacent wiring devices exceeds 300 volts.

G. Provide galvanized malleable iron fittings with threaded hubs for screw connections and with the proper type covers for switches and receptacles served by exposed conduit. Use pressed steel outlet only for ceiling fixture outlets.

H. Provide galvanized malleable iron condulets with threaded hubs and covers and with proper configurations for all changes of direction of exposed conduits. Standard conduit ells may be used if they do not interfere or damage or mar the appearance of the installation.

I. Provide rectangular boxes for floor outlets. Boxes to be 2-gang or 3-gang, fully adjustable before and after concrete pour, Steel City No. 642-643. Cover to be Steel City No. P64-D4/P6DS, aluminum, with duplex screw cover for duplex receptacle. Carpet flange to be Lexan type. Fittings to be Steel City No. SFH50, satin aluminum for high tension and Steel City No. SFH50-TEL, satin aluminum for low tension. For boxes in elevated slabs less than four inches thick, use Steel City 642 and 643-SC.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate boxes to prevent moisture from entering or accumulating within them.

B. Use boxes of sufficient cubic capacity to accommodate the number of conductors to be installed. See Article #370 of the latest edition of the National Electrical Code.

C. Effectively close unused openings in boxes with metal plugs or plates.

D. Set recessed boxes so that front edges are flush with finished surfaces.

E. Secure boxes to surfaces upon which they are mounted or embed boxes in concrete or masonry. Support boxes from structural members with approved braces.

F. Install blank device plates on outlet boxes left for future use.

G. Provide bushings in holes through which cords or conductors pass.

H. Install boxes so that the covers will be accessible at all times.

I. Outlet boxes in walls shall not be mounted back-to-back. Where drawings show outlets on both sides of the same wall, the boxes shall be staggered sideways and connected with short nipples to prevent passage of sound. Where outlets are mounted on both sides of same firewall, they are to be staggered a minimum of 24 inches to maintain the ratings of the wall.

J. Where required to hang a specified fixture, provide a fixture stud of the no-bolt, self-locking type on ceiling outlets.

END OF SECTION

SECTION 26 05 38 - PULL AND JUNCTION BOXES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide pull and junction boxes of appropriate size and depth or as indicated on the drawings and as specified hereinafter.

1.2 SUBMITTALS

A. Submittals of products furnished under this section are not required.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/MATERIALS

A. Pull and junction boxes shall be by Hoffman or approved substitute.

B. For interior work, provide galvanized sheet metal boxes of code thickness with lapped and welded joints, 3/4 inch flanges, screw covers, etc.

C. For exterior work, provide galvanized sheet metal boxes of code thickness with lapped and welded joints, 3/4 inch flanges, bolted covers with full gaskets forming a completely water-tight assembly, equal to Hoffman, Concept Series.

D. For exterior work in graded areas outside the building, provide heavy duty sidewalk junction boxes externally flanged for flush mounting. Covers to be fully gasketed, watertight and secured with plated screws or bolts.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide junction boxes as shown on drawings and otherwise where required, sized according to number of conductors in box or type of service to be provided. Minimum junction box size 4 inches square and 2-1/8 inches deep. Provide screw covers for junction boxes.

B. Use minimum 16 gauge steel for pull boxes and provide with screw cover.

C. Install boxes in conduit runs wherever necessary to avoid long runs or excessive bends. Do not exceed 100 foot runs, or three 90 degree bends, without pull boxes.

D. Rigidly secure boxes to walls or ceilings. Use of conduit as a support is not acceptable.

E. Install boxes in accessible locations. Size boxes in accordance with Articles No. 312 and No. 314 of the latest edition of the National Electrical Code.

F. Install boxes so that the covers will be accessible at all times.

G. Do not install pull or junction boxes for joint use of line voltage and signal or low voltage controls unless all conductors are insulated for the highest voltage being used in the same box. Emergency system and normal system circuits shall not be routed through a common pull or junction box.

END OF SECTION

SECTION 26 05 43 - UNDERGROUND ELECTRIC SERVICE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Service will be underground and will be a 120/240-volt, 1-phase, 3-wire system.

B. System will be serviced by Camp Shelby Public Works.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Service to be grounded in accordance with latest edition of National Electric Code, Article No. 250, and any special requirements as required by municipal, state, or federal authorities having jurisdiction.

B. Metering to be provided by electrical contractor.

C. Terminal pole, transformers, lightning arrestors, etc., to be provided by power company.

D. Meter base to be provided and installed by Division 26 on building where indicated on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Contractor to provide secondary conduit, wire, service heads, excavation, backfill, concrete, etc., from a point approximately 25' up pole (to be coordinated with power company) to main service disconnect within building.

3.2 SERVICE COORDINATION

A. Division 26 shall be responsible for coordination with power company to determine final exact location of transformer pole and point of service and shall furnish a breakdown of loads for the power company.

END OF SECTION

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide circuit breaker type panelboards as indicated on drawings and as specified in this section.

B. Refer to drawings for numbers of branch circuits, their ratings, number of poles, arrangements, etc.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/EQUIPMENT

A. Provide panelboards by Square D, G.E., Siemens, Cutler-Hammer, or approved substitute. Square D type designations are used to indicate type and quality of panelboards.

B. Lighting panelboards for 120/208-volts, 3-phase, 4-wire service shall be Square D type NQOD.

C. Lighting panelboards for 277/480-volts, 3-phase, 4-wire service shall be Square D type NF.

D. Power panelboards for 120/208-volt, and 480/277-volt, 3-phase, 4-wire service shall be Square D I-Line distribution type.

E. Lighting and power panelboards and their associated circuit breakers shall be furnished with a short-circuit current rating greater than the available fault current shown on the panel schedules.

F. Series rated panelboards are not acceptable.

G. Provide panelboards of circuit breaker, dead-front safety type, UL labeled and meeting all applicable requirements of the National Electrical Manufacturers Association.

H. Provide panelboards with lugs (both main lugs and branch circuit lugs) suitable and UL approved for copper 75 degree C rated conductors.

I. Provide shunt trip and GFI breakers where indicated on panel schedule.

J. Provide electrically isolated neutral bars.

K. Provide separate ground bars complete with lugs or connectors on bar.

L. Provide panelboards with sequence phased bus bars or distributed phase bussing for: single phase, 3-wire, 115/230-volts.

M. Provide panel doors equipped with chrome-plated locks and catches, all keyed alike. Provide two keys for each lock. Provide fronts with adjustable indicating trim clamps.

N. Provide thermal magnetic circuit breakers which are fully rated and temperature rated for a 40 degree C ambient. Breakers shall be quick-make, quick-break type with trip indication shown by handle position other than ON or OFF and with a common trip on all multi-pole breakers.

O. Where specific panelboard types, breaker types, or adjustable breaker devices are shown on the drawings, and the contractor elects to use another manufacturer or type, contractor will be responsible for additional cost incurred by the designer for evaluation of breaker coordination.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Ground separate ground bars to panel boxes and to the main service entrance ground bus with a code-sized grounding conductor installed in the same conduit as the phase and neutral conductors.

B. Install all circuits which use a common neutral in accordance with the latest edition of the National Electrical Code, Article Nos. 210-4, 210-5, 215-4, and 220-4d. Balance all circuits to achieve not greater than 10% unbalanced neutral current in panel feeders.

C. Provide six circuit breaker handle lock-on devices for each lighting panelboard for installation by the contractor on circuits as directed by the Owner to prevent unauthorized personnel from turning off circuits to controls, unit heaters, clocks, night lights, etc. Turn the spare lock-on devices over to the Owner for his use.

D. Provide typed directory cards mounted under plastic on the doors of all panelboards. The directories shall indicate the type of devices being served, including the space number or space names in which the devices or fixtures are located.

E. Provide engraved Bakelite nameplates for all the circuit breakers in use on power panelboards. Indicate the device, panel, or motor being served with 1/4" high letters. Provide nameplates without engraving for the spare breakers and/or spaces. Secure all nameplates to the panelboard trim with two roundhead sheet metal screws.

F. Provide engraved Bakelite nameplates on the visible face of all lighting and power panels indicating the panel designation in 3/8" letters. Secure the nameplates with a minimum of two round-head sheet metal screws. Normal power nameplates shall be black and emergency power nameplates shall be red.

G. Provide 7 sets of final as-built drawings for the panels after delivery of the panels for distribution by the Owner.

END OF SECTION

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide switches, receptacles, device plates, and other wiring devices as indicated on drawings.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Acceptable manufacturers include Leviton, Hubbell, Eagle, Arrowhart, Pass and Seymour, and Bryant. Leviton numbers are used for clarity.

2.2 SWITCHES

A. 20-Amp, 120/277 VAC:

1. Single pole: Leviton No. 1221-2W.
2. Three-way: Leviton No. 1223-2W
3. Single pole, weatherproof: Leviton No. 1221-2W with Steel City No. SW1-C weatherproof plate.
4. Single pole with pilot light (120 VAC): Leviton No. 1221-PLC.
5. Momentary contact switch: Leviton No. 1257.

B. Dimmers shall be universal (LED/CFL/MLV/Incandescent) slide dimmers equal to Leviton DSM10-1LZ.

2.3 RECEPTACLES

A. 20-Amp, 125-VAC, NEMA 5-20R:

1. Duplex type: Leviton No. 5362-W (white).
2. Ground fault circuit interrupter: Leviton No. MGFN2-W (white).
3. Tamper resistant type: Leviton 5362-SGW (white).
4. Duplex isolated ground type: Leviton 5362-IGW (white).
5. Weatherproof “In Use”, extra-duty type cover: Leviton 5980-UCL.

2.4 MISCELLANEOUS DEVICES

A. Twist lock receptacle: Hubbell No. 23000-HG series or approved substitute.

B. Flush dryer receptacle, 30-amp, 125/250 VAC: Leviton No. 5207 with No. 84028 plate.

C. Flush range receptacle, 50-amp, 125/250 VAC: Leviton No. 5206 with No. 84028 plate.

D. Clock outlet: Leviton No. 5261CH.

2.5 DEVICE PLATES

A. Provide Leviton Series 84 stainless steel Leviton Series 80 nylon plates (white), or approved substitute. Provide cast alloy or stamped metal plates on all exposed switches and receptacles.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mounting:

1. Mount all switches 46" above the finished floor to centerline of switch unless noted otherwise.
2. Mount all receptacles 18" above the finished floor to centerline of receptacle unless noted otherwise.
3. Mount weatherproof receptacles vertically.
4. Work devices to nearest block course using proper type outlet boxes as specified under Section 26 05 37 - Outlet Boxes. Check architectural and furniture drawings for counter (desk, special booth etc.) locations. Mount devices above work counters. Verify other special mounting conditions and locate devices as required.

B. Polarity: Properly wire all convenience outlets so that the hot wire, the neutral wire and the ground wire connect to the proper terminal on all receptacles.

C. Grounding: Install all receptacles in boxes specified under Section 26 05 37 - Outlet Boxes, and install a No. 12 green ground wire from device grounding terminal back to the grounding bus in the panelboard and bond to outlet box.

D. Receptacles shown on the drawings as "special mounting height" shall be installed at mounting height as indicated on drawings. Where no mounting height is given and receptacles are above counters (or casework), they shall be mounted with centers 4" above top of counter. If the counter has a backsplash, receptacles shall be mounted with centers 4" above top of backsplash. Where special mounting height receptacles are not above counters and no mounting height is indicated, receptacle mounting heights shall match adjacent light switches or above counter receptacles. The Contractor shall coordinate the installation of all special mounting height receptacles with architectural design.

E. Install device plates in full contact with wall surface. Plates shall not project out from the wall.

F. Install device plates in full contact with surface-mounted box. Plates shall not project out from the edge of the box.

G. Receptacle plates for all receptacles in critical patient care areas shall be labeled to indicate the appropriate panel designations and circuit number. Plates shall be labeled by engraving on the

plate or with other approved method. Use of laminated tape such as Dymotape is not acceptable.

END OF SECTION

SECTION 26 28 18 - SAFETY SWITCHES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide horsepower-rated, quick-make, quick-break, safety switches provided with the number of poles and fuses as required.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/EQUIPMENT

A. Safety switches shall be as manufactured by General Electric, Square D Company, Cutler-Hammer, or approved substitute.

B. For 208- and 240-volt circuits, use general-duty type switches with Class R fuse clips. For 480-volt circuits, use heavy-duty type switches with Class R fuse clips.

C. Switches shall have arc shields, shall be of enclosed construction and fusible or non-fusible as indicated. Switches shall be rated for either 250-volt AC or 600-volt AC service as required.

D. Switches shall have Electrical Interlock Kit with one normally open and one normally closed contact.

E. All switches shall be capable of interrupting locked rotor current of motor which it serves.

F. Enclosures to be NEMA-1 for interior use and NEMA-3R for exterior use unless noted otherwise.

G. Provide dual-element Bussman type FRN (250 volt) or type FRS (600 volt) fuses for any fusible safety switch serving a motor circuit.

H. For non-motor loads, provide dual element Bussman type LPN (250 volt) or type LPS (600 volt).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide non-fusible switches at remote motor locations (raintight where required) as indicated on drawings.

B. Mount switches to walls or adjacent to equipment enclosures using unistruts with a minimum of four bolts using toggle anchors for masonry construction, Phillips "Red Head" anchors for poured concrete construction and bolts, jumbo washers, lock washers and nuts for equipment enclosure mounting.

C. All safety switches to be identified with Bakelite nameplates.

END OF SECTION

SECTION 26 51 00 - INTERIOR LIGHTING AND LAMPS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, material, equipment and services necessary to provide all interior lighting fixtures, necessary hangers and lamps. Fixtures include all interior fixtures plus all exterior fixtures mounted to exterior wall or to structures connected directly to building.

1.2 SUBMITTALS

A. Submit for approval prior to purchasing fixtures complete fixture lists of fixtures proposed to be used. Include cuts of both specified fixture and proposed equivalent fixtures if fixtures other than those specified are submitted.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Provide lighting fixtures indicated by type on lighting fixture schedule on drawings.

2.2 EQUIPMENT REQUIREMENTS

A. Fluorescent fixtures shall be designed in such a manner that all electrical components may be replaced without disturbing fixture in or on ceiling.

B. Recessed fluorescent fixtures shown with acrylic lenses to be furnished with 0.125 minimum thickness acrylic lens.

C. All recessed indirect fluorescent fixtures shall be equipped with dust shields.

D. Provide UL labeled electronic ballasts with less than 10 percent THD for fluorescent fixtures.

E. Fluorescent Solid State Ballasts. Provide energy-saving, solid state ballast of the full light output type. Electromagnetic interference shall be minimal. Ballasts shall be able to withstand voltage transients in accordance with IEEE C62.41, Category A, for normal and common modes. Minimum power factor shall not be less than 0.90. Ballast shall operate at a frequency of not less than 25,000 hertz. Ballast current third harmonic content shall be less than 10%. Ballast shall have an average input wattage of 65 or less watts when operating 2-32 wall lamps tested in accordance with ANSI C82.2 methods. Ballast shall be compatible for use with energy-saving lamps. Ballast shall be as manufactured by Magnetek or equal in Advance, or Motorola.

F. Provide emergency fluorescent battery packs where indicated on drawings. All battery packs are to be concealed in fixtures unless otherwise noted and shall provide the minimum lumen output as stated below.

LAMP	Battery Lumen Output
Linear and U-Tube T8	1100
42 W PLT	1000
32 W PLT	700
26 W PLT	575
26 W PLC	450

G. Provide all fluorescent, high intensity discharge and incandescent lamps as indicated below.

H. Fluorescent Lamps:

1. Fluorescent lamps shall be high performance T8 lamps.
2. Fluorescent lamps shall be standard warm white, SP30, unless noted otherwise.
3. Fluorescent lamps, T-8 rapid start, 32 watts, 2900 lumens, SP35.
4. Fluorescent lamps, single ended, multipin, compact, SP35.
5. Fluorescent lamps shall be standard cool white, SP41, unless noted otherwise.
6. Fluorescent lamp used in O.R.'s, nursery labs, to be SPX50.

I. Miscellaneous Lamps:

1. Lamps to be manufactured by General Electric, Sylvania, Philips or approved equivalent.
2. Metal halide lamps, phosphor coated unless otherwise noted.
3. High pressure sodium lamp, voltage to match fixture ballast characteristics.
4. Sodium vapor lamps shall be as recommended by manufacturer of fixture.

J. All fluorescent fixtures containing double-ended lamps shall be equipped with a ballast disconnect, between the line voltage and ballast terminations, per NEC Article 410.73(G).

K. All 150-1500 watt metal halide luminaries shall be equipped with a proper ballast that is in compliance with the minimum requirements of the Energy Independence and Security Act of 2007 (EISA of 2007). Luminaries shall be marked with the circle E symbol indicating compliance with EISA.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. Fixtures shall be securely mounted as required by Section 410, NEC and as specified herein.

B. Fixtures mounted in a suspended ceiling shall be secured to the grid with approved clips as required by the NEC.

C. Fixtures shall be mounted in locations as shown on architectural reflected ceiling drawings.

D. Mount fixtures as called for in schedule on electrical drawings. Determine type of ceiling to be installed in each space from architectural drawings and schedules and furnish fixtures suitable for the exact type.

E. Receive, store, uncrate, and install lighting fixtures shown in schedule on drawings to be furnished by others.

F. Recessed fixtures in dropped ceiling areas shall be connected using Greenfield and No. 14 THHN wire. Greenfield shall be connected to fixture and outlet box. Each piece of Greenfield shall include in it a separate insulated green grounding conductor not smaller than No. 14 AWG for grounding continuity between fixture and conduit system. Grounding conductor shall be mechanically connected in a permanent and effective manner to fixture and conduit system and shall be electrical continuous. No conduit shall enter a recessed fixture directly as this would prevent removal of fixture without disturbing balance of circuit.

G. Joints in fixture wiring shall be made using wire nuts, preinsulated Scotch locks, Ideal No. 30-410 crimps and No. 30-415 wrap caps, or other approved mechanical means of connection.

H. Adjustable type fixtures shall be adjusted by the Contractor to illuminate intended area to satisfaction of Owner.

I. Any adjustable outside area lights or lights mounted on building shall be adjusted at night by the contractor to satisfaction of Owner.

J. Recessed fixtures installed in exposed or concealed tee bar ceilings may use ceiling grid to support fixtures. Fixtures shall be securely fastened to ceiling framework per NEC Article 410.

K. Surface mounted fixtures on exposed tee bar ceilings shall use patented grip clamps on tee bars to secure fixtures and shall be supported by structure as indicated on mechanical drawings.

L. Surface or recessed fixtures in or on plastered or drywall ceilings shall be supported in accordance with mechanical drawings and shall not depend on ceilings for support.

M. All light fixtures shall be grounded in accordance with the NEC. Any fixtures suspended from ceiling which do not include a separate ground wire shall be grounded in a method approved by section 250 of the NEC. Where the conduit is utilized as the ground with a hook pendant style mounting system, a separate ground conductor shall be bonded to the conduit where the conduit ceases to be continuous and routed to the fixture.

END OF SECTION

SECTION 26 56 00 - EXTERIOR LIGHTING AND LAMPS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services necessary for installation of all exterior lighting fixtures, lamps, poles, pole bases etc. for walkways and exterior building lights.

B. Refer to details and arrangements shown on drawings.

C. Concrete bases as required for type of arrangements indicated shall be installed under Division 03. Coordinate with other divisions for proper size of bases, anchor bolt arrangements, conduit stub-ups to pole bases, etc.

D. Fixtures, poles, and appurtenances, shall be suitable for exterior use, shall be UL listed, and shall be of standard design for intended application.

1.2 SUBMITTALS

A. Submit for approval prior to purchasing fixtures complete shop drawings and brochures including photometrics for each type of exterior lighting system specified. Shop drawings and brochures shall be specific and shall include all pertinent data and accessories. If substitute fixtures are proposed, include cuts of both specified fixture and proposed equivalent fixtures including photometrics of both fixtures.

B. If requested by Architect, submit a sample fixture which will be returned after inspection by Architect.

C. Architect reserves right to accept any fixture as an approved equivalent.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Lighting fixtures as indicated on Lighting Fixture Schedule.

B. Contactors and selector switches shall be Square D or approved substitute.

C. Photocells: Tork.

D. Lighting Contactors: Square D or approved substitute.

2.2 MATERIALS

A. Provide luminaire and pole assemblies as scheduled.

B. Luminaires, including all components, shall be designed to meet extreme temperature (low), moisture, and wind conditions in area.

C. Poles: Steel round or square, designed for wind load in the area of installation.

D. All 150-1500 watt metal halide luminaires shall be equipped with a proper ballast that is in compliance with the minimum requirements of the Energy Independence and Security Act of 2007 (EISA of 2007). Luminaires shall be marked with the circle E symbol indicating compliance with EISA.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install parking lot/roadway luminaires and poles on concrete bases. Provide all anchor bolts and bolt hole circle templates. Adjust luminaires to correct tilt and lamp all fixtures.

B. Adjust or rotate area and roadway lighting at night to maximize light utilization in intended areas.

C. Contractor to adjust or rotate area and roadway lighting at night to maximize light utilization in intended areas.

D. Ground all luminaires to poles and all poles to equipment grounding conductor or to separate 3/4" diameter x 10' copperweld ground rod driven at base of each pole.

E. Each pole mounted outside lighting luminaire shall have its conductors spliced to the branch circuit connectors in the pole base. Provide a Tron waterproof fuse holder with time delay fuse (1.5 X luminaire current) in the pole base for each ungrounded conductor for each luminaire.

END OF SECTION

SECTION 27 10 05 - STRUCTURED VOICE AND DATA CABLING INFRASTRUCTURE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Equipment, materials, labor, and services to provide telephone and data distribution system including, but not limited to:

1. Raceway, boxes, and cable tray.
2. Telephone and data cabling terminations.
3. Optical fiber and terminations.
4. Telecommunications outlets.
5. Terminal blocks/cross-connect systems.
6. Equipment racks and cabinets.
7. System testing.
8. Documentation and submissions.

B. Provide all equipment, materials, labor, and services, not specifically mentioned or shown, which may be necessary to complete turnkey installation. Ensure that they are in compliance with requirements stated or reasonably inferred by the contract documents.

C. Work not included:

1. The following work will be done by others:

a. Offsite services.
b. Providing data concentrators, hubs, servers, computers, and other active devices.
c. Telephone switch (PBX) and handsets.

2. Painting will be done by the General Contractor.

1.2 REFERENCES

A. Design, manufacture, test, and install telecommunications cabling networks per manufacturer's requirements and in accordance with NFPA70 (National Electrical Code®), state codes, local codes, requirements of authorities having jurisdiction, and particularly the following standards:

1. ANSI/NECA/BICSI568 - Standard for Installing Commercial Building Telecommunications Cabling.
2. ANSI/TIA/EIA Standards:

a. ANSI/TIA/EIA568B.1 Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.
b. ANSI/TIA/EIA568B.2 Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components.
c. ANSI/TIA/EIA568B.

3. Optical Fiber Cabling Components Standard.
4. ANSI/TIA/EIA569A Commercial Building Standard for Telecommunications Pathways and Spaces.
5. ANSI/TIA/EIA606(A) The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
6. ANSI/TIA/EIA607(A) Commercial Building Grounding and Bonding Requirements for Telecommunications.

B. Install cabling in accordance with the most recent edition of BICSI® publications:

1. BICSI Telecommunications Distribution Methods Manual.
2. BICSI Cabling Installation Manual.
3. BICSI LAN Design Manual

C. Federal, state, and local codes, rules, regulations, and ordinances governing the work, are as fully part of the specifications as if herein repeated or hereto attached. If the contractor should note items in the drawings or the specifications, construction of which would be code violations, promptly call them to the attention of the owner's representative in writing. Where the requirements of other sections of the specifications are more stringent than applicable codes, rules, regulations, and ordinances, the specifications shall apply.

1.3 PERMITS, FEES, AND CERTIFICATES OF APPROVAL

A. The General Contractor will make application and pay for building permit.

B. As prerequisite to final acceptance, supply to the owner certificates of inspection from an inspection agency acceptable to the owner and approved by local municipality and utility company serving the project.

1.4 SYSTEM DESCRIPTION

A. A telecommunication cabling system generally consists of one telecommunications outlet in each workstation, wall telephones in common and mechanical areas, Intermediate Distribution Frames (IDF) located on each floor, and the Main Distribution Frame (MDF) Rate demarcation point (RDP) is located in the MDF.

B. All voice cables will consist of Category 6 cable terminated with a RJ11 jack and terminated on 110 blocks in the IDF.

C. All Data cables will consist of Category 6 cable terminated with a RJ45 jack and terminate the cables on rack mounted modular patch panels located in the appropriate IDF. (TIA/EIA 568B)

D. A typical workstation will consist of one voice jack and two data jacks. The number of cables is indicated on the drawings.

E. Vertical/horizontal copper backbone cabling consists of multiple pair unshielded twisted-pair installed from the main cross-connect (MC) located in the MDF to the horizontal cross-connect (HC) located in each IDF. This copper backbone will serve as the telephone riser backbone.

F. Vertical/horizontal backbone cabling consists of 62.5/125 mm multi-mode optical fiber cable installed from the MC to the HC and will serve as the data communications fiber backbone.

G. Non-plenum rated cable is acceptable.

1.5 SUBMITTALS

A. Submit to the engineer/designer shop drawings, product data (including cut sheets and catalog information), and samples required by the contract documents. Submit shop drawings, product data, and samples with such promptness and in such sequence as to cause no delay in the work or in the activities of separate contractors. The engineer/designer will indicate approval of shop drawings, product data, and samples submitted to the engineer by stamping such submittals "APPROVED" with a stamp. Submitted shop drawings shall be initialed or signed by the contractor, showing the date and the contractor's legitimate firm name.

1. By submitting shop drawings, product data, and samples, the contractor represents that he or she has carefully reviewed and verified materials, quantities, field measurements, and field construction criteria related thereto. It also represents that the contractor has checked, coordinated, and verified that information contained within shop drawings, product data, and samples conform to the requirements of the work and of the contract documents. The engineer/designer remains responsible for the design concept expressed in the contract documents as defined herein.
2. The engineer’s/designer’s approval of shop drawings, product data, and samples submitted by the contractor shall not relieve the contractor of responsibility for deviations from requirements of the contract documents, unless the contractor has specifically informed the engineer/designer in writing of such deviation at time of submittal, and the engineer/designer has given written approval of the specific deviation. The contractor shall continue to be responsible for deviations from requirements of the contract documents not specifically noted by the contractor in writing, and specifically approved by the engineer in writing.
3. The engineer’s/designer’s approval of shop drawings, product data, and samples shall not relieve the contractor of responsibility for errors or omissions in such shop drawings, product data, and samples.
4. The engineer’s/designer’s review and approval, or other appropriate action upon shop drawings, product data, and samples, is for the limited purpose of checking for conformance with information given and design concept expressed in the contract documents. The engineer’s/designer’s review of such submittals is not conducted for the purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the contractor as required by the contract documents. The review shall not constitute approval of safety precautions or of construction means, methods, techniques, sequences, or procedures. The engineer’s/designer’s approval of a specific item shall not indicate approval of an assembly of which the item is a component.

B. Perform no portion of the work requiring submittal and review of shop drawings, product data, or samples, until the engineer/designer has approved the respective submittal. Such work shall be in accordance with approved submittals.

C. Submit shop drawings, product data, and samples as a complete set within thirty (30) days of award of contract.

1. For initial submission and for resubmission required for approval, submit eight (8) copies of each item. Make reproductions as required for your use and distribution to subcontractors
2. Illegible submittals will not be checked by the engineer.

D. General: Submit the following:

1. Bill of materials, noting long lead time items.
2. Data cable and outlet labeling scheme using project specific examples.

E. Shop drawings: Submit the following:

1. Backbone (riser) diagrams.
2. System block diagram, indicating interconnection between system components and subsystems.
3. Interface requirements, including connector types and pinouts, to external systems and systems or components not supplied by the contractor.
4. Fabrication drawings for custom-built equipment.
5. Scaled layout of each IDF and MDF equipment layout. Any concerns regarding sizes of Communication Room are to be presented at the time submittals are issued for approval.

F. Product Data: Provide catalog cut sheets and information for the following:

1. Wire, cable, and optical fiber.
2. Outlets, jacks, faceplates, and connectors.
3. All metallic and nonmetallic raceways, including surface raceways, outlet boxes, and fittings.
4. Terminal blocks and patch panels.
5. Enclosures, racks, and equipment housings.
6. Over-voltage protectors.
7. Splice housings.

G. Project record drawings: Submit project record drawings at conclusion of the project and include:

1. Approved shop drawings.
2. As-Built Drawings: The drawings are to include cable routes and outlet locations. Outlet locations shall be identified by their sequential number as defined elsewhere in this document. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronic (DWG, AutoCAD rel. 14) formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the Owner. The Contractors shall annotate the base drawings and return a hard copy (same plot size as originals) and electronic (AutoCAD rel. 14) form.
3. Intermediate Distribution Frames (IDF) and Main Distribution Frame (MDF) termination detail sheets, and scaled equipment layouts.

4. Cross-connect schedules including entrance point, main cross-connects, intermediate cross-connects, and horizontal cross-connects.
5. Labeling and administration documentation.
6. Warranty documents for equipment.
7. Copper certification test result printouts and diskettes.
8. Optical fiber power meter/light source test results.

1.6 QUALITY ASSURANCE

A. The following manufacturer's cabling solutions are approved for the work of this section:

1. Siemon / Comscope.
2. Panduit / Belden.
3. Avaya.
4. Nordex.

B. The contractor shall have worked satisfactorily for a minimum of five (5) years on systems of this type and size. Installers must be certified and approved by the manufacturer with a minimum of three years' experience installing that manufacturer.

C. Upon request by the engineer/designer, furnish a list of references with specific information regarding type of project and involvement in providing of equipment and systems.

D. Equipment and materials of the type for which there are independent standard testing requirements, listings, and labels, shall be listed and labeled by the independent testing laboratory.

E. Where equipment and materials have industry certification, labels, or standards (i.e., NEMA National Electrical Manufacturers Association), this equipment shall be labeled as certified or complying with standards.

F. Material and equipment shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.

G. Subcontractors shall assume all rights and obligations toward the contractor that the contractor assumes toward the owner and engineer/designer.

1.7 WARRANTY

A. Unless otherwise specified, unconditionally guarantee in writing the materials, equipment, and workmanship for a period of not less than fifteen (15) years from date of acceptance by the owner. The owner shall deem acceptance as beneficial use.

B. Transfer manufacturer's warranties to the owner in addition to the General System Guarantee. Submit these warranties on each item in list form with shop drawings. Detail specific parts within equipment that are subject to separate conditional warranty. Warranty proprietary equipment and systems involved in this contract during the guarantee period. Final payment shall not relieve you of these obligations.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect equipment during transit, storage, and handling to prevent damage, theft, soiling, and misalignment. Coordinate with the owner for secure storage of equipment and materials. Do not store equipment where conditions fall outside manufacturer's recommendations for environmental conditions. Do not install damaged equipment; remove from site and replace damaged equipment with new equipment.

1.9 SEQUENCE AND SCHEDULING

A. Submit schedule for installation of equipment and cabling. Indicate delivery, installation, and testing for conformance to specific job completion dates. As a minimum, dates are to be provided for bid award, installation start date, completion of station cabling, completion of riser cabling, completion of testing and labeling, cut-over, completion of the final punch list and owner acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products of manufacturers as named in individual articles.

B. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements.

2.2 FABRICATION

A. Fabricate custom-made equipment with careful consideration given to aesthetic, technical, and functional aspects of equipment and its installation.

2.3 SUITABILITY

A. Provide products that are suitable for intended use, including, but not limited to environmental, regulatory, and electrical. All cabling, copper riser, and fiber shall be provided with suitable insulation for installing in an air plenum.

2.4 VOICE/DATA TELECOMMUNICATIONS SERVICE BACKBONE CABLE

A. Solid copper, 24 AWG, 100 W balanced twisted-pair (UTP) backbone cable, in sizes as indicated on the drawings, with mechanical and transmission performance specifications that meet or exceed ANSI/TIA/EIA568B.2. Note: Listed Type CMR, CMP, MPR and/or MPP (as required in the NEC 2002).

B. Multi-mode 62.5/125 ìm diameter tight-buffered optical fiber, with fiber counts as indicated on drawings, with mechanical and transmission performance specifications that meet or exceed ANSI/TIA/EIA568B.3. Note: Listed type OFNP, OFNR, OFCR, and/or OFCP (as required in the NEC 2002).

2.5 VOICE TELECOMMUNICATIONS STATION CABLE

A. Solid copper, 24 AWG, 100 W balanced twisted-pair (UTP) Category 6 cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA568B.2 up to 100 MHz. Note: Listed Type CMR, CMP, MPR and/or MPP (as required in the NEC 2002).

2.6 DATA STATION CABLE (Copper)

A. Solid copper, 24 AWG, 100 W balanced twisted-pair (UTP) Category 6 cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA568B.2 up to 100 MHz. Note: Listed Type CMR, CMP, MPR and/or MPP (as required in the NEC 2002).

2.7 UNDERGROUND TELECOMMUNICATIONS CABLE (Optical Fiber)

A. Multi-mode 62.5/125 ìm diameter, armored, gel-filled optical fiber, with number of usable fibers as shown on drawings, which meet or exceed the mechanical and transmission performance specifications listed in ANSI/TIA/EIA568B.3 and ANSI/TIA/EIA758(A).

B. Single-mode 8.7 ìm to 10 ìm diameter, armored, gel-filled optical fiber, with number of usable fibers as shown on drawings, which meet or exceed the mechanical and transmission performance specifications listed in ANSI/TIA/EIA568B.3 and ANSI/TIA/EIA758(A).

2.8 VOICE/DATA – COPPER & OPTICAL FIBER WORK AREA OUTLETS

A. Single-gang mounting plate with four (4) openings containing the following devices:

1. Voice Outlet 8pin modular, Category 6, unkeyed, pink, pinned to T568 B standards.
2. Data Outlet 8pin modular, Category 6, unkeyed, blue, pinned to T568 B standards.

B. Optical Fiber Connectors – duplex 568SC adapter.

2.9 VOICE/DATA WORK AREA OUTLETS (Copper only)

A. Single-gang mounting plate with four (4) openings containing the following devices:

1. Voice Outlet 8pin modular, Category 6, unkeyed, pink, pinned to T568 B standards.
2. Data Outlet 8pin modular, Category 6, unkeyed, blue, pinned to T568 B standards.

2.10 WALL VOICE OUTLETS

A. Single-gang stainless steel faceplate with six-conductor jack and wall telephone mounting lugs

2.11 DATA ONLY WORK AREA OUTLET

A. Single-gang faceplate with 8-pin modular, Category 6, unkeyed, blue data jack, pinned to T568 B standards.

2.12 VOICE ONLY WORK AREA OUTLET

A. Single-gang faceplate with 8-pin modular, Category 6, unkeyed, pink telephone jack, pinned to T568 B standards.

2.13 OPTICAL FIBER WORK AREA OUTLETS

A. Single-gang faceplate with duplex SC568 adapter.

2.14 TERMINATION BLOCKS

A. Product(s) as approved by the engineer/designer: Wiring blocks are to be in following configurations:

B. 110 voice punch down blocks.

2.15 PATCH PANELS

A. 19 in. rack mountable, 48port 8pin modular to insulation displacement connector (IDC) meeting Category 6e performance standards, and pinned to T568 A and B standards.

2.16 WALL MOUNTED OPTICAL FIBER PATCH PANELS

A. Wall-mounted optical fiber termination panel with 12fiber capacity, hinged door, cable strain relief, slack storage, and two 6port SC connector panels with adapters and provisions for two splice trays.

2.17 RACK MOUNTED OPTICAL FIBER TERMINATION PANEL

A. 19 in. rack mounted 72port rack-mounted optical fiber termination panel with cable strain relief, grounding lugs, slack storage and three 12port duplex SC or approved alternative connector panels with adapters and provisions for six (6) splice trays.

2.18 SPLICE TRAYS

A. Sized for multi-mode fibers, nonmetallic with clear plastic cover, 12fiber splice capacity, compatible with splice enclosure and splicing method.

2.19 OPTICAL FIBER CONNECTORS

A. Ceramic tipped field installed 568SC connectors, which meet or exceed the performance specifications in ANSI/TIA/EIA568B.3.

2.20 OPTICAL FIBER JUMPERS

A. Dual 62.5/125ìm (and/or single-mode) optical fiber jumper cable, 1 m long with 3.0 mm Duplex 568SC optical fiber connectors on each end.

2.21 OPTICAL FIBER PIGTAILS

A. A.62.5/125 ìm (and/or single-mode) optical fiber pigtail 1 m long with 3.0 mm single 568 SC optical fiber connectors on one end

2.22 OPEN FRAME EQUIPMENT RACK

A. Open frame, 19 in. equipment rack, 7 foot 6 in. overall height with flange base, mounting rails drilled front and back and tapped to EIA standards, and a front-rack mountable 10 outlet multiple outlet electrical strip.

2.23 LISTED BUILDING ENTRANCE PROTECTORS

A. Building entrance terminal utilizing a two (2) foot fuse link between the outside cable plant splice and the protector module with IDC type input and output terminals, 100pair capacity and female mounting base, equipped with 230 volt solid state protector modules. Provide sufficient protector modules to completely populate all building entrance terminals.

2.24 SPARES

A. Furnish the following spare equipment and parts:

1. Terminal block connectors, if required.
2. Test set cords, if required.
3. Install one test cord set in each telecommunications closet.
4. Five (5) percent of base bid quantity of each type of jack shall be provided.
5. Five (5) percent of base bid quantity of each type of outlet.
6. Five thousand (5000) ft of each type of station cable.
7. One thousand (1000) ft of one-pair cross-connect wire for each telecommunications closet.

8. One thousand (1000) ft of two-pair cross-connect wire for each telecommunications closet.
9. Five (5) percent of base bid quantity of protector modules.
10. Patch cords for 80% of data outlets terminated on patch panel.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION SITE SURVEY

A. Prior to start of systems installation, meet at the project site with the owner's representative and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with the General Contractor will be necessary to plan the crucial scheduled completions of the equipment room and telecommunications closets.

B. Examine areas and conditions under which the system is to be installed. Do not proceed with the work until satisfactory conditions have been achieved.

3.2 HANDLING AND PROTECTION OF EQUIPMENT AND MATERIALS

A. Be responsible for safekeeping of your own and your subcontractors' property, such as equipment and materials, on the job site. The owner assumes no responsibility for protection of above-named property against fire, theft, and environmental conditions.

3.3 PROTECTION OF OWNER'S FACILITIES

A. Effectively protect the owner's facilities, equipment, and materials from dust, dirt, and damage during construction.

B. Remove protection at completion of the work.

3.4 INSTALLATION

A. Receive, check, unload, handle, store, and adequately protect equipment and materials to be installed as part of the contract. Store in areas as directed by the owner's representative. Include delivery, unloading, setting in place, fastening to walls, floors, ceilings, or other structures where required, interconnecting wiring of system components, equipment alignment and adjustment, and other related work whether or not expressly defined herein.

B. Install materials and equipment in accordance with applicable standards, codes, requirements, and recommendations of national, state, and local authorities having jurisdiction, and National Electrical Code® (NEC) and with manufacturer's printed instructions.

C. Adhere to manufacturer's published specifications for pulling tension, minimum bend radii, and sidewall pressure when installing cables. Where manufacturer does not provide bending radii information, minimum-bending radius shall be 15 times cable diameter. Arrange and mount equipment and materials in a manner acceptable to the engineer and the owner.

D. Penetrations through floor and fire-rated walls shall utilize intermediate metallic conduit (IMC) or galvanized rigid conduit (GRC) sleeves and shall be firestopped after installation and testing, utilizing a firestopping assembly approved for that application.

E. Install station cabling to the nearest Intermediate Distribution Frame (IDF), unless otherwise noted.

F. Installation shall conform to the following basic guidelines:

1. Use of approved wire, cable, and wiring devices.
2. Neat and uncluttered wire termination.

G. Attach cables to permanent structure with suitable attachments at intervals of 48 to 60 inches. Support cables installed above removable ceilings.

H. Install adequate support structures for 10 foot of service slack at each IDF.

I. Support riser cables every three (3) floors and at top of run with cable grips.

1. Limit number of four-pair data riser cables per grip to fifty (50).

J. Install cables in one continuous piece. Splices shall not be allowed except as indicated on the drawings or noted below:

K. Provide over-voltage protection on both ends of cabling exposed to lightning or accidental contact with power conductors.

3.5 GROUNDING

A. Grounding shall conform to ANSI/TIA/EIA 607(A) Commercial Building Grounding and Bonding Requirements for Telecommunications, National Electrical Code®, ANSI/NECA/BICSI568 and manufacturer's grounding requirements as minimum.

B. Bond and ground equipment racks, housings, messenger cables, and raceways (including J-Hooks.)

C. Connect cabinets, racks, and frames to single-point ground which is connected to building ground system via #6 AWG green insulated copper grounding conductor.

3.6 LABELING

A. Labeling shall conform to ANSI/TIA/EIA606(A) standards. In addition, provide the following:

1. Label each outlet with permanent self-adhesive label with minimum 3/16 in. high characters.
2. Label each cable with permanent self-adhesive label with minimum, 1/8 in. high characters, in the following locations:

    a. Inside receptacle box at the work area.
    b. Behind the communication closet patch panel or punch block.

3. Use labels on face of data patch panels. Provide facility assignment records in a protective cover at each telecommunications closet location that is specific to the facilities terminated therein.
4. Use color-coded labels for each termination field that conforms to ANSI/TIA/EIA606(A) standard color codes for termination blocks.
5. Labels shall be machine-printed. Hand-lettered labels shall not be acceptable.
6. Label cables, outlets, patch panels, and punch blocks with room number in which outlet is located, followed by a single letter suffix to indicate particular outlet within room, i.e., S2107A, S2107B. Indicate riser cables by an R then pair or cable number. Contractor is to submit labeling scheme for approval.
7. Mark up floor plans showing outlet locations, type, and cable marking of cables. Turn these drawings over to the owner four (4) weeks prior to move in to allow the owner's personnel to connect and test owner-provided equipment in a timely fashion.
8. Three (3) sets of as-built drawing shall be delivered to the owner within four (4) weeks of acceptance of project by the owner. A set of as-built drawings shall be provided to the owner in electronic media form (compact disk) and utilizing AutoCAD software that is acceptable to the owner. The CD shall be delivered to the owner within six (6) weeks of acceptance of project by owner.

3.7 TESTING

A. Testing shall conform to ANSI/TIA/EIA568B.1 standard. Testing shall be accomplished using level IIe or higher field testers.

B. Test each pair and shield of each cable for opens, shorts, grounds, and pair reversal. Correct grounded, and reversed pairs. Examine open and shorted pairs to determine if problem is caused by improper termination. If termination is proper, tag bad pairs at both ends and note on termination sheets.

1. Perform testing of copper cables with tester meeting ANSI/TIA/EIA568B.1 requirements.
2. If copper cables contain more than the following quantity of bad pairs, or if outer sheath damage is cause of bad pairs, remove and replace the entire cable:

CABLE SIZE	MAXIMUM BAD PAIRS
<100	1
101 to 300	1 – 3
301 to 600	3 – 6
>601	6

3. If horizontal cable contains bad conductors or shield, remove and replace cable.

C. Initially test optical cable with a light source and power meter utilizing procedures as stated in ANSI/TIA/EIA52614A: OFSTP14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant and ANSI/TIA/EIA5267 Measurement of Optical Power Loss of Installed Singlemode Fiber Cable Plant. Measured results shall be plus/minus 1 dB of submitted loss budget calculations. If loss figures are outside this range, test cable with optical time domain reflectometer to determine cause of variation. Correct improper splices and replace damaged cables at no charge to the owner.

1. Cables shall be tested at 850 and 1300 nm for multimode optical fiber cables. Cables shall be tested at 1310 and 1550 nm for singlemode optical fibers.
2. Testing procedures shall utilize “Method B” – One jumper reference.
3. Bi-directional testing of optical fibers is required.

D. Perform optical time domain reflectometer (OTDR) testing on each fiber optic conductor. Measured results shall be plus/minus 1 dB of submitted loss budget calculations.

1. Submit printout for each cable tested.
2. Submit compact disk with test results and program to view results.

E. Where any portion of system does not meet the specifications, correct deviation and repeat applicable testing at no additional cost to the owner.

3.8 FIELD QUALITY CONTROL

A. Employ job superintendent or project manager during the course of the installation to provide coordination of work of this specification and of other trades, and provide technical information when requested by other trades. This person shall maintain current RCDD® (Registered Communications Distribution Designer) registration and shall be responsible for quality control during installation, equipment setup, and testing.

B. All installation personnel shall meet manufacturer’s training and education requirements for implementation of extended warranty program.

END OF SECTION

SECTION 28 31 00 - FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 SCOPE AND RELATED DOCUMENTS

A. The work covered by this section of the specifications includes the furnishing of all labor, equipment, materials, and performance of all operations associated with the installation of the fire alarm system and Mass Notification System.

B. The requirements of the conditions of the Contract, Supplementary Conditions, and General Requirements apply to the work specified in this section.

C. The complete installation shall conform to the following:
1. UFC 3-600-01 (2021) – Fire Protection Engineering for Facilities.
2. UFC 4-021-01 – Design and O&M: Mass Notification Systems.
3. UFC 4-010-06 – Cybersecurity of Facility-Related Control Systems.
4. UFC 1-200-01 – DoD Building Code, Paragraph 1-7.
5. 2021 International Fire Code (IFC) – Section 907.
6. NFPA 72 (2021) – National Fire Alarm and Signaling Code, including Section 10.5.3.6.
7. NFPA 70 (NEC) – National Electrical Code, with particular attention to Article 760.
8. ADA Standards for Accessible Design (2021), Section 4.28.
9. UL 864 – Standard for Control Units and Accessories for Fire Alarm Systems.
10. UL 2572 – Standard for Mass Notification Systems.
11. UL 1971 – Standard for Signaling Devices for the Hearing Impaired.
12. MIL-STD 3007 – Standard Practice for Unified Facilities Criteria.

D. The work covered by this section of the specifications shall be coordinated with the related work as specified elsewhere under the project specifications.

1.2 QUALITY ASSURANCE

A. Listing Requirements: All fire alarm and MNS components shall be listed by Underwriters Laboratories, Inc. (UL) under the appropriate category and bear the UL label. Control equipment shall be listed under UL category UOJZ as a single control unit. Partial listings are not acceptable.

B. Installer Qualifications: Minimum five years of experience installing fire alarm and MNS systems in military facilities, with NICET Level III certification in fire alarm systems and familiarity with UFC standards.

C. Transient Protection: All control equipment shall include transient protection complying with UL 864. Where fire alarm or MNS circuits leave the building, provide additional transient protection devices listed under UL 497B (Isolated Loop Circuit Protectors).

D. MNS Compliance: The system shall be UL 2572-listed for mass notification systems, integrated with the fire alarm system per UFC 4-021-01.

1.3 GENERAL

A. Furnish and install a complete, fully addressable fire alarm system integrated with an in-building MNS, as shown on the plans. The system shall include control panel(s), annunciator(s), manual stations, automatic fire detectors, smoke detectors, alarm indicating appliances, MNS components, wiring, terminations, electrical boxes, and all necessary materials for a complete operating system compliant with UFC and NFPA standards.

B. Programming Flexibility

1. The system shall allow loading and editing of special instructions and operating sequences as required.
2. The system shall support on-site programming to accommodate expansion and operational changes, stored in non-volatile programmable memory within the fire alarm control panel. Loss of primary or secondary power shall not erase stored instructions.
3. Provide full flexibility for selective input/output control functions using AND, OR, NOT, timing, and special coded operations within resident software.
4. Allow configuration of initiating circuits without additional hardware to support changes (e.g., normally open to normally closed contact devices, current-limited to non-current-limited devices, or non-verification to verification circuits).
5. Allow configuration of indicating appliance and control circuits without additional hardware to support changes (e.g., non-coded to coded circuits, slow march time 20 BPM to fast march time 120 BPM).

C. Resident software shall allow for full configuration of initiating circuits so that additional hardware shall not be necessary to accommodate changes in, for instance, sensing of normally open contact devices to sensing of normally closed contact devices, or from sensing of normally open contact devices to sensing a combination of current limited and non-current limited devices on the same circuit and being able to differentiate between the two, or changing from a non-verification circuit to a verification circuit or vice-versa.

D. Resident software shall also allow for configuration of indicating appliance and control circuits so that additional hardware shall not be necessary to accommodate changes in, for instance, changing a non-coded indicating appliance circuit to a coded circuit, or from a slow march time (20 BPM) to a fast march time (120 BPM).

E. The system shall have the capability of recalling alarms and trouble conditions in chronological order for the purpose of recreating an event history.

F. All panels and peripheral devices shall be the standard product of a single manufacturer and shall display the manufacturer's name on each component. The catalog numbers specified under this section are those of Simplex Time Recorder Company and constitute the type, product quality, material, and desired operating features. Equal equipment as manufactured by Siemens, Honeywell, or Notifier are acceptable.

1.4 OPERATION

A. The system alarm operation subsequent to the alarm activation of any manual station, automatic detection device, or sprinkler flow switch shall be as follows:

1. All audible alarm indicating appliances shall sound a continuous fire alarm signal until silenced by the alarm silence switch at the control panel and at the remote annunciator.
2. All visible alarm indicating appliances shall flash continuously until the system is reset.
3. Alarm indicating appliances shall operate selectively by zone.
4. Any subsequent zone alarm shall reactivate the alarm indicating appliances.
5. All doors normally held open by door control devices shall release after an adjustable time delay.
6. A supervised signal to notify the local fire department or an approved central station shall be activated.
7. The mechanical controls shall activate the air handling systems in accordance with NFPA 90.

B. Upon reset of the fire alarm control panel, air handling units shall sequentially start up to minimize power demand.

C. The alarm shall be displayed on an 80-character LCD display. The top line of 40 characters shall be the point label and the second line shall be the device type identifier. The system alarm LED shall flash on the control panel and the remote annunciator until the alarm has been acknowledged. Once acknowledged, this same LED shall latch on. A subsequent alarm received from another zone shall flash the system alarm LED on the control panel and remote annunciator. The LCD display shall show the new alarm information.

D. A pulsing alarm tone shall occur within the control panel and the remote annunciator until the event has been acknowledged.

E. The alarm activation of any elevator lobby smoke detector shall, in addition to the operations listed above, cause the elevator cabs to be recalled according to the following sequence:

1. If the alarmed detector is on any floor other than the main level of egress, the elevator cabs shall be recalled to the main level of egress.
2. If the alarmed detector is on the main egress level, the elevator cabs shall be recalled to the predetermined alternate recall level as determined by the local authority having jurisdiction.

F. The activation of any system smoke detector shall initiate an alarm verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If, within one (1) minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm as described previously. If no second alarm occurs within one minute, the system shall resume normal operation. The alarm verification shall operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation shall be selectable by zone. The control panel shall have the capability to display the number of times (tally) a zone has gone into a verification mode. Should this smoke verification tally reach a pre-programmed number, a trouble condition shall occur.

G. The control panel shall have a dedicated supervisory service LED and a dedicated supervisory service acknowledge switch.

1. The activation of any standpipe or sprinkler valve supervisory (tamper) switch shall activate the system supervisory service audible signal and illuminate the LED at the control panel and the remote annunciator. Differentiation between valve tamper activation and opens and/or grounds on the initiation circuit wiring shall be provided.
2. Pressing the supervisory service acknowledge key will silence the supervisory audible signal while maintaining the supervisory service LED "ON" indicating the off-normal condition.
3. Restoring the valve to the normal position shall cause the supervisory service LED to extinguish, indicating restoration to normal.
4. Restoring the valve to the normal position shall cause the supervisory service audible signal to pulse indicating the restoration to normal position. The supervisory service acknowledge key shall silence the audible signal.

H. The alarm activation by either a manual or an electrically-operated coded station shall pulse the alarm indicating appliance to follow that code. The coded input signal shall take priority over all other input signals. All other alarm inputs shall be processed accordingly after coding is completed. If PNIS code is interrupted, it must be restarted and completed in its entirety without missing any portion of the code. Activation of control circuits for door release and air handling system shall not be delayed.

I. A manual evacuation (drill) switch shall be provided to operate the alarm indicating appliances without causing other control circuits to be activated. However, should a true alarm occur, all alarm functions would occur as described previously.

J. The system shall have a single key that will allow the operator to display all alarms, troubles, and supervisory service conditions including the time of each occurrence.

K. All doors normally held open by door control devices shall release upon AC power failure.

L. The actuation of the "enable walk test" program at the control panel shall activate the "walk test" mode of the system which shall cause the following to occur:

1. The city circuit connection shall be bypassed.
2. Control relay functions shall be bypassed.
3. The control panel shall show a trouble condition.
4. The alarm activation of any initiation device shall cause the audible signals to activate for two seconds.
5. The panel shall automatically reset itself after signaling is complete.
6. Any momentary opening of an initiating or indicating appliance circuit wiring shall cause the audible signals to sound for four seconds indicating a trouble condition.
7. The system shall have the capacity of eight distinctive walk test groups. Such that only a portion of the system need be disabled during testing.

1.5 SUPERVISION

A. The system shall contain Class "A", Style "D" independently supervised initiating device circuits. The alarm activation of any initiation circuit shall not prevent the subsequent alarm operation of any other initiation circuit.

B. There shall be supervisory service initiation device circuits for connection of all sprinkler valve supervisory (tamper). Device activation shall cause a supervisory alarm at the control panel.

C. There shall be independently supervised and independently fused indicating appliance circuits for alarm horns, speakers, flashing alarm lamps. Disarrangement conditions of any circuit shall not affect the operation of other circuits.

D. Auxiliary manual controls shall be supervised so that an "off normal" position of any switch shall cause an "off normal" system trouble.

E. Each independently supervised circuit shall include a discrete LCD readout to indicate disarrangement conditions per circuit.

F. The incoming power to the system shall be supervised so that any power failure must be audibly and visually indicated at the control panel and the remote annunciator. A green "power on" LED shall be displayed continuously while incoming power is present.

G. The system batteries shall be supervised so that a low battery condition or disconnection of the battery shall be audibly and visually indicated at the control panel and the remote annunciator.

H. The system modules shall be electrically supervised for module placement. Should a module become disconnected, the system trouble indicator shall illuminate and the audible trouble signal shall sound.

I. The system shall have provisions for disabling and enabling all circuits individually for maintenance or testing purposes.

J. There shall be independent supervision for opens of the air handling on/off/auto switch control output wiring. A discrete trouble LCD readout per output circuit will be provided for indication. A ground condition of the air handling control output wiring shall indicate a common ground trouble on the control panel.

1.6 POWER REQUIREMENTS

A. The control panel shall receive 120 VAC power (as noted on the plans) via a dedicated fused disconnect circuit.

B. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of four (4)][twenty-four (24) hours with 5 minutes of alarm operation at the end of this period. The system shall automatically transfer to the standby batteries upon power failure. All battery charging and recharging operations shall be automatic.

C. All external circuits requiring system operating power shall be 24 VDC and shall be individually fused at the control panel.

PART 2 - PRODUCTS

2.1 FIRE ALARM CONTROL PANEL - SIMPLEX TYPE 4017ES

A. Control panel construction shall be modular with solid-state, microprocessor-based electronics. It shall display only those primary controls and displays essential to operation during a fire alarm condition. Keyboards or keypads shall not be required to operate the system during fire alarm conditions.

B. A local audible device shall sound during alarm, trouble, or supervisory conditions. This audible device shall sound differently during each condition to distinguish one condition from another without having to view the panel. This audible device shall also sound during each keypress to provide an audible feedback to ensure that the key has been pressed properly.

C. The following primary controls shall be visible through a front access panel:

1. Eighty-character liquid crystal display.
2. Individual red system alarm LED.
3. Individual yellow supervisory service LED.
4. Individual yellow trouble LED.
5. Green "power on" LED.
6. Alarm Acknowledge key.
7. Supervisory Acknowledge key.
8. Trouble Acknowledge key.
9. Alarm Silence key.
10. System Reset key.

D. The following secondary control switches and LEDs shall be available behind an access door:

1. City disconnect/switch.
2. Manual evacuation (drill).
3. Elevator bypass.
4. Door holder release bypass.
5. Future.

E. The control panel shall provide the following:

1. Setting of time and date.
2. LED testing.
3. Alarm, Trouble, and Abnormal condition listing.
4. Enabling and disabling of each monitor point separately.
5. Activation and deactivation of each control point separately.
6. Changing operator access levels.
7. Walk Test enable.
8. Running diagnostic functions.
9. Displaying software revision level.
10. Displaying historical logs.
11. Displaying card status.
12. Point listing.

F. For maintenance purposes, the following lists shall be available from the point lists menu:

1. All points list by address.
2. Monitor point list.
3. Signal/speaker list.
4. Auxiliary control list.
5. Feedback point list.
6. Psuedo point list.
7. LED/switch status list.

G. Scrolling through menu options or lists shall be accomplished in a self-directing manner in which prompting messages shall direct the user. These controls shall be located behind an access door.

H. Primary Keys, LEDs, and LCD Display:

1. The control panel shall have a 2 line x 40 character liquid crystal display which shall be backlit for enhanced readability. So as to conserve battery standby power, it shall not be lit during an AC power failure unless an alarm condition occurs or there is keypad activity.
2. The display shall support both upper- and lower-case letters. Lowercase letters shall be used for softkey titles and prompting the user. Uppercase letters shall be used for system status information. A cursor shall be visible when entering information.

2.2 SYSTEM FRONT PANEL OPERATION AND CAPABILITIES

A. Under normal condition, the front panel shall display a "System is Normal" message and the current time and date.

B. Should an abnormal condition be detected, the appropriate LED (Alarm, Supervisory, or Trouble) shall flash. The panel audible signal shall pulse for alarm conditions and sound steady for trouble and supervisory conditions.

C. The LCD shall display the following information relative to the abnormal condition of a point in the system.

1. 40-character custom location label.
2. Type of device (i.e., smoke, pull station, water flow).
3. Point status (i.e., alarm, trouble).

D. Two methods of acknowledgment for each abnormal condition shall be provided. One may be chosen depending on the NFPA requirements.

1. For NFPA 72D requirements: Pressing the appropriate acknowledge button shall display the first unacknowledged condition in the appropriate list (either alarm, supervisory, or trouble), and require another acknowledge button. Press to acknowledge only the displayed point.
2. For NFPA 72A, B, or C requirements: Pressing the appropriate acknowledge button shall globally acknowledge every point in the list.

E. These acknowledge functions may be passcode protected if the user has insufficient privilege to acknowledge such conditions. A message shall indicate insufficient privilege but allow the user to view the points without acknowledging them. Should the user have sufficient privilege to acknowledge, a message will be displayed informing the user that the condition has been acknowledged.

F. After all points have been acknowledged, the LEDs shall glow steady and the Sonalert will be silenced. The total number of alarms, supervisory, and trouble conditions shall be displayed along with a prompt to review each list chronologically. The end of the list shall be indicated by an end-of-list message "END OF LIST."

G. Alarm Silencing:

1. Should the Alarm Silence button be pressed, all audible alarm signals shall cease to operate.
2. Signals shall not be silenced during alarm silence inhibit mode.

H. System Reset:

1. The System Reset button shall be used to return the system to its normal state after an alarm condition has been remedied. The LCD display shall step the user through the reset process with simple English Language messages. Messages "SYSTEM RESET IN PROGRESS" will first be displayed followed by the message "SYSTEM RESET COMPLETED" and finally "SYSTEM IS NORMAL" should all alarm conditions be cleared.
2. Should an alarm condition continue to exist the message "SYSTEM RESET IN PROGRESS" will be followed by the message "SYSTEM RESET ABORTED" and the system will remain in an abnormal state. System control relays shall not reset. The Sonalert and the alarm LED will be on. The display will indicate the total number of alarms and troubles present in the system along with a prompt to use the ACK keys to review the points. These points will not require acknowledgment, if they were previously acknowledged.
3. Should the Alarm Silence Inhibit function be active, the SYSTEM RESET key press will be ignored. The message "SYSTEM RESET INHIBITED" will be displayed for a short time to indicate the action was not taken. As feedback to the operator, the message "SYSTEM RESET NO LONGER INHIBITED" will be displayed when the inhibit function times out.

I. Function Keys:

1. Additional function keys shall be provided to access status data for the following points:

   a. Initiating device circuits.
   b. Indicating appliance circuits.
   c. Auxiliary relays.
   d. Feedback points.
   e. All other input/output points.

2. The following status data shall be available.

   a. Primary state of point.

b. Zone, PID and Card type information.
c. Class "A" status.
d. Current priority of outputs.
e. Disable/Enable status.
f. Verification tallies of initiating devices.
g. Automatic/Manual Control Status of output points.
h. Acknowledge status.
i. Relay status.

J. History Logging:

1. The system shall be capable of logging and storing 300 events in an alarm log and 300 events in a trouble log. These events shall be stored in a battery-protected random-access memory. Each recorded event shall include the time and date of that event's occurrence.
2. The following Historical Alarm log events shall be stored:

a. Alarms.
b. Alarm Acknowledgment.
c. Alarm Silence.
d. System Reset.
e. Alarm Historical log cleared.

3. The following Historical Trouble log events shall be stored:

a. Trouble conditions.
b. Supervisory alarms.
c. Trouble acknowledgment.
d. Supervisory acknowledgment.
e. Alarm Verification tallies.
f. Walk Test results.
g. Trouble Historical log cleared.

4. Silent Walk Test with History Logging:

a. The system shall be capable of being tested by one person. While in testing mode, the alarm activation of an initiating device circuit shall be silently logged as an alarm condition in the historical data file. The panel shall automatically reset itself after logging of the alarm.
b. The momentary disconnection of an initiating or indicating device circuit shall be silently logged as a trouble condition in the historical data file. The panel shall automatically reset itself after logging of the trouble condition.
c. Should the walk test feature be on for an inappropriate amount of time, it shall revert to the normal mode automatically.
d. The control panel shall be capable of supporting up to 8 separate testing groups whereby one group of points may be in a testing mode and the other (non-testing) groups may be active and operate as programmed per normal system operation. After testing is considered complete, testing data may be retrieved from the system in chronological order to ensure device/circuit activation.
e. Should an alarm condition occur from an active point, not in walk test mode, it shall perform operations described in Section 1.4.

K. LED Supervision: All slave module LEDs shall be supervised for burnout or disarrangement. Should a problem occur, the LCD shall display the module and LED location numbers to facilitate location of that LED.

L. System Trouble Reminder: Should a trouble condition be present within the system and the audible trouble signal silenced, the trouble signal shall resound at preprogrammed time intervals to act as reminder that the fire alarm system is not 100% operational. Both the time interval and the trouble reminder signal shall be programmed to suit the owner's application.

M. Access Levels:

1. There shall be four (4) access levels with level 4 being the highest level. Level 1 actions shall not require a passcode. Passcodes shall consist of up to ten (10) digits. Changes to passcodes shall only be made by authorized personnel.
2. In order to maintain security when entering a passcode, the digits entered will not be displayed, but a cursor will move along filling the position with an X to indicate that the digit has been accepted. All key presses will be acknowledged by a local audible sound.
3. When a correct passcode is entered, the message "Access Granted" shall be displayed. The new access level shall be in effect until the operator manually logs out or the keypad has been inactive for ten (10) minutes.
4. Should an invalid code be inputted, the operator shall be notified with the message "ERROR...INCORRECT PASSCODE" and shall be allowed up to three chances to enter a valid code. After three unsuccessful tries, the message "ACCESS DENIED" shall be displayed. The level shall not be altered, and the operator shall no longer be in the menu option.
5. Access to a level will only allow the operator to perform all actions within that level plus all actions of lower levels, not higher levels.
6. The following keys/switches shall have access levels associated with them:

    a. Alarm Silence
    b. System Reset
    c. Set Time/Date
    d. Manual Control
    e. On/Off/Auto Control
    f. Disable/Enable
    g. Clear Historical Alarm Log
    h. Clear Historical Trouble Log
    i. Walk Test
    j. Change Alarm Verification

7. Acknowledge keys shall also require privileged access to acknowledge points. If the operator presses an (ACK) key with insufficient access, an error message will be displayed. The points will scroll with (ACK) key presses to view the points on the list, but the points will not get acknowledged in the database.

N. Fire Alarm Control System Network:

1. Each fire alarm control panel shall operate as a proprietary local system with data communication to a higher order Central Processing Unit (CPU).
2. The CPU shall monitor all alarms and troubles of each fire alarm control panel.
3. The CPU shall control each fire alarm control panel as listed in this specification.

4. All data communication wiring between the CPU and fire alarm control panel shall be supervised for opens, shorts, and grounds.

O. Equipment Enclosures: Provide cabinets of sufficient size to accommodate the aforementioned equipment. Cabinet shall be equipped with locks and transparent door panel providing freedom from tampering yet allowing full view of the various lights and controls.

2.3 REMOTE ANNUNCIATOR(S) - SIMPLEX TYPE 4603-9101

A. Where shown on the plans, provide and install an LCD annunciator. The annunciator(s) shall have a beige enamel finish and shall communicate to the control panel over one twisted shielded pair of wire and operating power shall be 24 VDC and be fused at the control panel. Point-wired annunciators will not be considered as equal. The LCD display shall mimic the LCD display on the control panel.

B. The serial annunciator shall provide a common alarm and trouble circuit consist of:

1. Control Push-Button Switches - for: alarm silence, trouble silence, system reset, and manual evacuation duplicating the control panel switches. A key "enable" switch shall be provided to activate or deactivate the control switches.
2. Tone Alert - Duplicates the control panel tone alert during alarm and trouble conditions.
3. System trouble English language display.
4. Power on LED.
5. To accommodate and facilitate job site changes, the control switches shall have the capability to be programmed on-site to provide for manual switch input operation other than their standard purpose.

2.4 MULTIPLE ADDRESSABLE PERIPHERAL NETWORK (MAPNET)

A. Communication with addressable devices. The system must provide communication with initiating and control devices individually. All of these devices will be individually annunciated at the control panel. Annunciation shall include the following conditions for each point:

1. Alarm.
2. Trouble.
3. Open.
4. Short.
5. Device missing/failed.

B. All addressable devices shall have the capability of being disabled or enabled individually.

C. Up to 127 addressable devices may be multi-dropped from a single pair of wires. Systems that require factory reprogramming to add or delete devices are unacceptable.

D. Format: The communication format must be a completely digital poll/response protocol to allow t-tapping of the circuit wiring. A high degree of communication reliability must be obtained by using parity data bit error checking routines for address codes and check sum routines for the data transmission portion of the protocol. Systems that do not utilize full digital transmission protocol are not acceptable.

E. Identification of Addressable Devices: Each addressable device must be uniquely identified by an address code entered on each device at time of installation. The use of jumpers to set address will not be acceptable due to the potential of vibration and poor contact. Device identification schemes that do not use uniquely set addresses, but rely on electrical position along the communication channel are unacceptable. These systems cannot accommodate t-tapping the addition of an addressable device between existing devices requires reprogramming all existing electrically further devices. The system must verify that proper type device is in place and matches the desired software configuration.

F. Wiring Type, Distances, Survivability, and Configurations: Wiring types will be approved by the equipment manufacturer. Existing wiring will be utilized in retrofit applications. The system shall allow a line distance of up to 2,500 feet to the furthest addressable device on a Class B circuit. (Class A communications will be provided where shown on the drawings. Wire will be so routed to maintain sufficient distance between the forward and return loop as called for by the authority having jurisdiction.) To minimize wire routing and to facilitate future additions, t-tapping of the communications channel will be supported except where Class A wiring is required.

G. Addressable Device Types:

1. General: The system control panel, must be capable of communicating with the types of addressable devices specified below. Addressable devices will be located as shown on the drawings.
2. TrueAlarm Addressable Detector Bases - Simplex Type 4098-9781: All addressable smoke and heat detector heads as specified below will be pluggable into their bases. The base will contain electronics that communicate the detector status (normal, alarm, trouble) to the control panel over two wires. The same two wires shall also provide power to the base and detector. Different detector heads (smoke or heat) must be interchangeable. Upon removal of the head, a trouble signal will be transmitted to the control panel.
3. Ionization Detector Heads - Simplex Type 4098-9716, TrueAlarm:

    a. The ionization type detector shall be a plug-in unit which mounts to a twist-lock base and shall be UL listed.
    b. In order to provide stability over wide changes in environmental conditions such as temperature, humidity and pressure, they will be of dual chamber type: one chamber for sampling, one chamber for reference. They will be sealed against rear airflow entry.
    c. There shall be no limit to the number of detectors, stations, or zone adapter modules, which may be activated or "in alarm" simultaneously.
    d. The detector shall fit into a base that is common with both the heat detector and photoelectric type detector and shall be compatible with other addressable detectors, addressable manual stations, and addressable zone adapter modules on the same circuit. The detector shall also fit into a non-addressable base that is capable of being monitored by an addressable zone adapter module.
    e. Cover all smoke detection devices with plastic bags immediately after installation to maintain cleanliness, if field conditions so require.

4. Photoelectric TrueAlarm Sensor - Simplex Type 4098-9701:

a. The photoelectric type detector shall be a plug-in unit which mounts to a twist-lock base, and shall be UL approved.
b. The detectors shall be of the solid-state photoelectric type and shall contain no radioactive material. They will use a pulsed infrared LED light source and be sealed against rear airflow entry.
c. The detector shall fit into a base that is common with both the heat detector and ionization type detector and shall be compatible with other addressable detectors, addressable manual stations, and addressable zone adapter modules on the same circuit. There shall be no limit to the number of detectors or zone adapter modules which may be activated or "in alarm" simultaneously.

5. Addressable Thermal Detector Head - Simplex 4098-9731: Thermal detector heads must be UL listed. They will be a combination rate-of-rise and fixed temperature (135 F) type, automatically restorable.
6. Addressable Pull Stations - Simplex Type 2099-9784:

a. Addressable pull stations will contain electronics that communicate the station's status (alarm, normal) to the transponder over two wires which also provide power to the pull station. The address will be set on the station. They will be manufactured from high impact red Lexan. Station will mechanically latch upon operation and remain so until manually reset by opening with a key common to all system locks. Pull stations will be double action.
b. The front of the station is to be hinged to a backplate assembly and must be opened with a key to reset the station. The key shall be common with the control panels. Stations which use Allen wrenches or special tools to reset, will not be accepted. The station shall consist of high impact Lexan plastic, red in color.
c. The addressable manual station shall be capable of field programming of its "address" location on an addressable initiating circuit. The manual station shall be fitted with screw terminals for field wire attachment.
d. There shall be no limit to the number of stations, detectors or zone adapter modules, which may be activated or "in alarm" simultaneously.
e. The addressable manual station shall be UL listed.

7. Addressable Photoelectric Duct Detector TrueAlarm - Simplex Type 4098-9702 with 4098-9701 Smoke Sensor:

a. The detector shall be a non-polarized 24 VDC type which is compatible with the fire alarm panel and obtains its operating power from the supervisory current in the fire alarm detection loop.
b. Detectors shall be of the solid-state photoelectric type and shall operate on the light scattering, photodiode principle. To minimize nuisance alarms, detectors shall have an insect screen and be designed to ignore invisible airborne particles or smoke densities that are below the factory set alarm point. No radioactive material shall be used.
c. The detector head shall be directly interchangeable with an ionization detector type. The 24 VDC detector may be reset by actuating the control panel reset switch.

d. Detector construction shall have a mounting base with a twist-lock detecting head that is lockable. The locking feature must be field removable when not required. Contact between the base and head shall be of the bifurcated type utilizing spring type, self-wiping contacts. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control panel. Detector design shall provide compatibility with other normally open fire alarm detection loop devices (heat detectors, pull stations, etc.).
e. It shall be possible to alarm the duct housing by using a test switch. Simplex Type 2098-9786 test LED alarm indicator.
f. For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housings front cover.
g. To minimize false alarms, voltage and RF transient suppression techniques shall be employed as-well-as smoke signal verification circuit and an insect screen.
h. Auxiliary SPDT relays and or remote LED alarm indicators and key-operated test stations shall be installed where indicated.

8. Zone Adaptor Module - Simplex Type MAPNET II 2190-9155: Zone adapter modules shall be used for monitoring of water flow, valve tamper, Halon control panels, non-addressable detectors, and for control of evacuation indicating appliances and AHU systems:

a. An addressable interface module shall be provided for interfacing normally open direct contact devices to an addressable initiating circuit. The device shall be a Simplex Type Zone Adapter Module (ZAM).
b. ZAMs will be capable of mounting in a standard electric outlet box. ZAMs will include cover plates to allow surface or flush mounting. ZAMs will receive their 24 VDC power from a separate two-wire pair running from an appropriate power supply.
c. There shall be two types of devices:
d. For Type 1 above:

1) For conventional 2-wire smoke detector and/or contact device monitoring with class A wiring supervision.

a) This type of addressable device module will provide power to and monitor the status of a zone consisting of conventional 2-wire smoke detectors and/or N/O contact devices as specified elsewhere as identified in a schedule on the plans. The supervision of the zone wiring will be Class A. These ZAMs will communicate the zone's status (normal, alarm, trouble) to the transponder.

2) For conventional 4-wire smoke detector with Class B wiring supervision - 2190-9158.

a) This type of addressable device will provide power to and monitor the contact status of a zone consisting of conventional 4-wire smoke detectors as specified elsewhere. The ZAM will provide detector reset capability and a 2-amp fuse to provide over-current power protection for the 4-wire detector. These ZAMs will communicate the zone's status (normal, alarm, trouble) to the transponder.

e. For Type 2 above:

1) Zone Adaptor Module - Simplex Type 2190-9161.

a) For signals, speakers, fire fighter phone jacks and other device control with Class B or Class A wiring supervision.
b) This type of addressable device will provide double-pole, double-throw relay switching that can be used to connect through easily replaceable 2-amp fuses: a zone of signals to a power source, speakers to an audio source, fire fighter phone jacks to a communications channel, or activate a variety of controlled devices. The module will be available in either a Class B or Class A supervision version. In the Class B version, the wiring will be supervised by an end-of-line device. In the Class A version, the wiring will be looped back and connected to the module to allow continual operation of the controlled devices even if the wiring sustains a single break. Class A devices will be provided. These ZAMs will communicate the supervised wiring status (normal, trouble) to the fire alarm control panel and will receive a command to transfer the relay from the fire alarm control panel.

2) Zone Adaptor Module. For non-supervised control - Simplex Type 2190-9163. This type of addressable device will provide double-pole, double-throw relay switching for loads up to 120 VAC. It will contain easily replaceable 2-amp fuses, one on each common leg of the relay.

f. The ZAM shall be supervised and uniquely identified by the control panel. Device identification shall be transmitted to the control panel for processing according to the program instructions. Should the ZAM become non-operational, tampered with, or removed, a discrete trouble signal, unique to the device, shall be transmitted to, and annunciated at, the control panel.
g. The ZAM shall be capable of being programmed for its "address" location on the addressable device initiating circuit. The ZAM shall be compatible with addressable manual stations and addressable detectors on the same addressable initiating circuit.

9. Addressable Device Supervision:

a. All devices shall be supervised for trouble conditions. The system control panel will be capable of displaying the type of trouble condition (open, short, device missing/failed).
b. Should a device fail, it will not hinder the operation of other system devices.

2.5 ONE-WAY VOICE COMMUNICATION

A. Provide one-way voice communication and tone generating capabilities.

B. A central audio control module shall be provided for the necessary alarm message/tone generation, main and remote microphone connections, music inputs, and mixer/pre-amplifier circuits. Continuous supervision shall be provided. Audio outputs shall have individual gain control, Simplex Type 4100-0210.

C. A hand-held, push-to-talk microphone shall be provided recessed within a protective panel-mounted enclosure. The microphone shall be a dynamic communication type with a frequency range of 200 Hz to 4000 Hz and shall be equipped with a self-winding 5-foot coiled cable. An LED indicator shall be provided to indicate microphone push-to-talk button has been pressed and speaker circuits are ready for transmission. Microphone shall be supervised from disconnection, Simplex Type 4100-0204.

D. An audio control switch module shall be furnished to provide manual to the audio functions. These switches and associated LED indicators shall be supervised from disarrangement or failure.

E. Audio power amplifiers shall be furnished with Dual 25W self-contained filtered 24 VDC power supply, transformer, and amplifier monitor circuits. Amplifiers shall provide a 25 VRMS output with a frequency response of 120 Hz to 12,000 Hz. Provide a sufficient quantity of amplifiers to operate all system speakers simultaneously plus ten (10) percent space capacity.

F. In addition, provide at least one back-up amplifier capable of automatically replacing any failed amplifier.

G. Speaker circuits shall be supplied which are capable of supplying audio signals at 25 VRMS supplied by the system amplifiers. Supervision for open, short, or ground fault conditions shall be provided. Individual and distinct trouble indications shall be provided for each fault. Provide one circuit for each zone or area of distinct communication.

H. Tones: Digitized tones for alarm or auxiliary requirements shall be available. Tone requirements are as follows:

1. The Slow Whoop shall be a slowly ascending tone from 200 to 830 Hz in 2.5 seconds.
2. The Wail shall ascent and descent from 600 to 940 Hz.
3. The Beep shall be a 470 Hz tone. The time duration shall be 0.7 seconds on and 0.7 seconds off.
4. The Horn shall be a continuous 470 Hz tone.
5. The Stutter shall be a 470 Hz tone which is on for 100 milliseconds and off for 100 milliseconds.
6. The Chime shall be a 700 Hz tone with a 1.5 second delay time.
7. The Coded Horn shall be a 470 Hz tone designed specifically for use on a coded system.
8. The Hi/Lo shall be a free running tone with a high frequency of 544 Hz and a low frequency of 440 Hz. The "on time" (Hi) shall be 100 milliseconds while the "off time" (Lo) is 400 milliseconds.

I. A pre-recorded digitized voice message capability shall be provided for automatic transmission to building occupants during alarm conditions. A minimum of 8 messages must be provided to meet the requirements of the military. This message player shall not rely on a tape or other mechanical means of transmitting the evacuation message. Those systems that do not use tape players must provide a back-up player designed to automatically operate should the primary device jam or otherwise fail to operate. A standard evacuation message shall be provided under this contract; however, the message player must be capable of transmitting a customized message of up to 4 minutes long. A self-contained speaker will provide testing of the message(s) without disturbing the occupants of the facility.

J. A pre-recorded digitized P.N.I.S. (Positive Non-Interfering Successive) "voice coding" capability shall be provided for automatic transmission to building occupants during alarm conditions. A separate "voice code" shall sound throughout the facility for each zone in alarm condition. Examples of voice messages are as follows:

1. Doctor Firestone please dial two-three-two.
2. Doctor Firestone please call five-four-seven.
3. Code Red three-four-five.

K. Two (2) remote microphone/annunciator command location(s) as shown on the plans shall be provided to duplicate the manual voice transmission capability of the main fire alarm control panel.

L. Automatic Voice Evacuation Sequence:

1. The audio alarm signal shall consist of an alarm tone for a maximum of 10 seconds followed by automatic pre-selected voice evacuation messages. At the end of each voice evacuation message, the alarm tone shall resume. The alarm tones shall sound until the alarm silence switch at the fire alarm control panel has been operated.
2. All audio alarm operations (speaker circuit selection and alarm tone/voice message timing variations) shall be activated by the system software so that any required future changes to the evacuation sequence can be facilitated by authorized personnel without any component rewiring.

M. Manual Voice Paging Sequence:

1. The system shall be configured to allow selective voice paging. Upon activation of any speaker manual control switch, two (2) seconds of tone shall sound over the speakers indicating an impending voice message will occur.
2. If any speaker manual control switches are activated, the control panel operator shall be able to make announcements via the push-to-talk paging microphone over the preselected speakers.
3. Facility for total building evacuation and paging shall be provided to allow for activation of speakers. This shall be accomplished by the means of an "All Circuit" switch.

N. Alarm Signals:

1. Provide audio/visual units with flush trims and backboxes for all wall mount audio-visual unit locations as shown on the plans.
2. Provide speakers with mounting plates for all locations requiring surface-mounted audio devices only.

3. Provide speakers and visual alarm signals for all locations requiring ceiling-mounted audio-visual alarm signals as shown on the plans.

2.6 PRINTERS AND/OR CRT'S

A. Where shown on the plans, provide and install a printer and/or CRT. Printer(s) shall receive English language text from the fire alarm control panel in an industry standard ASCII format via an EIA RS-232-C connection.

B. All printed information shall include time and date.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of NEC article 760 A and C, Power-Limited Fire Protective Signaling Circuits or if required may be reclassified as non-power limited and wired in accordance with NEC-Article 760 A and B. Upon completion, the contractor shall so certify in writing to the owner and general contractor. All junction boxes shall be sprayed red and labeled "Fire Alarm." Wiring color code shall be maintained throughout the installation.

B. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.

C. The contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of the installation.

D. The manufacturer's authorized representative shall provide on-site supervision of installation.

E. All wiring shall be installed in conduit.

3.2 TESTING

A. The completed fire alarm system shall be fully tested in accordance with NFPA-71H by the contractor in the presence of the owner's representative and the local Fire Marshal. Upon completion of a successful test, the contractor shall so certify in writing to the owner and general contractor.

3.3 WARRANTY

A. The contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.

B. The equipment manufacturer shall make available to the owner a maintenance contract proposal to provide a minimum of two (2) inspections and tests per year in compliance with NFPA-72H guidelines.

END OF SECTION

SECTION 31 00 01 – EARTHWORK FOR BUILDING ONLY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. Extent of earthwork is indicated on drawings and described herein.

B. Site grading to elevations indicated on drawings is included as part of this work.

C. Preparation of subgrade for building footprint is included as part of this work.

D. Soil compaction and control is included as a part of this work.

E. Drainage fill course for support of building slabs is included as part of this work.

F. Backfilling of trenches within building lines is included as part of this work.

G. Excavation of Mechanical/Electrical Work: Refer to Divisions 15 and 16 sections for excavation required in conjunction with underground mechanical and electrical utilities, backfilling of excavated trenches shall be in accordance with this section.

H. Definition: "Excavation" consists of removal of material encountered to subgrade elevations indicated and subsequent disposal or relocation of materials removed.

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Testing and Inspection Service: Employ, at contractor's expense, testing laboratory to perform soil testing and inspection service for quality control testing during earthwork operations.

1.4 JOB CONDITIONS:

A. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

B. Should uncharted, or incorrectly charted, piping, or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

1.5 SITE CLEARING AND PROTECTION

A. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active. Remove any remnants of previous foundations present on the site within the building footprint.

B. Use of Explosives: The use of explosives is not permitted.

C. Protection of Persons and Property: Barricade open excavations occurring as part of this work.

D. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS:

A. Select Fill – Materials conforming to Unified Soil Classifications CL, having a plasticity index (PI) of 10 to 24, and a liquid limit less than 45. Existing silty clays or sandy clays may be reused as select fill, if they are free of organic materials, and have acceptable moisture content.

B. Building Slab Drainage Course shall be #610 Crushed Limestone as specified in SECTION 31 00 02

C. Backfill and Fill Materials: Satisfactory soil must as be a Select Fill as described above, free of clay, rock, or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

PART 3 - EXECUTION

3.1 EXCAVATION:

A. Earth Excavation includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be at contractor's expense.

C. Under footings and gradebeams, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom without altering required top elevation.

D. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect.

E. Remove soil in the vicinity of soil boring #1 to eliminate organic materials in the soil from an old burn pit. This excavation shall extend 4' beyond the new foundation footprint. The excavation shall not go under the existing foundation nor below the bottom of the existing foundation when abutting the existing foundation. Extent of excavation shall continue until all existing organic material is removed. If soft or unstable areas are found during the initial excavation or during compaction of existing soils, remove soils as needed to expose stable material. Stability is defined as the absence of rutting, pumping, or excessive movement of the subgrade under normal compactive efforts. After making initial excavation, notify the Architect to allow for inspection and determination if stable ground has been reached for the excavation. Compact the exposed surface to 95% of Standard Proctor density.

F. Additional Excavation: Where excavation has reached required subgrade elevations, notify Architect who will inspect conditions.

G. If unsuitable bearing materials are encountered at required subgrade elevations, outside of footings supported by rammed aggregate piers, carry excavations deeper and replace excavated material as directed by Architect.

H. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.

I. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

J. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

3.2 SHORING AND BRACING

A. Provide materials for shoring and bracing in good serviceable condition.

B. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.

C. Maintain shoring and bracing in excavations regardless of time excavations will be open. Carry down shoring and bracing as excavation progresses.

3.3 DEWATERING

A. Prevent surface water from flowing into excavations and from flooding project site, surrounding area and existing building.

B. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

C. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or run-off areas. Do not use utility trench excavations as temporary drainage ditches.

3.4 MATERIAL STORAGE

A. Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place grade, and shape stockpiles for proper drainage.

B. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

C. Dispose of excess soil material and waste materials as herein specified.

3.5 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10' and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.

B. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6 EXCAVATION FOR TRENCHES

A. Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.

B. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freezing.

C. Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensate, drainage) so top of piping is not less than 2'-6" below finished grade.

D. Grade bottoms of trenches as indicated, including notching under pipe bells to provide solid bearing for entire body of pipe.

E. Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.

F. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Architect. Use care in backfilling to avoid damage or displacement of pipe systems.

3.7 COMPACTION:

A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.

B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density.

C. STRUCTURES, BUILDING SLABS, STEPS, RAMPS

1. Compact 9” loose lifts for all layers of backfill or fill material at 95% standard proctor (ASTM D-698) within 3% of optimum moisture.

D. LAWN OR UNPAVE AREAS

1. Compact top 6" of subgrade and each layer of backfill or fill material at 90% maximum density.

3.8 MOISTURE CONTROL

A. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or after compaction operations.

B. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

C. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.9 BACKFILL AND FILL:

A. General

1. Place acceptable soil material in layers in required subgrade elevations, for each area classification listed below.

B. Inside Building Area with Drainage Course

1. Top four inches of material under all building slabs shall be building slab drainage course. Areas requiring fill (under drainage coverage) within building boundaries shall be Select Fill.

C. Outside Building Area

1. Use select on-site material against foundation walls, under grassed areas, trenches, and piping areas not indicated to be paved shall have a minimum of 4" of topsoil.

D. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing, and waterproofing.

2. Inspection, testing, approval, and recording locations of underground utilities.

3. Removal of concrete formwork.

4. Removal of shoring, bracing, and backfilling of voids with satisfactory materials.

5. Removal of trash and debris.

6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

3.10 GROUND SURFACE PREPARATION

A. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than one vertical to four horizontal so that fill material will bond with existing surface.

B. When existing ground surface has a density less than that specified under "Compaction" for particular area classification. Break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

3.11 PLACEMENT AND COMPACTION

A. Place backfill and fill materials in layers not more than 9" under building and 12" outside building in loose depth for material compacted by heavy compaction equipment, and not more than 6" in loose depth for material compacted by hand-operated tampers.

B. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

C. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

3.12 GRADING:

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

C. Finish surfaces free from irregular surface changes, and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.

2. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.

3. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

D. If in opinion of Architect based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

3.13 BUILDING SLAB DRAINAGE COURSE:

A. General: A drainage course shall be provided consisting of placement of #610 crushed limestone fill material, 4" thick, over subgrade surface to support concrete building slabs.

3.14 FIELD QUALITY CONTROL:

A. Quality Control Testing During Construction: Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.

B. Perform field density tests in accordance with ASTM D2922 Density of Soil and Soil Aggregates in Place by Nuclear Methods.

C. Building Slab Subgrade: Make at least one field density test of subgrade for every 2500 sq. ft. of building slab, but in no case less than three tests. In each compacted fill layer, make one field density test for every 2500 sq. ft. of overlaying building slab, but in no case less than three tests.

3.15 MAINTENANCE:

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material,

compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work and eliminate evidence of restoration to greatest extent possible.

3.16 DISPOSAL OF EXCESS AND WASTE MATERIALS:

A. Removal from Owner's Property: Remove waste materials, including unacceptable and acceptable excavated material, trash, and debris, and dispose of it off Owner's property.

END OF SECTION

SECTION 311000 - SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of existing debris.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fill Material: As specified in Section 312323 – Fill.

PART 3 EXECUTION

3.1 SITE CLEARING

A. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.2 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Protect existing structures and other elements that are not to be removed.

3.3 VEGETATION

A. Do not remove or damage vegetation beyond the limits indicated on drawings.

B. Install substantial, highly visible fences to prevent inadvertent damage to vegetation to remain:

1. At vegetation removal limits.

C. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with min. disturbance of the subsoil.

D. Vegetation Removed: Do not bury, landfill, or leave on site, except as indicated.

E. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Government.

3.4 DEBRIS

A. Remove debris, junk, and trash from site. Leave site in clean condition, ready for subsequent work. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 311000

SECTION 312200 - GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal and storage of topsoil.

B. Rough grading the site for site structures.

C. Topsoil and finish grading.

1.2 QUALITY ASSURANCE

A. Perform Work in accordance with State of Mississippi, Highway Department standards.

PART 2 PRODUCTS

1.2 MATERIALS

A. Topsoil: Topsoil shall consist of natural friable soil that is representative of soils in the vicinity which produce heavy growths of crops, grass, or other vegetation and is reasonably free from underlying subsoil, clay lumps, objectionable weeds, litter, brush, matted roots, toxic substances, or any material that might be harmful to plan growth or be hindrance to grading, planting, or maintenance operations.

B. Obtain approved topsoil material off-site when satisfactory topsoil materials are not available on-site.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Poor soils conditions and groundwater may be encountered and should be expected on the site.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Notify utility company to remove and relocate utilities.

E. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

F. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.

G. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

3.3 STRIPPING EXCAVATION

A. Once all demolition and clearing operations have been completed, topsoil stripping excavations shall be continued to the limits and depths indicated indicated on the drawings.

B. Stripping Excavation: Stripping Excavation will consist of the removal of all sod, vegetable matter and topsoil to a minimum depth as required by the plans and specifications, and the stockpiling of suitable materials to be used by future projects.

C. See Section 312323 for subsoil excavation and filling procedures.

3.4 SOIL STOCKPILING

A. Stockpile topsoil to be re-used on site; remove remainder from site.

B. Locate stockpiles as indicated on the drawings and where they will not interfere with the construction phases and at least 15 feet away from areas of concentrated flows or pavements.

C. Protect stockpiles from erosion.

3.5 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch (13 mm) in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 3 inches (75 mm).

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches (75 mm).

E. Place topsoil in areas where seeding and sodding are indicated.

F. Place topsoil where required to level finish grade.

G. Place topsoil to nominal depth of 3 inches.

H. Place topsoil during dry weather.

I. Remove roots, weeds, rocks, and foreign material while spreading.

J. Near plants spread topsoil manually to prevent damage.

K. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

L. Lightly compact placed topsoil.

3.6 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) (30 mm) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch) (13 mm).

3.7 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Engineer as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

D. Protecting Graded Areas: Protect newly graded areas from traffic and erosion.

E. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

3.8 CLEANING

A. Leave site clean and raked, ready to receive landscaping.

END OF SECTION 312200

SECTION 312316 - EXCAVATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavating for building volume below grade.

B. Trenching for utilities.

1.2 RELATED REQUIREMENTS

A. Section 015713 - Temporary Erosion and Sedimentation Control: Slope protection and erosion control.

B. Section 024100 - Demolition: Shoring and underpinning.

C. Section 312200 - Grading: Soil removal from surface of site.

D. Section 312200 - Grading: Grading.

E. Section 312316.13 - Trenching: Excavating for utility trenches as shown on the plans.

F. Section 312323 - Fill: Fill materials, filling, and compacting.

1.3 SUBMITTALS

A. See Section 013300 - Administrative Requirements, for submittal procedures.

B. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.

1.4 PROJECT CONDITIONS

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 312200 for additional requirements.

3.3 EXCAVATING

A. Excavate to accommodate construction operations.

B. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Cut utility trenches wide enough to allow inspection of installed utilities.

F. Hand trim excavations. Remove loose matter.

G. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd (0.25 cu m) measured by volume. See Section 312316.26 for removal of larger material.

H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 312323.

I. Grade top perimeter of excavation to prevent surface water from draining into excavation.

J. Remove excavated material that is unsuitable for re-use from site.

K. Stockpile excavated material to be re-used in area designated on site in accordance with Section 312200.

L. Remove excess excavated material from site.

3.5 FIELD QUALITY CONTROL

A. See Section 014500 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.6 PROTECTION

A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing

END OF SECTION 312316

SECTION 312323 - FILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Filling , backfilling, and compacting for paving and site structures.

B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.2 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials ; 2010

B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates ; 2014.

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)) ; 2012.

D. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method ; 2007.

E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)) ; 2012.

F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method ; 2008.

G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) ; 2011.

H. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth) ; 2005.

I. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils ; 2010.

1.3 SUBMITTALS

A. See Section 013300 - Administrative Requirements, for submittal procedures.

B. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

C. Compaction Density Test Reports.

1.4 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where they will not interfere with the construction phases and at least 15 feet away from areas of concentrated flows or pavements.

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination.

3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. General: Controlled, compacted fill should consist of approved materials that are free of organic matter and debris. A sample of each material type should be submitted for evaluation.

B. Engineered Fill (Off-Site): Engineered Fill from off-site sources shall be a Lean Clay with a USCS Classification of CL, a plasticity index between 10 and 24, a maximum liquid limit of 45, and 60% passing the #200 sieve.

C. Engineered Fill (On-Site): Engineered Fill from on-site soils sources shall have a USCS Classification of CL, a plasticity index between 10 and 24, a maximum liquid limit of 45, and 60% passing the #200 sieve.

D. Delineation of fat clays and lean clays should be performed in the field and could require additional laboratory testing.

2.2 ACCESSORIES

A. Geotextile Stabilization: non-woven , geotextile ; N-Series manufactured by Mirafi or approved equal.

2.3 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

C. See Section 312200 for additional requirements.

3.2 PREPARATION

A. The initial step shall be stripping existing vegetation and loose, soft or otherwise unsuitable material. Stripped materials consisting of vegetation and organic materials should be wasted off site, or used to vegetate landscape areas.

3.3 DRAINAGE

A. Effective drainage, including ditching and/or positive grading, should be established during the initial stages of site development and modified as necessary during construction.

B. Groundwater may be encountered and should be expected during excavation work. When required the Contractor shall provide a system for controlling groundwater below excavations.

2 Surface water shall be prevented from flowing into excavations and from flooding the project site and surrounding areas by methods approved by the Engineer.

3 Contractor shall not allow water to accumulate in excavations. Remove water to prevent softening of foundation soils, undercutting of footings, ans soil changes detrimental to the stability of sub-grades and foundations. Contractor shall not use trench excavation as temporary drainage ditches.

4 Maintain grades so that the surface is well drained. When required the Contractor shall provide dewatering system necessary to convey water away from excavations.

3.4 EXCAVATION

A. After clearing, grubbing, and stripping excavation are completed, excavate existing soils to depths necessary to accommodate site structures and install the required pavement sections.

B. Over excavate around the perimeter of the existing building as follows:

- Excavation to be 4’ deep.
- Excavation to be 8’ wide at the bottom.
- Maximum length of excavation to be 20’.
- Excavation shall follow the requirements set by the geotechnical engineer.
- Do not undermine or damage the existing building.

C. Suitable fill materials shall be used as general fill in areas outside building or pavement areas as approved by the Engineer. If the site conditions permit, additional suitable excavation material may be wasted on site as approved by the Engineer.

3.5 UNAUTHORIZED EXCAVATION

A. The Contractor will not be compensated for excavation beyond the dimensions and elevations as shown on the plans or that has been directed and approved by the Engineer.

B. Any unauthorized excavation that requires filling shall be corrected at the Contractor's expense.

C. No payment will be made for the removal, disposal, or replacement of material determined to be loosened or undercut through carelessness or negligence on the part of the Contractor.

3.6 SUB-GRADE INSPECTION AND PREPARATION

A. The in-place soils must be stable prior to the placement of any fill materials and construction of sidewalks. After undercutting expansive soils to achieve the 2 foot

buffer thickness beneath the sidewalks and the finished subgrade elevation in cut areas, and prior to placing fill ina any areas that are currently below finished subgrade elevation, the exposed subgrade should be evaluated to confirm that all soft, yielding and unsuitable materials have been removed. Where practical, those areas which are at finished subgrade or are to receive fill should be proof-rolled with a loaded tandem-axle dump truck or similar pneumatic-tired equipment with a minimum weight of 15 tons and a maximum of 25 tons. Proof-rolling will help reveal the presence of unstable materials. Where proof-rolling is not possible due to the presence of the existing building, etc., the stability of the subgrade soils should be visually evaluated.

B. Any areas that yield or pump under proof-roll equipment or are otherwise observed to be unstable should be mitigated. Mitigation might include processing to remove excess moisture, over excavation and backfilling, chemical stabilization, or modification with geotextile reinforcement. Should mitigation of wet and pumping soils be required, mitigation should be prescribed by the project geotechnical engineer.

3.7 FILL PLACEMENT AND COMPACTION

A. Fill materials shall be placed on prepared and inspected sub-grade to contours and elevations indicated using appropriate materials.

B. Employ a placement method that does not disturb or damage other work.

C. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain a moisture content to within -2 to +2 percent of optimum moisture content as determined by the standard Proctor test at the time of placement and compaction.

E. The moisture content and compaction should be measured for each lift of engineered fill during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved. the zone of fill compacted to meet this criteria should extend the entire footing width.

F. Fill material meeting the requirements of Engineered Fill shall be placed to obtain final grade outside of building and pavement areas. This material should be compacted in 9 inch loose lifts when heavy, self propelled compaction equipment is used or 4 to 6 inch loose lifts when hand-guided equipment is used to not less than 98 percent of the maximum dry unit weight according to ASTM D 698 (Standard Proctor).

G. Correct areas that are over-excavated.

H. Reshape and re-compact fills subjected to vehicular traffic.

3.8 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch (25 mm) from required elevations.

3.9 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D3017, or ASTM D6938.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: Foundation areas shall have 1 test per footing per lift and pavement areas shall have one test for every 5,000 square feet per lift.

3.10 CLEANING AND PROTECTION

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

C. Protect newly graded areas from traffic and erosion.

D. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

END OF SECTION 312323

SECTION 312316.13 - TRENCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Backfilling and compacting for utilities outside the building to utility main connections.

1.2 REFERENCES

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials ; 2010

B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates ; 2014.

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)) ; 2012.

D. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method ; 2007.

E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)) ; 2012.

F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method ; 2008.

G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) ; 2011.

H. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth) ; 2005.

I. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils ; 2010.

J. Mississippi Standard Specifications for Road and Bridge Construction, 2004.

1.3 SUBMITTALS

A. See Section 013300 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

D. Compaction Density Test Reports.

1.4 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where they will not interfere with the construction phases and at least 15 feet away from areas of concentrated flows or pavemtns.

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
2. Prevent contamination.

3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 BEDDING AND FILL MATERIALS

A. See Section 312323 for fill material requirements.

2.2 ACCESSORIES

A. Warning Tape: Warning tape shall be metallic or polyethylene film warning tape manufactured for making and identifying underground utilities, 3 inches wide and 4 mils thick, continuously inscribed with a description of the utility.

B. Locator Wire: Locator wire shall be fourteen (14) gauge solid copper insulated wire.

2.3 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 312200 for additional requirements.

3.3 TRENCHING

A. Excavate trenches to indicated widths, gradients, lines, depths, and elevations as indicated on the drawings.

B. All pipe and associated fittings/structures will be installed in accordance with manufacturer's recommendations unless more stringent requirements are imposed by the drawings and these specifications.

C. Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape sub-grade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

D. Remove projecting stones and sharp objects along trench sub-grade.

3.4 FOUNDATION FOR UTILITY PLACEMENT

A. When native material at the bottom of the trench is not a suitable foundation for the pipe or conduit, excavate trench an additional 6 inches and replace with approved Foundation Material.

3.5 BEDDING FOR UTILITY PLACEMENT

A. Place and compact bedding material on trench bottoms as indicated on the drawings. Shape bedding material to provide continuous support of bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. The bedding material shall be Suitable Soil secured from the trench excavation and shall be thoroughly compacted to a minimum 98 percent of Standard Proctor Density (ASTM D 698).

C. When the native sol is not suitable for bedding material then a minimum of 4 inches of Select Bedding Material shall be compacted to a minimum of 98 percent of the Standard Proctor Density (ASTM D 698).

3.6 INITIAL BACKFILLING

A. Coordinate backfilling with utility testing.

B. Place and compact initial backfill to a height of 12 inches over the utility pipe or conduit. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit.

C. The backfill material shall be Suitable Soil secured from the trench excavation and shall be thoroughly compacted to a minimum 98 percent of Standard Proctor Density (ASTM D 698).

D. When the native soil is not suitable for backfill material then backfill with Select Backfill Material compacted to a minimum of 98 percent of the Standard Proctor Density (ASTM D 698).

E. See Section 312323 for further backfill requirements.

F. Correct areas that are over-excavated.

G. Reshape and re-compact fills subjected to vehicular traffic.

3.7 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch (25 mm) from required elevations.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch (25 mm) from required elevations.

3.8 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D3017, or ASTM D6938.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: one test per 100 linear feet per lift.

3.9 CLEANING

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION 312316.13

SECTION 313116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. Provide soil treatment for termite control, as herein specified.

1.3 QUALITY ASSURANCE:

A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work, including preparation of substrate and application.

B. Engage a professional pest control operator, licensed in accordance with regulations of governing authorities for application of soil treatment solution.

1.4 JOB CONDITIONS:

A. Restrictions: Do not apply soil treatment solution until excavating, filling and grading operations are completed, except as otherwise required in construction operations.

B. To insure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

1.5 SUBMITTALS:

A. Product Data: Submit manufacturer's technical data and application instructions.

1.6 SPECIFIC PRODUCT WARRANTY:

A. Furnish written warranty certifying that applied soil poisoning treatment will prevent infestation of subterranean termites and, that if subterranean termite activity is discovered during warranty period, contractor will re-treat soil and repair or replace damage caused by termite infestation.

B. Provide warranty for a period of five years from date of treatment signed by applicator and contractor.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT SOLUTION:

A. Use an emulsible concentrate insecticide for dilution with water, specially formulated to prevent infestation by termites. Fuel oil will not be permitted as a diluent. Provide a working solution of one of following chemical elements and concentrations:

Dursban TC

B. Other solutions may be used as recommended by applicator and if acceptable to Contracting Officer and local governing authorities. Use only soil treatment solutions which are not injurious to planting.

PART 3 - EXECUTION

3.1 APPLICATION: NEW CONSTRUCTION

A. Surface Preparation: Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs, if recommended by toxicant manufacturer.

B. Application Rates: Apply soil treatment solution as follows:

C. Under slab-on-grade structures, treat soil before concrete slabs are placed using either power sprayer or tank-type garden sprayer.

D. Horizontal application shall be made using low pressure spray after grading is completed and prior to the pouring of the slab or footing.

E. Apply 1 gallon of dilution per 10 square feet (a 1% rate), or use 2 2/3 fluid ounces of Dursban TC per 10 square feet in sufficient water (no less than ½ gallon or more than 2 gallons) to provide thorough and continuous coverage of the area being treated.

F. If the fill is washed gravel or other course material, it is important that a sufficient amount of dilution be used to reach the soil substrate beneath the course fill.

G. Vapor barrier shall be placed over the treated soil immediately to prevent disturbance of the termiticide barrier.

H. Vertical barriers' apply the 1.0% dilution at a rate of 4 gallons per 10 linear feet per foot of depth. Establish vertical barriers in areas such as around foundations, plumbing lines, backfilled soil against foundation walls and other areas which may warrant more than just a horizontal barrier.

I. When treating foundations deeper than 4 feet, apply the termiticide as the backfill is being replaced, or is the construction contractor fails to notify the applicator to permit this, treat the foundation to a minimum depth of 4 feet after the backfill has been installed. The applicator must trench and rod into the trench or trench along the foundation walls and around pillars and other foundation elements, at the rate prescribed from grade to a minimum depth of 4 feet. When the top of the footing is exposed the applicator must treat the soil adjacent to the footing to a depth not to exceed the bottom of the footing. However, in no case should a structure be treaded below the footing.

J. Trenches need not be wider than 6 inches. Treat soil with the dilution as it is being replaced in the trench.

K. For a 1.0% rate, apply 4 gallons of dilution per 10 linear feet per foot of depth of 10 2/3 fluid ounces of Dursban TC per 10 linear feet per foot of depth from grade to top of footing in sufficient water (not less than 2 gallons or more than 8 gallons) to ensure complete coverage.

L. Hollow block foundations or voids of masonry can be treated to make a complete chemical barrier especially if the soil was not treated prior to pouring the footing. Apply the dilution at a rate of 2 gallons per 10 linear feet so that it reaches the top of the footing.

M. For crawl spaces, establish a vertical barrier on both sides of the foundation and around all piers and areas where underground utilities exit the soil. Do no apply the dilution to the entire surface area intended as the crawl.

3.2 APPLICATION: EXISTING BUILDING

A. Application Rates: Apply soil treatment solutions as follows:

1. At Edges of Floating Slab: Where slab butts existing partition drill holes at 16" o.c. and apply dilution at a rate of 4 gallons per 10 linear feet.
2. At Exterior Walls: Drill into existing concrete block or brick at 4" below slab level as required to apply solution to all cells of CMU and cavity between laid CMU at a rate of 2 gallons per 10 linear feet.
3. Around perimeter of building trench ditch 6" deep and 6" wide and apply dilution in trench at a rate of 4 gallons per 10 linear feet.
4. In area where existing slab is removed for installation of new plumbing treat soil as specified for new construction.

B. Post signs in areas of application warning workers that soil poisoning has been applied. Remove signs when areas are covered by other construction.

C. Reapply soil treatment solution to areas disturbed by subsequent excavation or other construction activities following application including rain.

END OF SECTION 313116

SECTION 321123 – AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Granular base Course for pavements.

1.2 REFERENCE STANDARDS

A. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

C. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

D. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

E. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

1.3 SUBMITTALS

A. See Section 013300 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

D. Compaction Density Test Reports.

1.4 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. Aggregate Storage, General:
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 MATERIALS

A. Granular Base Course: Granular Base Course: Granular Base Course material shall dense-graded plant mixed crushed limestone, conforming to State of Mississippi Highway Department requirements for 610 Limestone.

2.2 SOURCE QUALITY CONTROL

A See Section 014500 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.

B. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.
C. If tests indicate materials do not meet specified requirements, change material and retest.
D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.
B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.3 INSTALLATION

A. Spread Granular Base Course material over prepared substrate and compact at optimum moisture content to not less than the percentage of maximum dry unit weight as shown on the drawings.
B. Level and contour surfaces to elevations and gradients indicated.
C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch (6.4 mm) measured with 10 foot (3 m) straight edge.
B. Scheduled Compacted Thickness: Within 1/4 inch (6.4 mm).
C. Variation From Design Elevation: Within 1/2 inch (12.8 mm).

3.5 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.
B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017 as applicable.
C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

D. Frequency of Tests: Perform at least one test for every 2,000 square feet of paved area but in no case fewer than three test.
E. Prior to construction of pavements, proof roll compacted aggregate at surfaces that will be under paving.

3.6 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION 321123

SECTION 321216 - ASPHALT PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hot Mix Asphalt (HMA) Pavements

1.2 RELATED REQUIREMENTS

A. Section 321123 - Aggregate Base Courses: Aggregate base course.

1.3 REFERENCE STANDARDS

A. Mississippi Standard Specifications for Road and Bridge Construction, 2004.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with State of Mississippi Highways standard.

B. Mixing Plant: Conform to State of Mississippi Highways standard.

C. Obtain materials from same source throughout.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for paving work on public property.

1.6 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.

PART 2 PRODUCTS

2.1 MATERIALS

A. Hot Mix Asphalt (HMA): In accordance with State of Mississippi Highways standards.

B. Primer: In accordance with State of Mississippi Highways standards.

C. Tack Coat: In accordance with State of Mississippi Highways standards.

2.2 ASPHALT PAVING MIXES AND MIX DESIGN

A. Base Course: Hot Mix Asphalt (HMA), ST, 19 mm in accordance with State of Mississippi Highways standards.

B. Wearing Course: Hot Mix Asphalt (HMA), ST, 9.5 mm in accordance with State of Mississippi Highways standards.

C. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.3 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with State of Mississippi Highway standards.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

3.2 GRANULAR BASE COURSE

A. See Section 321123.

3.3 PREPARATION - PRIMER

A. Apply primer in accordance with manufacturer's instructions.

B. Apply primer on aggregate base or subbase at uniform rate of 1/3 gal/sq yd (1.5 L/sq m).

C. Use clean sand to blot excess primer.

3.4 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions.

B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 1/3 gal/sq yd (1.5 L/sq m).

3.5 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch (6 mm) measured with 10 foot (3 m) straight edge.

B. Variation from True Elevation: Within 1/2 inch (12 mm).

3.6 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for quality control.

B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

3.7 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 24 hours or until surface temperature is less than 140 degrees F (60 degrees C).

END OF SECTION

SECTION 321313 – CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete sidewalks and drives.

1.2 RELATED REQUIREMENTS

A. Section 032000 - Concrete Reinforcing.

1.3 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; 2010 (Errata 2012).

B. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

C. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.

D. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.

E. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.

F. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

1.4 SUBMITTALS

A. See Section 013300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on joint filler, admixtures, and curing compound.

PART 2 PRODUCTS

2.1 PAVING ASSEMBLIES

A. Comply with applicable requirements of ACI 301.

2.2 FORM MATERIALS

A. Form Materials: Conform to ACI 301.

2.3 REINFORCEMENT

A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 032000.

2.4 CONCRETE MATERIALS

A. Concrete: Class B, MDOT Specifications

2.5 ACCESSORIES

A. Curing Compound: ASTM C309, Type 1, Class A.

B. Joint Filler: Bituminous, 1/2-inch thick, AASHTO M-213.

C. Joint Sealant: Lion D-200, or equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.2 SUBBASE

A. See Section 321123 for construction of base course for work of this Section.

3.3 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.4 REINFORCEMENT

A. Place reinforcement as indicated.

3.5 COLD AND HOT WEATHER CONCRETING

A. Follow recommendations of ACI 305R when concreting during hot weather.

B. Follow recommendations of ACI 306R when concreting during cold weather.

C. Do not place concrete when base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.

3.6 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

D. Apply surface retarder to all exposed surfaces in accordance with manufacturer's instructions.

3.7 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Place 3/8 inch (10 mm) wide expansion joints at 40 foot (m) intervals and to separate paving from vertical surfaces and other components and in pattern indicated.

1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch (13 mm) of finished surface.
2. Secure to resist movement by wet concrete.

C. Provide scored joints as indicated.

D. Provide keyed joints as indicated.

E. Saw cut contraction joints 3/16 inch (5 mm) wide at an optimum time after finishing.

Cut 1/3 into depth of slab.

3.8 FINISHING

A. Area Paving: Light broom, texture perpendicular to pavement direction.

B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius (6 mm radius).

C. Curbs and Gutters: Light broom, texture parallel to pavement direction.

D. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.9 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4 inch (6 mm) in 10 ft (3 m).

3.10 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014500 - Quality Requirements.
   1. Provide free access to concrete operations at project site and cooperate with appointed firm.
   2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
   3. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd (76 cu m) or less of each class of concrete placed.
   1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
   2. Perform one slump test for each set of test cylinders taken.

C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.11 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian traffic over pavement for 7 days’ minimum after finishing.

END OF SECTION 321313

SECTION 329219 – TURF AND SOD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including Division 1 Specifications sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. Extent of landscape development work includes furnishing and placement of topsoil and grass.

B. Areas disturbed by grading or improvements and those areas noted on the drawings shall receive a permanent stand of warm season grass established with warranty as specified herein.

C. Subgrade Elevations: Excavation, filling and grading required to establish elevations shown on drawings are not specified in this section. Refer to earthwork sections.

1.3 DELIVERY, STORAGE AND HANDLING:

A. Sod: Time delivery so that sod will be placed within twenty-four hours after stripping. Protect sod against drying and breaking of rolled strips.

B. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site.

1.4 JOB CONDITIONS:

A. Proceed with and complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.

B. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

C. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Contracting Officer before planting.

D. Coordination with Owner: Coordinate work with Owner who will furnish watering system, trees and shrubs.

1.5 SPECIAL PROJECT WARRANTY:

A. Warranty lawns until final acceptance.

PART 2 - PRODUCTS

2.1 TOPSOIL:

A. Topsoil stockpile for reuse in landscape work. If quantity of stockpiled topsoil is insufficient, provide additional topsoil as required to complete landscape work.

B. Provide new topsoil which is fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 1" in any dimension, and other extraneous of toxic matter harmful to plant growth.

C. Obtain topsoil from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 4"; do not obtain from bogs or marshes.

2.2 GRASS MATERIALS:

A. Sod: Provide strongly rooted sod, not less than two years old, free of weeds and undesirable native grasses and machine cut to pad thickness of 3/4" (plus or minus 1/4"), excluding top growth and thatch. Provide only sod capable of vigorous growth and development when planted (viable, not dormant).

B. Provide sod of uniform pad sizes with maximum 5% deviation in either length or width. Broken pads or pads with uneven ends will not be acceptable. Sod pads incapable of supporting their own weight when suspended vertically with a firm grasp on upper 10% of pad will be rejected.

C. Provide sod composed principally of following:

1. Centipede grass (Eremochloa ophiuroides)

PART 3 - EXECUTION

3.1 PREPARATION:

A. Preparation of Planting Soil:

1. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.

2. Mix specified fertilizers with top soil at the rate of thirty (30) pounds per 1,000 square feet of lawn area. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.

B. Preparation for Planting Lawns:

1. Loosen subgrade of lawn areas to a minimum depth of 4". Remove stones over 1-1/2" in any dimension and sticks, roots, rubbish and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation.
2. Spread top soil to minimum depth of 2" required to meet lines, grades and elevations shown, after light rolling and natural settlement.

C. Preparation of Unchanged Grades: Where lawns are to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare soil for lawn planting as follows: Till to a depth of not less than 6"; remove high areas and fill in depressions; till soil to a homogeneous mixture of fine texture, free of lumps, clods, stones, roots and other extraneous matter.

D. Prior to preparation of unchanged areas, remove existing grass, vegetation and turf. Dispose of such material outside of Owner's property; do not turn over into soil being prepared for lawns.

E. Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.

F. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.

G. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.3 RECONDITIONING EXISTING LAWNS:

A. Recondition existing lawn areas damaged by contractor's operations including storage of materials and equipment and movement of vehicles. Also recondition existing lawn areas where minor regrading is required.

B. Provide fertilizer, seed and soil amendments as specified for new lawns and as required to provide a satisfactorily reconditioned lawn. Provide new topsoil as required to fill low spots and meet new finish grades.

C. Provide fertilizer, sod and soil amendments as specified for new lawns and as required to provide a satisfactorily reconditioned lawn. Provide new topsoil as required to fill low spots and meet new finish grades.

D. Cultivate bare and compacted areas thoroughly to provide a satisfactory, planting bed.

E. Remove diseased and unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from contractor's operations including oil drippings, stone, gravel and other loose building materials.

F. Where substantial lawn remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps and cultivate soil, fertilize, and seed. Remove weeds before seeding or if extensive, apply selective chemical weed killers as required. Apply a seedbed mulch, if required, to maintain moist conditions.

G. Water newly planted areas and keep moist until new grass is established.

3.4 CLEAN-UP AND PROTECTION:

A. During landscape work, keep pavements clean and work area in an orderly condition.

B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

3.5 MAINTENANCE:

A. Begin maintenance immediately after planting.

B. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

3.6 INSPECTION AND ACCEPTANCE:

A. When landscape work is completed, including maintenance, Contracting Officer will, upon request, make an inspection to determine acceptability.

B. When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until reinspected by Architect and found to be acceptable. Remove rejected grass and materials promptly from project site.

3.7 PROJECT COMPLETION:

A. Maintenance: Begin immediately after each plant and/or seeding is planted and continues until planting has passed final inspection and acceptance. Includes watering, weeding, cultivating, mowing, removal of dead materials, resetting plants to proper grades and other necessary operations.

B. Mowing shall begin twenty-one days after planting and continue every fourteen days until Final acceptance. Perform mowing with rotary or reel mowers - no bushhogs or flail mowers allowed.

C. Provide protection to lawn areas. Repair damage resulting from construction operations promptly.

D. Maintenance by Owner: Owner will provide adequate maintenance during the guarantee period, however, Contractor shall fully explain the watering, and mowing needs of the work to the Owner in writing, submitted with the closeout documents.

E. Contractor is responsible for planting until the guarantee period is up, unless the Owner is grossly negligent in his maintenance of the work.

F. Maintenance by Owner shall not begin until final acceptance.

3.8 GUARANTEE, INSPECTION AND ACCEPTANCE:

A. Guarantee: Period - 60 days, BEGINNING at the time of FINAL acceptance of the project.

B. Grass shall be alive, in satisfactory condition, and growth for each specified species of plant at the end of the guarantee period, unless the plant material has suffered from direct damage or negligence by the Owner.

C. Grass damaged directly or indirectly as a result of the Work prior to final acceptance of the complete project, shall be replaced.

D. Final Acceptance: Where seeding is included, will not be made for a minimum period of 21 calendar days after permanent grass seeding and until seed have germinated and are growing in a satisfactory stand. A satisfactory stand of grass is a cover of living grass (limited to the species of seed, springs or sod which is expected to germinate in the current season), in which no gaps greater than 4 inches occur.

E. If an acceptable stand of grass is not established which 45 calendar days from date of planting, the area shall be reseeded or repaired (at no cost to the Owner) until an acceptable stand is established. Deficiencies in the work must be corrected before final acceptance will be made.

END OF SECTION 329219