

MDOT Use Only

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SM No. CBWO2198170031

PROPOSAL AND CONTRACT DOCUMENTS

FOR THE CONSTRUCTION OF
(EXEMPT)

13

A single Contract for construction necessary to renovate the Rest Area Buildings on I-55 Northbound near Hernando, known as State Project No. BWO-2198-17(003) / 502016301, in the County of Desoto, State of Mississippi.

Project Completion: August 31, 2011

NOTICE

**BIDDERS MUST PURCHASE A BOUND PROPOSAL
FROM MDOT CONTRACT ADMINISTRATION DIVISION
TO BID THIS PROJECT.**

Electronic addendum updates will be posted on www.gomdot.com

**SECTION 900
OF THE CURRENT
(2004) STANDARD SPECIFICATIONS
FOR ROAD AND BRIDGE CONSTRUCTION
MISSISSIPPI DEPARTMENT OF TRANSPORTATION
JACKSON, MISSISSIPPI**

**BIDDER CHECK LIST
(FOR INFORMATION ONLY)**

- _____ All unit prices and item totals have been entered in accordance with Subsection 102.06 of the Mississippi Standard Specifications for Road and Bridge Construction.
- _____ If the bid sheets were prepared using the Electronic Bid System, proposal sheets have been stapled and inserted into the proposal package.
- _____ First sheet of SECTION 905--PROPOSAL has been completed.
- _____ Second sheet of SECTION 905--PROPOSAL has been completed and signed.
- _____ Addenda, if any, have been acknowledged. Second sheet of Section 905 listing the addendum number has been substituted for the original second sheet of Section 905. Substituted second sheet of Section 905 has been properly completed, signed, and added to the proposal.
- _____ DBE/WBE percentage, when required by contract, has been entered on last sheet of the bid sheets of SECTION 905 - PROPOSAL.
- _____ Form OCR-485, when required by contract, has been completed and signed.
- _____ The last sheet of the bid sheets of SECTION 905--PROPOSAL has been signed.
- _____ Combination Bid Proposal of SECTION 905--PROPOSAL has been completed for each project which is to be considered in combination (See Subsection 102.11).
- _____ Equal Opportunity Clause Certification, when included in contract, has been completed and signed.
- _____ The Certification regarding Non-Collusion, Debarment and Suspension, etc. has been executed in duplicate.
- _____ A certified check, cashier's check or bid bond payable to the State of Mississippi in the principal amount of 5% of the bid has been included with project number identified on same. A bid bond has been signed by the bidder and has also been signed or countersigned by a Mississippi Agent or Qualified Nonresident Agent for the Surety with Power of Attorney attached.
- _____ Non-resident Bidders: ON STATE FUNDED PROJECTS ONLY, a copy of the current laws regarding any preference for local Contractors from State wherein domiciled has been included. See Subsection 103.01, Mississippi Standard Specifications for Road and Bridge Construction, and Section 31-7-47, MCA, 1972 regarding this matter.

Return the proposal and contract documents in its entirety in a sealed envelope. DO NOT remove any part of the contract documents; exception - an addendum requires substitution of second sheet of Section 905. A stripped proposal is considered as an irregular bid and will be rejected.

Failure to complete any or all of the applicable requirements will be cause for the proposal to be considered irregular.

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ON I-55 (NORTHBOUND) NEAR HERNANDO
IN DESOTO COUNTY, MISSISSIPPI**

PROJECT NUMBER: BWO-2198-17(003) 502016

DATE: AUGUST 2, 2010

DESCRIPTION A: This Work shall consist of minor site work and all construction work necessary to renovate the Rest Area Buildings on I-55 Northbound near Hernando in Desoto County, Mississippi, in accordance with these Specifications and conforming to the Drawings.

It is the intention of these Specifications to provide the necessary items and instruction for a complete building including all code compliance. Omission of items or instruction necessary or considered standard good practice for the proper installation and construction of the building shall not relieve the Contractor of furnishing and installing such items and conforming to the building codes having jurisdiction.

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(REVISIONS TO THE ABOVE WILL BE INDICATED ON THE SECOND SHEET
OF SECTION 905 AS ADDENDA)

END OF SECTION

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WORKING NUMBER	SHEET NUMBER	DESCRIPTION
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MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**ADVERTISEMENT FOR BIDS
SECTION 00 11 13**

Sealed bids will be received by the Mississippi Transportation Commission in the Office of the Contract Administration Engineer, Room 1013, Mississippi Department of Transportation Administration Building, 401 North West Street, Jackson, Mississippi, until 10:00 o'clock A.M., Tuesday, September 28, 2010; and shortly thereafter publicly opened on the Sixth Floor for:

A single Contract for construction necessary to renovate the Rest Area Buildings on I-55 Northbound near Hernando in Desoto County, Mississippi, known as Project No. BWO-2198-17(003) 502016.

The attention of bidders is directed to the Contract Provisions governing selection and employment of labor. Minimum wage rates have been predetermined by the Secretary of Labor and are subject to Public Law 87-581, Work Hours Act of 1962, as set forth in the Contract Provisions.

The Mississippi Department of Transportation hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, religion or national origin in consideration for an award.

Drawings and Specifications are on file in the offices of the Mississippi Department of Transportation at Batesville and Jackson.

Bid or specimen proposals must be acquired from the Contract Administration Engineer Division, First Floor of Mississippi Department of Transportation Office Building, Telephone (601) 359-7744. These proposals are available at a cost of Ten Dollars (\$10.00) per proposal.

Plans may be acquired on a cost per sheet basis from MDOT Shop Complex, 2567 North West Street, Building C, Room 114, Jackson, Mississippi 39216, Telephone (601) 359-7460, FAX (601) 359-7461, E-mail plans@mdot.state.ms.us.

Bid Bond, signed or countersigned by a Mississippi Agent or Qualified Non-Resident Agent, with Power of Attorney attached or on file with the Contract Administration Engineer of the Department, a Cashier's check or Certified Check for five (5%) percent of bid, payable to STATE OF MISSISSIPPI, must accompany each proposal.

The attention of bidders is directed to the provisions of Document 00 21 13 - Instructions to Bidders pertaining to irregular proposals and rejection of bids.

(SPWP)

LARRY L."BUTCH" BROWN
EXECUTIVE DIRECTOR

END OF SECTION

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.01 QUESTIONS

- A. General questions should be directed to the Project Engineer. Should a Bidder find Discrepancies in or omissions from the Drawings or Project Manual, or be in doubt as to their meaning, the Bidder should immediately notify the Project Engineer. The Contract Administration Engineer will send the Project Engineer's written instruction(s) or interpretation(s) to all known holders of the Documents. Neither the Owner, nor the Project Engineer, will be responsible for any oral instruction or interpretation.

1.02 BIDDER'S QUALIFICATIONS

- A. Certificate of Responsibility: 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. Bid Under \$50,000: If a Bidder submits a bid not exceeding \$50,000, no Certificate of Responsibility number is required; however, a notation stating the bid does not exceed \$50,000 must appear on the face of the envelope, or a Certificate of Responsibility number.
- C. Bid Over \$50,000: Each Bidder submitting a bid in excess of \$50,000 must show its Certificate of Responsibility number on the bid and on the face of the envelope containing the bid.
- D. Joint Venture Bid: When multiple Contractors submit a joint venture bid in excess of \$50,000, 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.

1.03 NON-RESIDENT BIDDER

- A. When a non-resident Bidder (a Contractor whose principal place of Business is outside the State of Mississippi) submits a bid for a Mississippi public works project, one of the following is required and shall be submitted with the Proposal Form:
- B. Copy of Law: If the non-resident Bidder's state has a resident Bidder preference law, a copy of that law shall be submitted with the Proposal Form.
- C. Statement: If the state has no such law then a statement indicating the State of (Name of State) has no resident Contractor preference law shall be submitted with the Proposal Form.

1.04 DISQUALIFICATION OF BIDDER

- A. A Bidder may be disqualified for having defaulted on a previous Contract.

1.05 CONDITIONS OF WORK

- A. Each Bidder must fully inform himself of all conditions relating to the construction of the Project and employment of labor thereon. Failure to do so will not relieve a successful Bidder of obligations to furnish all material and labor necessary to carry out the provisions of the Contract. Insofar as possible, the Bidder must employ methods, or means, which will not cause interruption of, or interference with, the work of any other Bidder or Contractor.

1.06 EXAMINATION OF SITE

- A. All Bidders, including the general Contractor and Subcontractors shall visit the building site, compare the Drawings and Project Manual with any work in place and informed of all conditions. 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 Drawings and Project Manual (Proposal) without additional cost to the Owner.

1.07 LAWS AND REGULATIONS

- A. The Bidder's attention is directed to the fact that all applicable Mississippi state laws, rules and regulations of all authorities having jurisdiction over construction of the Project apply to the Contract.

1.08 OBLIGATION OF BIDDER

- A. At the bid opening, each Bidder will be presumed to have inspected the site, read and become thoroughly familiar with the Drawings and the Project Manual (Proposal) including all addenda.

1.09 BID DOCUMENT

- A. The amount for Bid Document (Proposal) is indicated in the advertisement for Bids. Selected plan rooms will be issued one set of documents without charge.

1.10 METHOD OF BIDDING

- A. Lump sum, single bids received on a general contract will include general, mechanical and electrical construction and all work shown on Drawings or specified in the Project Manual (Proposal).

1.11 PROPOSAL FORMS

- A. The Bidder shall make all proposals on forms provided and shall fill all applicable blank spaces without interlineation or alteration and must not contain recapitulation of the work to be done. No oral or telegraphic proposals will be considered.

1.12 TIME OF COMPLETION

- A. The Bidder shall agree to commence work on, or before a date specified in a written *NOTICE TO PROCEED* and fully complete the Project within the calendar days indicated on the Proposal Form.

1.13 SUBSTITUTIONS

- A. No substitutions, qualifications or redefining of the Specification requirements are allowed to be marked on the Proposal Form, unless specifically required by the Bid Documents. Refer to Section 01 62 15 entitled *Product Options and Substitution Procedures* which covers procedures after the award of Contract.

1.14 ADDENDA

- A. Any addenda to the Drawings or Project Manual issued before or during the time of bidding shall be included in the proposal and become a part of the Contract

1.15 BIDDER IDENTIFICATION

- A. Signature: The Proposal Form shall be signed, by any individual authorized to enter into a binding agreement for the Business making the bid proposal.
- B. Name of Business: The name appearing on the Proposal Form should be the same as the name appearing in the current Mississippi State Board of Contractors Roster.
- C. Legal Address: The address appearing on the Proposal Form should be the same address appearing in the current Mississippi State Board of Contractors Roster.
- D. Certificate of Responsibility Number(s): The Certificate of Responsibility Number(s) appearing on the Proposal Form should be the same number appearing in the current Mississippi State Board of Contractors Roster.

1.16 BID SECURITY

- A. The Bid Security shall be in the form of a Bid Bond, or a Certified Check:
 - 1. Bid Bond: The Bidder may submit a Bid Bond made out to the STATE OF MISSISSIPPI by a Surety licensed in Mississippi in the amount of five percent (5%) of the base bid. The Bidder, the Surety and a Mississippi Agent or Qualified Non-Resident Agent, with Power of Attorney attached or on file with the Contract Administration Engineer, shall duly execute the Bid Bond. The Project number shall be identified on the Bid Bond. (No standard form is required for the Bid Bond.)
 - 2. Certified Check: The Bidder may submit a certified check made out to the STATE OF MISSISSIPPI in the amount of five percent (5%) of the base bid. The Project number shall be identified on the Certified check. All checks received from Bidders will be returned upon request, unless a Bidder is one (1) of the three (3) apparent low Bidders. The three (3) apparent low Bidder's checks will be held for forty-five (45) days, unless a Contract is awarded and executed in less time.

1.17 POWER OF ATTORNEY

- A. Each bid security must be accompanied by an appropriate Power of attorney.

1.18 SUBMITTAL

- A. This Proposal, which includes the Bid Forms and Specifications, must have all applicable parts completely filled out and delivered in its entirety to the address indicated on the Advertisement for Bids prior to the time and date stated.
- B. DO NOT remove any part of the Contract Documents (Exception – An addendum requires substitution of second sheet of Section 905 (*Proposal Forms*)).

- C. Failure to complete all of the applicable requirements may be cause for the Proposal to be considered irregular.
- D. A STRIPPED PROPOSAL THAT IS NOT RE-ASSEMBLED IN ITS CORRECT ORDER IS CONSIDERED AS AN IRREGULAR BID AND WILL BE REJECTED.
- E. The Proposal shall be submitted and sealed in the opaque envelope provided and mailed or hand-delivered.
 - 1. If the Bid is mailed, the bid envelope shall be placed inside a second envelope to prevent inadvertent premature opening of the Proposal. The second mailing envelope shall have the notations "SEALED BID ENCLOSED" on the face thereof.

1.19 MODIFICATION TO BID

- A. A Bidder may **not** modify the bid prior to the scheduled closing time indicated in the Advertisement for Bids in the following manner:
 - 1. Notification on Envelope: A modification may NOT be written on the outside of the sealed envelope containing the bid.
 - 2. Facsimile: A facsimile (fax) will NOT be acceptable.

1.20 WITHDRAWAL OF BID

- A. Any bid may be withdrawn prior to the scheduled time for opening of bids. However, bids may not be withdrawn until sixty (60) days after bid opening.

1.21 OPENING OF BIDS

- A. Bids will be publicly opened shortly after the time stated in the advertisement for Bids. Bidder representatives are invited; however, attendance is not mandatory.

1.22 IRREGULARITIES

- A. The omission of any information requested on the Proposal Form may be considered as an informality, or irregularity, by the awarding public body when in their opinion the omitted information does not alter the amounts contained in the submitted bid proposal, or place other Bidders at a disadvantage.

1.23 PROTEST

- A. Any protest must be delivered in writing to the Owner within twenty-four (24) hours after the bid opening.

1.24 ERRORS

- A. Any claim of error and request for release from bid must be delivered in writing to the Owner within twenty-four (24) hours after the bid opening. The Bidder shall provide sufficient documentation with the written request clearly proving an error was made.

1.25 AWARD OF CONTRACT

- A. The Owner reserves the right to reject any, or all bids. A Contract will be awarded on the basis of the low base bid, or low combination of base bid and those alternates selected by the Owner in any order determined to be in the best interest of the Mississippi Transportation Commission and which produces a total within available funds.

1.26 FAILURE TO ENTER INTO A CONTRACT

- A. The Bidder shall forfeit the Bid Security to the Owner as liquidated damages for failure, or refusal, to execute and deliver the Contract, Bond and Certificate of Insurance within the required ten (10) days after notice of the acceptance of the bid.

1.27 SECURITY FOR FAITHFUL PERFORMANCE

- A. Simultaneously, with delivery of the executed Contract, the Contractor shall furnish a Surety Bond, or Bonds, as security for faithful performance, the payment of all persons performing labor on the project and furnishing materials in connection with this Contract. The Surety on such Bond or Bonds shall be a duly authorized surety company satisfactory to the Owner and meeting all of the following requirements:

1. Licensed at the time of award by the State of Mississippi's Commissioner of Insurance for the purpose of providing surety.
2. Listed at the time of award in the Department of the Treasury's Federal Register as a company holding certificates of authority as acceptable sureties on Federal Bonds, commonly referred to as the Treasury List.
3. All Bonds shall be executed on the form provided in the Project Manual under Section 00 61 00 entitled *Bond Forms*.
4. A Mississippi Agent or Qualified Non-Resident Agent with Power of Attorney attached or on file with the Contract Administration Engineer, shall countersign all Bonds with the name and address typed, or lettered legibly.
5. All Bonds must be accompanied by an appropriate Power of Attorney.

1.28 BIDDER'S CHECKLIST

A. PROPOSAL FORM

1. Base Bid
() Write in the amount of the base bid in numbers.
2. Alternates
() Write in each alternates amount in words and numbers.
3. Certification Form (State Non-Collusion Certificate)
() Certification (regarding Non-Collusion, Debarment and Suspension, etc.) Form has been executed in duplicate.
4. Acceptance
() Proposal is signed by authorized person.
() Name of Business as it appears in the current Mississippi State Board of Contractors Roster.
() Legal address of the business listed above.
() Correct Certificate of Responsibility Number(s) as it appears in the current Mississippi State Board of Contractors Roster.

5. Certificate of Responsibility Number(s)
 Base Bid is under \$50,000 and no number is required.
 Base Bid is under \$50,000 and the statement "bid does not exceed \$50,000" is on the outside of the sealed envelope.
 Base Bid is over \$50,000 and number is required.
 Joint Venture and *joint venture* number is required.
Or
 Joint Venture participants' numbers are required.

B. BID SECURITY

1. Bid Bond
 Included Bid Bond payable to the STATE OF MISSISSIPPI with Project number identified thereon,
Or
 Included Certified Check payable to the STATE OF MISSISSIPPI with Project number identified thereon.
2. Power Of Attorney
 Included Power of Attorney

C. NON-RESIDENT BIDDER

1. Preference Law
 Attached a Copy of Non-Resident Bidder's Preference Law
Or
 Attached a Statement

1.29 BIDDER'S CONTACT LIST

- A. Proposal and Contract Documents: If the Bidder has any questions pertaining to the following specific areas of the Documents, please direct them to the following individuals:

- | | | |
|--|---|----------------|
| 1. Additional Proposals | Emma Taylor – Contract Administration | (601) 359-7744 |
| 2. Additional Prints | Clint Wells – MDOT Plans Print Shop | (601) 359-7460 |
| 3. Bid Forms | B.B. House – Contract Admin. Engineer | (601) 359-7730 |
| 4. Specifications | Richard Chisolm – Specifications Engineer | (601) 359-7301 |
| 5. Drawings | Richard Chisolm – Specifications Engineer | (601) 359-7301 |
| 6. Bidder's List & Specimen Proposals are available online at: | | |

<http://www.gomdot.com/Applications/BidSystem/Home.aspx>

PART 2 - PRODUCTS & PART 3 - EXECUTION (Not Used)

END OF SECTION

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS
SECTION 00 22 13

PART 1 - GENERAL

1.01 **WORK IN PROXIMITY OF HIGH VOLTAGE POWER LINES:** Bidders are hereby advised of Section 45-15-1, et seq., Mississippi Code of 1972, regarding the performance of work in the proximity of high voltage overhead power lines. It is the Contractor's responsibility to comply with those statutory requirements.

1.02 **AGENCY, COMMISSION AND OFFICER NAME CHANGES**

- A. Whenever the term "Mississippi State Highway Department", the word "Department", or variations thereof meaning the Mississippi State Highway Department appears in the plans, proposal, contract documents, and specifications for highway construction projects, in accordance with the laws of the State of Mississippi, it shall mean the "Mississippi Department of Transportation.
- B. Whenever the term "Mississippi State Highway Commission", the word "Commission", or variations thereof meaning the Mississippi State Highway Commission appears in the plans, proposal, contract documents, and specifications for highway construction projects, in accordance with the laws of the State of Mississippi, it shall mean the "Mississippi Transportation Commission".
- C. Whenever the term "Director", or variations thereof meaning the Chief Administrative Officer of the State Highway Department appears in the plans, proposal, contract documents, and specifications for highway construction projects, in accordance with the laws of the State of Mississippi, it shall mean the "Executive Director of the Mississippi Department of Transportation."

1.03 **COOPERATION BETWEEN CONTRACTORS**

A. The bidder's attention is hereby called to Subsection 105.07, Cooperation Between Contractors, of the 2004 Mississippi Standard Specifications for Road and Bridge Construction.

- 1. The Bidder is advised that this project has Projects that adjoins / incorporates it. They are as follows:

STP/IM-0055-04(091) / 105575
(Site Improvements to the Desoto County Rest Area on I-55, Desoto County)

IM-0055-04(080) / 104412
(Milling and Overlaying on I-55 from 2.3 miles North of the Tate / Desoto County Line to just South of Goodman Road).

- 2. The Bidder is advised that other contractors will be working in an adjacent area to this Project and is advised to cooperate with other contractors in all respects and coordinate construction with the contractors of the adjacent projects.

B. The Contractor shall cooperate in all respects and shall coordinate the construction of this Project with the Contractors of the adjoining Projects. **The Contractor will not be allowed to work on the grounds outside of the Rest Area Building until March 1, 2011.** And should consider this restriction when scheduling work activities. Should this

restriction be lifted earlier than the indicated date, the Engineer will advise the Contractor in writing.

- C. Each Contractor's Work shall be arranged such that the placement and disposal of the materials and equipment being used shall not interfere with the operations of the other Contractor. Each Contractor shall join their Work with others in an acceptable manner and perform it in the sequence of the established schedule.
- D. Each Contractor involved shall assume all liability, financial and otherwise, in connection with the Contracts and shall protect and save harmless the Commission, Department or any of its officers or employees from damages or claims that may arise because of inconvenience, delay, or loss experienced because of the presence and operations of the other Contractor(s) working within the same Contract limits.

1.04 MAINTENANCE OF TRAFFIC

Bidders are hereby advised that the traffic control devices necessary to close each Rest Area site will be provided and erected by MDOT Maintenance personnel. The Contractor shall maintain, clean, repair and replace as necessary these devices throughout the life of the Project. Payment for completing this Work will be included in the lump sum price

1.05 PLANT PEST QUARANTINES INFORMATION: AT the request of the U. S. Department of Agriculture, Plant Pest Control Information Concerning Domestic Quarantines is cited as follows:

- A. The entire state of Mississippi has been quarantined for the Imported Fire Ants. Soil and soil-moving equipment operating in the state will be subject to plant quarantine regulations. In general, these regulations provide for cleaning soil from equipment before it is moved from the state. Complete information may be secured from the State of Mississippi Department of Agriculture and commerce, Bureau of Plant Industry, P.O. Box 5207, Mississippi State, Mississippi 39762-5207 – Telephone 325-3390.

IMPORTED FIRE AN QUARANTINES

THE FOLLOWING REGULATED ARTICLES REQUIRE A CERTIFICATE OR PERMIT FOR MOVEMENT:

1. Soil, separately or with other things, except soil samples shipped to approved laboratories*. Potting soil is exempt, if commercially prepared, packaged and shipped in original containers.
 2. Plants with roots with soil attached, except houseplants maintained indoors and not for sale.
 3. Grass sod.
 4. Baled hay and straw that have been stored in contact with the soil.
 5. Used soil-moving equipment.
 6. Any other products, articles, or means of conveyance of any character whatsoever not covered by the above, when it is determined by an inspector that they present a hazard of spread of the imported fire ant and the person in possession thereof has been so notified.
- Information as to designated laboratories, facilities, gins, oil mills, and processing plants may be obtained from an inspector. Consult your State or Federal plant protection Inspector or your county agent for assistance regarding exact areas under regulation and requirements for moving regulated articles. For detailed information see 7 CFR 301.81 for quarantine and regulations.

1.06 **FEDERAL BRIDGE FORMULA**

- A. Bidders are hereby advised that Federal Highway Administration Publication No. FHWA-MC-94-007, **BRIDGE FORMULA WEIGHTS**, dated January 1994, is made a part of this contract when applicable.

Prior to the preconstruction conference, the Contractor shall advise the Engineer, in writing, what materials, if any, will be delivered to the jobsite via Interstate route(s).

Copies of the **BRIDGE FORMULA WEIGHTS** publication may be obtained by contacting:

Federal Highway Administration
400 7th Street, SW
Washington, DC 20590
(202) 366-2212
or

http://ops.fhwa.dot.gov/freight/sw/brdgcalt/calc_page.htm

1.07 **FUEL TAX APPLICABILITY TO BIDDERS AND CONTRACTORS:** Bidders are hereby advised that the Mississippi Code of 1972, section 27-55-301 et seq. requires the use of taxed diesel fuel used in performing contracts for construction, reconstruction, maintenance, or repair where such contracts are entered into with the State of Mississippi, any agency, department, institution, or political subdivision thereof. Section 27-55-313 reads as follows:

- A. A tax at the rate of Eighteen Cents (18¢) per gallon until the date specified in Section 65-39-35, and Fourteen and Three-fourths Cents (14.75¢) per gallon thereafter, is levied upon any delivering other motor fuel to a retail dealer, user or any other person for use in propelling motor vehicles on the highways of this state and/or for the privilege of engaging in the business of selling and delivering other motor fuel to any other person who purchases or uses other motor fuel in performing contracts for construction, reconstruction, maintenance or repairs, where such contracts are entered into with the State of Mississippi, any political subdivision of the State of Mississippi, or any department, agency or institution of the State of Mississippi or any political subdivision thereof.
- B. A tax at the rate described in this section is hereby levied upon any person who purchases, receives or acquires any other motor fuel upon which the tax has not been paid when such other motor fuel is used for any taxable purpose as set forth in this article. A tax at the rate described in this section is hereby levied upon any retailer who purchases, receives, or acquires any other motor fuel upon which the tax has not been paid when such other motor fuel is sold for use or used for any taxable purpose as set forth in this article.
- C. The commission may adopt rules and regulations providing for the issuance of permits to persons performing contracts as hereinabove provided, allowing or requiring said persons to purchase other motor fuel for use in performing said contracts without the payment to the distributor of the tax imposed hereunder, and providing for such persons to report and pay such tax directly to the commission in instances where the commission determines that such payment will facilitate and expedite the collection of the tax which may be due on such purchases by the permittee. The distributor is relieved of collecting and remitting the taxes specified hereunder, when furnished with a copy of said permit, and the person holding the permit shall become liable for such taxes instead of the seller,

and the full enforcement provisions of this article shall apply in the collection of the tax from the permittee. The commission may require said person to execute and file with the commission a good and valid bond in a surety company authorized to do business in this state, or with sufficient sureties to be approved by the commission, conditioned that all taxes which may accrue to the State of Mississippi under the provisions of this chapter will be paid when due. Provided further, the commission may accept a bond filed under the provision of Section 27-65-21, when such bond is conditioned upon the payment of taxes hereunder.

- D. Any person who shall, while not licensed as a distributor of other motor fuel or retail dealer, sell or deliver to other persons any other motor fuel upon which the tax levied by this article has not been paid shall be liable for the tax and penalties imposed by this article if the person selling or delivering such fuel knows or has reason to know that it will be used or sold for a taxable purpose.
- E. A retail dealer may, with the approval of the commission, sell or dispense tax free other motor fuel. Said retailer shall comply with all rules and regulations pertaining to retailers selling or dispensing tax free other motor fuel. The commission may require said retailer to execute and file with the commission a good and valid bond, in a surety company authorized to do business in the state, conditioned that all taxes which may accrue to the State of Mississippi under the provisions of this chapter will be paid when due. Storage tanks or pumps located at all such retail dealers' place of business which are used or to be used in storing and dispensing kerosene for lamps, stoves, heaters and domestic purposes shall bear the label "not for highway use" of letters of not less than four (4) inches in height.
- F. When other motor fuel on which the full tax under this section has been paid has been Delivered to a retail dealer for sale or to a consumer for use as motor fuel for operating a motor vehicle upon the highways of this state, the distributor of other motor fuel who made said tax payments and deliveries may pick up and return to his bulk storage facility any portion of such other motor fuel which may be unused and claim credit for the amount of tax paid on the quantity so returned. In order to claim credit for the tax on the quantity of other motor fuel to be so returned, such distributor shall notify the commission of his desire to so return it. Such transaction shall only be made under the supervision of the commission.
- G. When dyed diesel fuel and clear diesel fuel are accidentally mixed and the mixture is converted to nonhighway use diesel fuel, the distributor or other person owning such mixture may claim credit for the highway portion of the tax paid on such mixture. Proof satisfactory to the distributor or other person owning such mixture shall notify the commission immediately after gaining knowledge that such accidental mixture has occurred.

Bidders/Contractors are required to comply with the provisions of said section, and any revisions or amendments thereto, for all work performed under this contract; and be able to substantiate compliance when requested by the Mississippi Department of Transportation or the Mississippi State Tax Commission.

1.08 PROMPT PAYMENT

- A. Bidders are hereby advised that the Prime Contractor must pay their subcontractor(s) for satisfactory performance of their contracts no later than a specific number of days from receipt of payment from the Department. Therefore, Prime Contractors are hereby advised of the following:

1. Within 15 calendar days after receiving payment from the Department for work satisfactorily performed, the Prime Contractor shall make prompt payment to all sub-contractors or material suppliers for all monies due.
2. Within 15 calendar days after receiving payment from the Department for work satisfactorily completed, the Prime Contractor shall promptly return all retainage monies due to all sub-contractors or material suppliers.
3. The Engineer will have the authority to suspend the Work wholly or in part and to withhold payments because of the Contractor's failure to make prompt payment within 15 calendar days as required above, or failure to submit the required OCR-484 Form, "Certification of Payments to Subcontractors", which is also designed to comply with prompt payment requirements.

1.09 ALTERATIONS IN BIDDING PROCESS

- A. Bidders are hereby advised that they may either use the traditional method of entering their Bid information by hand on Section 905--Proposal or may insert printed information obtained from the available Electronic Bid System (EBS).
- B. It is the responsibility of every bidder to check for any addendum or modification to the contract document(s) for which they intend to submit a response. It shall be the bidder's responsibility to be sure they are in receipt of all addenda, pre-bid conference information, and/or questions and answers provided at, or subsequent to, the pre-bid conference, if any are issued.

The Mississippi Transportation Commission assumes no responsibility for defects, irregularities or other problems caused by the use of electronic media. Operation of this electronic media is done at the sole risk of the user.

1.10 CONTRACT TIME

- E. It is anticipated that the Notice to Award will be issued by not later than October 12, 2010, and the date for Notice to Proceed and Beginning of Contract Time will be November 12, 2010.
- F. The calendar date for completion of this Contract shall be August 31, 2011 which date or extended date as provided in Article 8 – TIME shall be the end of contract time.
- G. A Construction Schedule as described in Section 01 32 00-Construction Progress Documentation of these Specifications will be required.

1.11 SUBCONTRACTING

- A. The Bidder is specifically advised that any person, firm or other party to whom it proposes to award a subcontract must be acceptable to the Owner. The total allowable subcontract amount shall not exceed **sixty percent (60%) of the Contract Sum**, excluding the value of any "Specialty Items" listed below:
 1. Specialty Items:
 - a. Masonry Restoration
 - b. Standing Seam Roofing & Sheet Metal Items
 - c. Plumbing Items
 - d. Heating, Ventilating and Air Conditioning Items
 - e. Electrical Items

These items are not to be confused with Division 10 – Specialties of the Specifications.

PART 2 – PRODUCTS (Not Used)
PART 3 – EXECUTION (Not Used)

END OF SECTION

PROPOSAL
SECTION 00 42 00

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Refer to DIVISION 50, SECTION 905 PROPOSAL for the Proposal Form. The form is bound in the back of the Project Manual.
- B. Comply with requirements in Section 00 21 13 .Instructions to Bidders.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

**BID SECURITY FORM
SECTION 00 43 13**

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Refer to DIVISION 50, BOND FORM, for Bid Bond Form. The form is bound in the back of the Project Manual.
- B. Comply with requirements in Section 00 21 13 - Instructions to Bidders.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

STATE NON-COLLUSION CERTIFICATE
SECTION 00 45 19

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Refer to DIVISION 50, CERTIFICATION, for State Non-Collusion Certificate Form. The form is bound in the back of the Project Manual.
- B. Comply with requirements in Section 00 21 13 .Instructions to Bidders.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

STATE BOARD OF CONTRACTORS REQUIREMENTS
SECTION 00 45 47

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Refer to DIVISION 50, CERTIFICATE, for State Board of Contractors Requirements Certificate Form. The form is bound in the back of the Project Manual.
- B. Comply with requirements in Section 00 21 13 .Instructions to Bidders.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

AGREEMENT
SECTION 00 52 00

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Refer to DIVISION 50, SECTION 902 CONTRACT FORM, for Contract (Agreement) Form. The form is bound in the back of the Project Manual.
- B. Comply with requirements in Section 00 21 13 - Instructions to Bidders.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 00 61 00

BOND FORMS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Refer to DIVISION 50, SECTION 903 CONTRACT BOND FORM, for Contract Bond Form. The form is bound in the back of the Project Manual.
- B. Comply with requirements in Section 00 21 13 - Instructions to Bidders.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

GENERAL CONDITIONS
SECTION 00 72 00

PART 1- GENERAL

1.01 DESCRIPTION.

- A. The American Institute of Architects **AIA DOCUMENT A201-2007**, "General Conditions of the Contract for Construction", 2007, Sixteenth Edition, Articles 1 through 15 inclusive, except as may be added to or modified herein, is hereby made a part of the Contract Documents. For brevity, **AIA DOCUMENT A201-2007** is also referred to in the Contract documents as the "General Conditions".
- B. All persons intending to provide goods or services in connection with this Work are required to read and understand the referenced document prior to proceeding.
- C. See Document 00800-*Supplementary Conditions*. In the event of a conflict between the **AIA DOCUMENT A201-2007**, "General Conditions of the Contract for Construction", 2007, Sixteenth Edition and Document 00800-*Supplementary Conditions*, Document 00800 shall control even if the conflicting provision in the **AIA DOCUMENT A201-2007** "General Conditions of the Contract for Construction" is not expressly deleted or revised by reference in Document 00800.

END OF SECTION

AIA[®] Document A201[™] – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

RENOVATE REST AREA BUILDINGS ON I-55 (NORTHBOUND) NEAR
HERNANDO IN DESOTO COUNTY, MISSISSIPPI

BWO-2198-17(003).502016

THE OWNER:

(Name, legal status and address)

THE ARCHITECT:

(Name, legal status and address)

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14	TERMINATION OR SUSPENSION OF THE CONTRACT
15	CLAIMS AND DISPUTES

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

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

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and

completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

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

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the

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Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount

for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, 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 Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or

encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .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.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

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

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment

property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by

such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

Additions and Deletions Report for AIA[®] Document A201[™] – 2007

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

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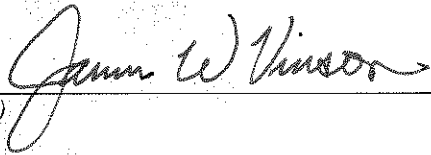
RENOVATE REST AREA BUILDINGS ON I-55 (NORTHBOUND) NEAR HERNANDO IN DESOTO COUNTY,
MISSISSIPPI

BWO-2198-17(003) 502016

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, JAMES W VINSON, AIA, CSI, CDT, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 11:02:50 on 08/03/2010 under Order No. 3861641932_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2007 - General Conditions of the Contract for Construction, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.



(Signed)

MOOT Architect

(Title)

August 2, 2010

(Dated)

SUPPLEMENTARY CONDITIONS
SECTION 00 73 00

SUMMARY

1.01 DESCRIPTION

- A. **Owner:** These supplements are necessary because the Owner is an agency, or political subdivision, 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 **AIA DOCUMENT A201-2007**, "General Conditions of the Contract for Construction". When any Article of the General Conditions is modified, or deleted, by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause will remain in effect. The "General Conditions of the Contract for Construction" may also be supplemented or amplified elsewhere in the Contract Documents by provisions located in, but not necessarily limited to, Division 01 of the Specifications.

1.02 Verification Of Dimensions: Before ordering any materials or doing any work, the Contractor shall verify the dimensions and shall be responsible for the accuracy of such dimensions as they affect the Work. No extra compensation will be allowed on account of differences between the dimensions shown on the Drawings and actual dimensions.

1.03 Plans And Specifications: The Specifications and the Drawings are intended to be in agreement with each other, and to be mutually explanatory. They are also intended to be complementary and any Work or material called for by either shall be provided as if called for by both.

1.04 Execution Of The Work: Sections of Division 01 General Requirements govern the execution of the Work of all Sections in Divisions 02-49 of the Specifications.

1.05 Workmanship: All Work as described or required shall be executed in a neat, skillful manner, in accordance with the best-recognized trade practice. Only competent workmen (including the superintendent), who work and perform their duties satisfactorily shall be employed on the Project. When requested by the Project Engineer, the Contractor shall discharge and shall not re-employ on the Project, any person who commits trespass or who is, in the opinion of the Project Engineer, dangerous, disorderly, insubordinate, incompetent, or otherwise objectionable.

1.06 Use Of Site And Facilities: Contractor shall not allow tradesman, technicians and laborers to enter other portions of existing facilities except as predetermined and approved by the Project Engineer. Existing utilities shall not be interrupted unless pre-approved by the Project Engineer. Parking for construction vehicles shall be in areas designated by the Owner at the Pre-construction Conference.

1.07 Utilities: The Owner will furnish utilities for construction (electricity and water). Contractor must use "as- is" or pay for any necessary modifications.

1.08 Inspection Of Work: All materials and each part or detail of the Work are subject to inspection by the Project Engineer. Work performed or materials used by the Contractor without supervision, inspection, or written approval by an authorized Department representative may be ordered removed and replaced, at Contractor's expense, if found to be defective or noncompliant with the Contract Documents. No Work shall be performed on Legal Holidays, Sundays or after 5:00 P.M. on week days without prior written approval from the Project Engineer.

ARTICLE 1 GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

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

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

- 1.1.7 **Instruments of Service:** Add a new sentence at the end of this Subparagraph:

The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATION 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 "Engineering Services Contract" Agreement Between the Owner and the Professional.

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 Transportation Commission, a body Corporate of the State of Mississippi, acting by and through the duly authorized Executive Director of the Mississippi Department of Transportation for the benefit of the Department for which the Work under this Contract is being performed. The Owner is the entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. 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 individual who signed the Construction Contract for the Owner. The term "Owner" means the Owner or the Owner's authorized representative.

- 2.2.5 Change this Subparagraph to read as follows:

After the Contract is executed by the Executive Director, the Contractor will receive free of charge two bound copies of the Project Manual (Proposal and Contract Documents) (one executed and one blank), and five full-scale copies of the Drawings and two half-scale copies. The Contractor shall have available on the Project Site at all times one copy each of the Contract Drawings and the Project Manual (Proposal).

ARTICLE 3 CONTRACTOR

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

- 3.3.1 Change the last sentence to read as follows:

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 Professional shall be responsible for any resulting loss or damage.

3.18 INDEMNIFICATION

3.18.3 Add a new Subparagraph as follows:

The Contractor agrees to defend, hold harmless and indemnify the Owner against all claims or demands caused by the Contractor's acts or omissions.

ARTICLE 4 ARCHITECT

4.1 GENERAL

4.1.4 Add a new Subparagraph as follows:

The term "Architect," "Engineer," "Professional", or "Consultant" as used in these Documents refers to the Professional firm who has been directed by the Owner to design and inspect construction of this Project.

4.1.5 Add a new Subparagraph as follows:

The term "Project Engineer" as used in these Documents refers to the Mississippi Department of Transportation Executive Director's authorized representative. The term "MDOT Architect" is the representative for the MDOT Architectural Services Unit and is an advisor to the Project Engineer.

ARTICLE 5 SUBCONTRACTORS

No supplementary conditions.

Article 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

No supplementary conditions.

ARTICLE 7 CHANGES IN THE WORK

7.1 GENERAL

7.1.1 Replace the words "Change Order" with the words "Supplemental Agreement".

7.2 CHANGE ORDERS

7.2.2 Add a new Subparagraph as follows:

The maximum cost included in a Change Order (Supplemental Agreement) 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 (Supplemental Agreement).

ARTICLE 8 TIME

8.1 DEFINITIONS

8.1.1 Change this Subparagraph to read as follows:

Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Completion of the Work.

8.1.3 Change this Subparagraph to read as follows:

The Date of Completion is the date certified by the Project Engineer and approved by the Owner in accordance with Paragraph 9.8 entitled "Substantial Completion."

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 Project Engineer, or by any employee or 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 Project Engineer determines may justify the delay, then the Contract time may be extended by Change Order for such reasonable time as the Engineer may determine, subject to the Owner's approval. 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

9.3 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.

9.3.1.3 Add a new Clause to Subparagraph 9.3.1 as follows:

The Owner will retain five percent (5%) until the Work is at least fifty percent (50%) complete, on schedule, and satisfactory in the Project Engineer's opinion, at which time fifty percent (50%) of the retainage held to date shall be returned to the Contractor for distribution to the appropriate Sub-Contractors and Suppliers. Future retainage shall be withheld at the rate of two and one half percent (2-1/2%) of the amount due the Contractor on account of progress payments.

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 made 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 Project Engineer 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 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 Project Engineer 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.
- .8 List of stored items shall be sent to the Chief Engineer for his approval prior to payment of stored materials.

9.3.2.2 Add a new Clause to Subparagraph 9.3.2 as follows:

Payment for materials stored at the building site, may be approved by the Project Engineer and the Owner after the Contractor has submitted the following items:

- .1 A Bill of Sale from the Manufacturer to the General Contractor for the stored materials.
- .2 List of stored items shall be sent to the Chief Engineer for his approval prior to payment of stored materials.
- .3 List of stored items shall be sent to the Chief Engineer for his approval prior to payment of stored materials.

9.6 PROGRESS PAYMENTS

9.6.8 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.

9.7 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

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

Substantial Completion shall not be recognized under this Contract. The Project Engineer shall determine when the building is complete to the point it can be used for its intended purpose and occupied. This date shall be the Date of Completion. All Warranties and Extended Warranties shall use this date as the starting date of Warranty Period.

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 substantially complete on the date set forth in the Contract Documents. The Contractor and his Surety will be liable for and will pay the Owner liquidated damages for each calendar day of delay until the work is substantially complete as follows:

For More Than	To and Including	Per Calendar Day
\$ 0	\$ 100,000	\$ 140
100,000	500,000	200
500,000	1,000,000	300
1,000,000	2,000,000	400
2,000,000	5,000,000	650
5,000,000	10,000,000	750
10,000,000	-----	1,400

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 Clause 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 Project Engineer 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.

10.3 HAZARDOUS MATERIALS

10.3.2 Delete this Subparagraph in its entirety.

10.3.3 Delete this Subparagraph in its entirety.

10.3.4 Delete this Subparagraph in its entirety.

10.3.5 Delete this Subparagraph in its entirety.

10.3.6 Delete this Subparagraph in its entirety.

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY 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)		
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.....	\$ 500,000.00	Per Occurrence
Fire Damage Liability.....	\$ 50,000.00	Per Fire
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 Vehicle 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

11.1.6 Add a new Subparagraph as follows:

Furnish one (1) copy of the Standard Construction Contract Certificate of Insurance Form for each copy of the Standard Form of Agreement Between Owner and Contractor specifically setting forth evidence of all coverage required by Subparagraphs 11.1.1, 11.1.2 and 11.1.3. Furnish to the Owner copies of any endorsements that are subsequently issued amending limits of coverage.

11.1.7 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

Change this Paragraph to read as follows:

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 11.1.4.

11.3 PROPERTY INSURANCE

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

The Contractor shall purchase...

11.3.1.2 Delete this Clause under Subparagraph 11.3.1 in its entirety.

11.3.1.3 Change the following Clause in Subparagraph 11.3.1.3 to read as follows:

If the property insurance requires deductibles, the Contractor shall pay costs not covered because of such deductibles.

11.3.2 Delete this Subparagraph in its entirety.

11.3.3 Delete this Subparagraph in its entirety.

11.3.4 Delete this Subparagraph in its entirety.

11.3.5 Delete this Subparagraph in its entirety.

11.3.6 Delete this Subparagraph in its entirety.

11.3.10 Change this Subparagraph to read as follows:

The Owner as fiduciary shall have power to adjust and settle a loss with Insurers unless one of the parties in interest shall object in writing within five (5) days after occurrence of loss.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

No supplementary conditions.

ARTICLE 13 MISCELLANEOUS PROVISIONS

No supplementary conditions.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

No supplementary conditions.

ARTICLE 15 CLAIMS AND DISPUTES

15.3 MEDIATION

15.3.1 Delete this Subparagraph in its entirety.

15.3.2 Delete this Subparagraph in its entirety.

15.3.3 Delete this Subparagraph in its entirety.

15.4 ARBITRATION

15.4.1 Delete this Subparagraph in its entirety.

15.4.1.1 Delete this Clause in its entirety.

15.4.2 Delete this Subparagraph in its entirety.

15.4.3 Delete this Subparagraph in its entirety.

15.4.4 Delete this Subparagraph in its entirety.

15.4.4.1 Delete this Clause in its entirety.

15.4.4.2 Delete this Clause in its entirety.

15.4.4.3 Delete this Clause in its entirety.

15.5 Add a new Paragraph as follows:

ARBITRATION PROCEDURES FOR THE MISSISSIPPI TRANSPORTATION COMMISSION

All matters of dispute arising out of any agreement with the Mississippi Transportation Commission for planning, design, engineering, construction, erection, repair, or alteration of any building, structure, fixture, road, highway, utility or any part thereof, or any agreement with the Mississippi Transportation Commission for architectural, engineering, surveying, planning, and related professional services which provides for mediation or arbitration, shall comply with the following course for resolution. No arbitration hearing shall be granted on any claim in excess of One Hundred Thousand Dollars (\$100,000.00).

15.5.1 Add a new Subparagraph as follows:

CONDITIONS PRECEDENT TO ARBITRATION

- .1 The aggrieved party must first notify opposing party in writing in detail of the matter(s) in dispute, the amount involved and the remedy sought. Such writing shall include copies of any documents, writings, plans, or other matter pertinent to the resolution of the dispute. The Chief Engineer of the Mississippi Department of Transportation, or his authorized representative, and a principal of the opposing party shall be the proper parties for such notice and shall be active parties in any subsequent dispute resolution.
- .2 If the dispute cannot be satisfactorily resolved, within thirty (30) days of the complaint being rejected in writing by either party, notice by certified mail shall be given to the Project Engineer. A copy of the notice shall be sent by certified mail to the opposing party. Such notice shall be in writing setting forth in detail the matter(s) in dispute, the amount involved, the remedy sought and state that informal resolution between the parties cannot be reached. Such writing shall include copies of any documents, writings, plans, or other matter pertinent to the resolution of the dispute. Opposing party shall have the opportunity to set forth in writing a rebuttal with pertinent documents attached. At the sole discretion of the Project Engineer, oral testimony may be had on the matter.

15.5.2 Add a new Subparagraph as follows:

REQUESTS FOR ARBITRATION: Within thirty (30) days of a claim being rejected in writing by the Project Engineer, either party may request arbitration. Notices for requests for arbitration shall be made in writing to the Chief Engineer of the Mississippi Department of Transportation, P. O. Box 1850, Jackson, Mississippi 39215-1850. Such notice shall set forth in detail the matter(s) in dispute, the amount involved, and the remedy sought. A copy of the request shall be mailed to the opposite party. The party requesting arbitration must deposit the sum of two hundred dollars (\$200.00) with its request as a deposit against costs incurred by the arbitrators. Each party will be notified in writing in any manner provided by law of certified mail not less than twenty (20) days before the hearing of the date, time and place for the hearing. Appearance at the hearing waives a party's right to notice.

15.5.3 Add a new Subparagraph as follows:

SELECTION OF ARBITRATORS: Upon request for arbitration, a panel of three (3) arbitrators shall be chosen. The Chief Engineer of the Mississippi Department of Transportation shall appoint one (1) member. One (1) member shall be appointed by the Executive Director of a professional or trade association that represents interests similar to that of the non-state party. The first two shall appoint the third member.

15.5.4 Add a new Subparagraph as follows:

HEARINGS: All hearings shall be open to the public. All hearings will be held in Jackson, Mississippi, unless the parties mutually agree to another location. The hearings shall be conducted as prescribed by **Mississippi Code 1972, Annotated**, Sections 11-15-113, 11-15-115, and 11-15-117. A full and complete record of all proceedings shall be taken by a certified court reporter. The scheduling and cost of retaining the court reporter shall be the responsibility of the party requesting arbitration. The costs of transcription of the record shall be the responsibility of the party requesting such transcript. No arbitration hearing shall be held without a certified court reporter. Deliberations of the arbitrators shall not be part of the record.

15.5.5 Add a new Subparagraph as follows:

AWARDS: Awards shall be made in writing and signed by the arbitrators joining in the award. A copy of the award shall be delivered to the parties by certified mail.

15.5.6 Add a new Subparagraph as follows:

FEES AND EXPENSES: Reasonable fees and expenses, excluding counsel fees, incurred in the conduct of the arbitration shall be at the discretion of the Arbitrator except each party shall bear its own attorney's fees and costs of expert witnesses.

15.5.7 Add a new Subparagraph as follows:

MODIFICATIONS, CONFIRMATIONS, AND APPEALS: All modifications, confirmations and appeals shall be as prescribed by **Mississippi Code 1972, Annotated**, Section 11-15-123 et seq. All awards shall be reduced to judgment and satisfied in the same manner other judgments against the State are satisfied.

15.5.8 Add a new Subparagraph as follows:

SECRETARY FOR THE ARBITRATORS: All notices, requests, or other correspondence intended for the arbitrators shall be sent to the Chief Engineer, Mississippi Department of Transportation, P. O. Box 1850, Jackson, Mississippi 39215-1850.

END OF SECTION

SECTION 00 91 13 ADDENDA

PART 1- GENERAL

1.01 DESCRIPTION

- A. Addenda issued on this Project will be included in Section 00 91 13 and become part of the Standard Form of the Agreement Between the Owner and the Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 10 00 SUMMARY

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work covered by the Contract Documents shall be provided by one (1) General Contractor as one (1) Contract to improve the Mississippi Department of Transportation site to Renovate Desoto County Rest Area on I-55 (Northbound) Near Hernando in Desoto County, Mississippi.
- B. Time of Completion: The completion of this Work is to be on or before the time indicated on the Owner and Contractor Agreement.
- C. Contractor's Duties:
1. Except as specifically noted, provide and pay for:
 - a. Labor, materials, equipment.
 - b. Tools, construction equipment, and machinery.
 - c. Other facilities and services necessary for proper execution and completion of the Work.
 2. Pay legally required sales, consumer, use, payroll, privilege and other taxes.
 3. Secure and pay for, as necessary for proper execution and completion of Work, and as applicable at time of receipt of bids:
 - a. Permits
 - b. Government Fees
 - c. Licenses
 4. Give required notices.
 5. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities that bear on performance of Work.
 6. Promptly submit written notice to Project Engineer of observed variance of Contract Documents from legal requirements. Appropriate modifications to Contract Documents will adjust necessary changes. Assume responsibility for Work known to be contrary to such requirements, without notice.
 7. Enforce strict discipline and good order among employees. Do not employ on Work, unfit persons or persons not skilled in assigned task.
 8. Schedule of Values: Submit 8 copies to the MDOT Architectural Services Unit a Schedule of Values as described in Section 01 29 73 of these Specifications. This submittal will be recorded as submittal number one for this Project. When this submittal is approved, a copy will be transmitted to Construction Administration to be used to review and compare to amounts submitted on the CAD-720 form. Other copies will be kept by Architectural Services Unit and distributed to Project Engineer, MDOT Consultants, and Contractor.
 9. Sub-Contractors List: Submit 8 copies of a list, acceptable to the MDOT, of all subcontractors to be used on the Project within seven (7) days after written notice of Contract award by the MDOT. The list shall include the Firm's name, contact person, street address, e-mail address, telephone and fax numbers. Submit original to Contract Administration Division and one copy to the Project Engineer and to the MDOT Architect CAD-720 form - REQUEST FOR PERMISSION TO SUBCONTRACT for each subcontractor before they are allowed to perform any Work.
 10. Coordination: The Contractor is responsible for the coordination of the total Project. All subcontractors will cooperate with the Contractor so as to facilitate the general progress of the Work. Each trade shall afford all other trades every reasonable opportunity for the installation of their Work. Refer to Section 01 31 00 Project Management & Coordination.

1.02 CONTRACTOR'S USE OF PREMISES

- A. Confine operations at the site to areas permitted by:
 - 1. Law
 - 2. Ordinances
 - 3. Permits
 - 4. Contract Documents
 - 5. Owner
- B. Do not unreasonably encumber site with materials or equipment.
- C. Do not load structure with weight that will endanger structure.
- D. Assume full responsibility for protection and safekeeping of products stored on premises.
- E. Move any stored products which interfere with operations of MDOT or other Contractors.
- F. Obtain and pay for use of additional storage of work areas needed for operations.
- G. Limit use of site for work and storage to the area indicated on the Drawings.

1.03 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Groups, Subgroups, Divisions and Sections using CSI/CSC's "MasterFormat" 2004 Edition numbering system.
 - 1. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in Divisions 02 through 49 in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 SCOPE

- A. This Section describes the procedures for processing Change Orders (Supplemental Agreements) by the Project Engineer and the Contractor.

1.02 CHANGE ORDER PROCEDURES

- A. Change Proposed by the Project Engineer: The Project Engineer may issue a Proposal Request to the Contractor which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications and a change in Contract Time for executing the change. The Contractor shall prepare and submit an estimate within 10 days.
- B. Change Proposed by the Contractor: The Contractor may propose a change by submitting a request for change to the Project Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with Section 01 62 14 - Product Options and Substitution Procedures.
- C. Contractor's Documentation:
1. Maintain detailed records of Work completed on a time and material basis. Provide full information required for evaluation of proposed changes, and substantiate costs of changes in the Work.
 2. Document each quotation for a change in cost or time with sufficient data allowing evaluation of the quotation.
 3. On request, provide additional data to support computations:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 4. Support each claim for additional costs, and for work completed on a time and material basis, with additional information:
 - a. Origin and date of claim.
 - b. Dates and time work was performed and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
- D. Construction Change Directive: The Project Engineer may issue a document, approved by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order (Supplemental Agreement). The document will describe changes in the Work, and will designate method of determining any change in the Contract Sum or Contract Time. The change in Work will be promptly executed.
- E. Format: The Project Engineer will prepare 5 originals of the Change Order (Supplemental Agreement) using the Mississippi Department of Transportation's Change Order (Supplemental Agreement) Form.

- F. Types of Change Orders (Supplemental Agreements):
1. Stipulated Sum Change Orders: Based on Proposal Request and Contractor's fixed price quotation, or Contractor's request for a Change Order (Supplemental Agreement) as approved by the Project Engineer and the MDOT Architect.
 2. Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order (Supplemental Agreement) will be executed on a fixed unit price basis. For unit costs or quantities of units of work, which are not pre-determined, execute Work under a Construction Change Directive. Changes in Contract Sum or Contract Time will be computed as specified for Time and Material Change Order (Supplemental Agreement).
 3. Time and Material Change Order (Supplemental Agreement): Submit itemized account and supporting data after completion of change, within time limits indicated in the Standard Form of Agreement Between the Owner and the Contractor. The Project Engineer will determine the change allowable in Contract Sum and Contract Time as provided in the Contract Documents. The Contractor shall maintain detailed records of Work accomplished on Time and Material basis and shall provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- G. Execution of Change Order (Supplemental Agreement): The Project Engineer will issue Change Orders (Supplemental Agreements) for signatures of parties as provided in the Standard Form of Agreement Between the Owner and the Contractor. Final execution of all Change Orders (Supplemental Agreements) requires approval by the Owner.
- H. Correlation of Contractor Submittals: The Contractor shall promptly revise Schedule of Values and the Application for Payment forms to record each authorized Change Order (Supplemental Agreement) as a separate line item and adjust the Contract Sum. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of Work affected by the change and resubmit. Promptly enter changes in Project Record Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 METHOD OF MEASUREMENT

- A. The method of measurement and payment shall conform to the applicable provisions of Article 9 of the AIA Document A201-2007 General Conditions of the Contract for Construction.

1.02 APPLICATION FOR PAYMENT

A. Format:

- 1. Applications for Payments will be prepared on AIA forms G702-Application and Certificate for payment and G703-Continuation Sheet; or, a computer generated form containing similar data may be used.

B. Preparation of Application:

- 1. Present required information in type written form.
- 2. Execute certification by signature of authorized officer.
- 3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed and for stored products.
- 4. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original Item of Work.
- 5. Prepare Application for Final Payment as specified in Section 01 77 00-Closeout Procedures.

C. Submittal Procedures:

- 1. Submit 3 copies of each Application for Payment to the Project Engineer and one copy to the MDOT Architect.
- 2. Submit an updated construction schedule with each Application for Payment as described in Section 01 32 00-Construction Progress Documentation.
- 3. Submit request for payment at intervals agreed upon by the Project Engineer, Owner, and Contractor.
- 4. Submit requests to the Project Engineer at agreed upon times, or as may be directed otherwise.

D. Substantiating Data:

- 1. Submit data justifying dollar amounts in question when such information is needed.
- 2. Provide one copy of the data with a cover letter for each submittal.
- 3. Indicate the Application number, date and line item number and description.

1.03 STATEMENTS AND PAYROLLS

- A. The submission by the Contractor of the actual weekly payrolls showing all employees, hours worked, hourly rates, overtime hours, etc., or copies thereof, is not required to be turned in. However, each Contractor and Subcontractor shall preserve weekly payroll records for a period of three years from the date of Contract completion.

- B. All Contractor personnel working at the project site will be paid unconditionally and not less often than once a week without subsequent deduction or rebate on any account, except such payroll deductions as are permitted by regulations, the full amounts of wages and bona fide fringe benefits due at time of payment.
- C. The payroll records shall contain the name, with an individually identifying number for each employee, classification, rate of pay, daily and weekly number of hours worked, itemized deductions and actual wages paid to each employee.
- D. Upon request, the Contractor will make payroll records available at the project site for inspection by the Department Compliance Officer or authorized representative and will permit such officer or representative to interview employees on the job during working hours.
- E. The Contractor and Subcontractors shall submit Form CAD-880, "Weekly Summary of Wage Rates", each week to the Project Engineer. The forms may be obtained from the Contract Compliance Officer, Contract Administration Division, Mississippi Department of Transportation, Jackson, Mississippi. Custom forms, approved by Contract Administration Division, may be used in lieu of CAD forms.
- F. The Contractor shall make all efforts necessary to submit this information to the Project Engineer in a timely manner. The Engineer will have the authority to suspend the work wholly or in part and to withhold payments because of the Contractor's failure to submit the required information. Submission of forms and payrolls shall be current through the first week of the estimate period in order for the Project Engineer to process an estimate.

1.04 BASIS OF PAYMENT

- A. This Work will be paid for by Contract Sum for all construction work necessary to renovate the Rest Area Buildings on I-55 Northbound near Hernando in Desoto County, Mississippi. The Contract Sum shall be full compensation for all site work, for furnishing all materials, and all other Work and effort of whatever nature in the construction of the building, installation of underground and other equipment, and final clean-up of the area. It shall also be complete compensation for all equipment, tools, labor, and incidentals necessary to complete the Work.
- B. Payment will be made under:

MDOT Project No. BWO-2198-17(003) 502016	Lump Sum
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TOTAL PROJECT CONTRACT SUM	LUMP SUM
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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 73

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope: Submit 7 copies of the Schedule of Values to the MDOT Architect, with a copy of the Transmittal Letter to the Project Engineer, at least 10 days prior to submitting first Application for Payment. Upon Project Engineer's request, support the values given with data substantiating their correctness. Payment for materials stored on site will be limited to those listed in Schedule of Unit Material Values (refer to Article 9 of the Supplementary Conditions for requirements). Use Schedule of Values only as basis for contractor's Application for Payment.
- B. The 7 copies of the Schedule of Values will be reviewed as Submittal #1. A copy of this submittal will be reviewed by the Architect and Mechanical / Electrical Consultants. One copy will be retained by MDOT Architectural Services, one by Mechanical / Electrical Consultants, one sent to Contract Administration for use in reviewing requests for Permission to Sub-Contract (CAD-720 Form), one sent to the Project Engineer, and two returned to the Contractor. If any extra copies are needed for the Contractor, adjust number submitted.
- C. Form of Submittal: Submit typewritten Schedule of Values on AIA Document G703-1992, using Table of Contents of this Specification as basis for format for listing costs of Work for Sections under Divisions 02 - 49. Identify each line item with number and title as listed in Table of Contents of this Specification.
- D. Preparing Schedule of Values:
 - 1. Itemize separate line item costs for each of the following general cost items: Performance and Payment Bonds, field supervision and layout, Contingency Allowance, temporary facilities and controls, and closeout documents.
 - 2. Itemize separate line item cost for Work required by each Section of this specification. Breakdown installed cost with overhead and profit.
 - 3. For each line item, which has installed value of more than \$20,000, break down costs to list major products for operations under each item; rounding figures to nearest dollar. Make sum of total costs of all items listed in schedule equal to total Contract Sum.
- E. Preparing Schedule of Unit Material Values:
 - 1. Submit separate schedule of unit prices for materials to be stored on which progress payments will be made. Make form of submittal parallel to Schedule of Values with each line item identified same as line item in Schedule of Values. Include in unit prices only: Cost of material, delivery and unloading site, and sales tax.
 - 2. Make sure unit prices (if required) multiplied by quantities equal material cost of that item in Schedule of Values.
- F. Review and Re-submittal: After Project Engineer / MDOT Architect's review, if requested, revise and resubmit schedule in same manner

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Scope: To set forth procedures, conditions and responsibility for coordination of the total project.
- B. Project Coordinator: The General Contractor shall designate one individual as Project Coordinator (Superintendent), as referred to in the General Conditions. Prior to beginning Work his name, qualifications and address shall be submitted, in writing, to the MDOT Executive Director with copies to the Construction Engineer, Contract Administration Engineer, District Engineer, Project Engineer and MDOT Architect. Upon approval, he will remain until the Project is completed and cannot be removed during construction without just cause and without the written consent of the Project Engineer.

1.02 DEFINITIONS

- A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.03 SUBMITTALS

- A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1.04 DUTIES OF PROJECT COORDINATOR (SUPERINTENDENT)

- A. General:
 - 1. Coordination: Coordinate the work of all subcontractors and material suppliers.
 - 2. Supervision: Supervise the activities of every phase of Work taking place on the project.
 - 3. Contractor's Daily Job Diary: Submit copy of daily job diary to Project Engineer and MDOT Architect each Monday for previous week.
 - 4. Electrical: Take special care to coordinate and supervise the Work of electrical and other subcontractors.
 - 5. Communication: Establish lines of authority and communication at the job site.
 - 6. Location: The Project Coordinator (Superintendent) must be present on the job site at all times while work is in progress. Superintendent shall advise Project Engineer of an intended absence from the work and designate a person to be in charge of the Work during such absence.
 - 7. Permits: Assist in obtaining building and special permits required for construction.
- B. Interpretations of Contract Documents
 - 1. Consultation: Consult with Project Engineer to obtain interpretations.
 - 2. Assistance: Assist in resolution of any questions.
 - 3. Transmission: Transmit written interpretations to concerned parties.

- C. Cessation of Work: Stop all Work not in accordance with the requirements of the Contract Documents.
- D. Division One: Coordinate and assist in the preparation of all requirements of Division One and specifically as follows:
 - 1. Enforce all safety requirements.
 - 2. Schedule of Values: Assist in preparation and be knowledgeable of each entry in the Schedule of Values.
 - 3. Cutting and Patching: Supervise and control all cutting and patching of other trades work.
 - 4. Project Meetings: Schedule with Project Engineer's approval and attend all project meetings.
 - 5. Construction Schedules: Prepare and submit all construction schedules. Supervise Work to monitor compliance with schedules.
 - 6. Shop Drawings, Product Data and Samples: Administer the processing of all submittals required by the Project Manual.
 - 7. Testing: Coordinate all required testing.
 - 8. Temporary Facilities and Controls: Allocate, maintain and monitor all temporary facilities.
 - 9. Substitutions and Product Options: Administer the processing of all substitutions.
 - 10. Cleaning: Direct and execute a continuing (daily) cleaning program throughout construction, requiring each trade to dispose of their debris.
 - 11. Project Closeout: Collect and present all closeout documents to the Project Engineer.
 - 12. Project Record Documents: Maintain up-to-date Project Record Documents.
- E. Changes: Recommend and assist in the preparation of requests to the Project Engineer for any changes in the Contract.
- F. Application for Payment: Assist in the preparation and be knowledgeable of each entry in the Application and Certificate for Payment.

1.05 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports, and installation of Mechanical and Electrical Work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy, if required.

- E. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.06 SUBCONTRACTOR'S DUTIES

- A. The Subcontractor is responsible to coordinate and supervise his employees in the Work accomplished under his part of the Contract.
- B. Schedules: Conduct Work to assure compliance with construction schedules.
- C. Suppliers: Transmit all instructions to his material suppliers.
- D. Cooperation: Cooperate with the Project Coordinator and other subcontractors.

1.07 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 - 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Contractor.
 - 4. Name of Architect.
 - 5. RFI number, numbered sequentially.
 - 6. Specification Section number and title and related paragraphs, as appropriate.
 - 7. Drawing number and detail references, as appropriate.
 - 8. Field dimensions and conditions, as appropriate.
 - 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 10. Contractor's signature.
 - 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: CSI Form 13.2A
 - 1. Identify each page of attachments with the RFI number and sequential page number.

- D. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow seven working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 7 days of receipt of the RFI response.
- E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log the first week of each month. Use CSI Log Form 13.2B. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were dropped and not submitted.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Provisions for and procedures related to the required Project Meetings which include, but not limited to, the following for each Project Phase:
 - 1. Pre-Construction Meeting.
 - 2. Periodic Progress Meetings.

1.02 MEETINGS

- A. Purpose of Meetings: Project Meetings shall be held for the following reasons:
 - 1. To establish an understanding of what is expected from everyone involved.
 - 2. To enable an orderly Project review during the progress of the Work.
 - 3. To provide for systematic discussion of problems and effect remedies and clarifications.
 - 4. To coordinate the Work.
 - 5. To review installation procedures and schedules.

1.03 SCHEDULING AND ADMINISTRATION

- A. The Project Engineer shall schedule and preside over all meetings throughout the progress of the Work. Duties include the following:
 - 1. Review, modify / approve minutes of the previous meeting.
 - 2. Discuss items that have been done the previous month and anticipated work to be done within the next month.
 - 3. Review Contractor's Pay Request and resolve questions or conflicts with Construction Documents.
- B. The Contractor shall attend and administer all meetings throughout the progress of the Work. Duties include the following:
 - 1. Preparation of agenda for meetings
 - 2. Distribution of agenda and written notice 7 days in advance of date for each regularly scheduled meeting.
 - 3. Make physical arrangements for meetings.
 - 4. Record the minutes which shall include list of all participants and all significant proceedings and, in particular, all decisions, agreements, clarifications, and other data related to Project cost, time, and modifications.
 - 5. Distribute copies of minutes within 7 calendar days to all parties affected by decisions made at the meeting.
 - 6. Follow-up unresolved matters discussed at meetings and promptly effect final resolution, especially for work in progress. Advise all effected parties of result and include report of activities in next scheduled meeting.
- C. Representatives of Contractor's, Subcontractor's, and Supplier's attending the meetings shall be qualified and authorized to act on behalf of the entity each represents.
- D. Consultants may attend meetings to ascertain work is expedited consistent with Contract Documents and construction schedules.

1.04 PRE-CONSTRUCTION MEETING

- A. Schedule: Schedule Pre-Construction Meeting within 10 days after Notice to Proceed.
- B. Location: A central site, convenient for all parties, designated by the Contractor and approved by the Project Engineer and the MDOT Architect.
- C. Attendance: Attending shall be the Project Engineer and MDOT representatives associated with the Project, the MDOT Architect (if requested by the District), his Consultants, the General Contractor, all major Subcontractors, and any representatives of governmental or other regulatory agencies as required.
- D. Minimum Agenda:
 - 1. Distribute and discuss construction schedule prepared by Contractor.
 - 2. Review critical Work sequencing.
 - 3. Designate responsibilities.
 - 4. State procedures for submittals.
 - 5. State procedures for maintaining record documents.
 - 6. State procedures for change orders.
 - 7. State procedures for application of payment.
 - 8. Coordinate use of premises, including office and storage areas.
 - 9. List Owner's requirements.
 - 10. Show clear understanding of Security.
 - 11. Show clear understanding of Housekeeping procedures.

1.05 PROGRESS MEETINGS

- A. Schedule: Progress Meetings will be scheduled monthly. The Project Engineer will cancel the meeting with at least 48 hours notice if a meeting is not necessary for any particular month.
- B. Place of Project Meetings: Contractor's Field Office except as otherwise agreed.
- C. Attendance: Attending shall be the Project Engineer or his representative and MDOT representatives associated with the Project, the MDOT Architect or his representative (if requested by the District) and his Consultants, the General Contractor, and all Subcontractors as pertinent to the agenda.
- D. Minimum Agenda:
 - 1. Review, modify / approve minutes of the previous meeting.
 - 2. Review work progress since last meeting.
 - 3. Note field observations, problems and decisions.
 - 4. Identify problems that impede planned progress.
 - 5. Review off-site fabrication problems.
 - 6. Revise construction schedule as indicated.
 - 7. Plan progress during the next work period.
 - 8. Review submittal schedules; expedite and modify as required.
 - 9. Review proposed changes,
 - 10. Review Request for Payment.
 - 11. Complete other current business.

PART 2 - PRODUCTS & PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope: Provide projected Construction Schedules for entire Work and revise monthly to show progress through the pay period. The following is a minimum requirement and other type schedules are acceptable with Owner's approval.
- B. Form of Schedules: Prepare in form of horizontal bar chart.
 - 1. Provide separate horizontal bar column for each trade or operation.
 - 2. Order: Table of Contents of Specifications.
 - 3. Identify each column by major Specification section number.
 - 4. Horizontal Time Scale: Identify first work day of each week.
 - 5. Scale and Spacing: To allow space for updating.
- C. Content of Schedules:
 - 1. Provide complete sequence of construction by activity.
 - 2. Indicate dates for beginning and completion of each stage of construction.
 - 3. Identify Work of logically grouped activities.
 - 4. Show projected percentage of completion for each item of Work as of first day of each month.
- D. Updating:
 - 1. Show all changes occurring since previous submission of updated schedule.
 - 2. Indicate progress of each activity and completion dates.
- E. Submittals:
 - 1. Submit initial schedules to the Project Engineer / MDOT Architect within 15 days after date of Notice to Proceed.
 - 2. Submit to the Project Engineer / MDOT Architect, periodically updated schedules accurately depicting progress to first day of each month.
 - 3. Submit 2 copies, one to be retained by the Project Engineer and the other forwarded to the MDOT Architect.
- F. If the Contractor is required to produce two revised construction schedules because of lack of progress in the Work, the Owner will notify the Contractor's surety.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Scope: Submit to the MDOT Architectural Services Unit shop drawings, product data, and samples required by Specification Sections. Faxed submittals WILL NOT be accepted. DO NOT submit Material Safety Data Sheets for approval. Refer to Section 01 62 14 – Product Options and Substitution Procedures, for requirements concerning products that will be acceptable on this Project.
- B. Shop Drawings: Original (LEGIBLE) drawings (NO FAXED COPIES) prepared by Contractor, subcontractor, supplier or distributor which illustrates actual portions of the Work; showing fabrication, layout, setting or erection details. REPRODUCTIONS of the Contract Drawings WILL NOT be acceptable. Minimum requirements for shop drawings shall include the following:
1. Prepared by a qualified detailer.
 2. IDENTIFY DETAILS BY REFERENCE TO SHEET AND DETAIL NUMBERS SHOWN ON CONTRACT DRAWINGS.
 3. Minimum sheet size: 8-1/2 inches by 11 inches.
 4. Shop drawings shall be stamped and signed by the Contractor certifying accuracy, completeness and COMPLIANCE with Contract requirements PRIOR TO SUBMITTING to the MDOT Architectural Services Unit.
- C. Product Data: Minimum information (NO FAXED COPIES) submitted shall include the following:
1. Manufacturer's standard schematic drawings: Modify drawings to delete information that is not applicable to the Project. Supplement standard information to provide additional information applicable to Project.
 2. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data: CLEARLY MARK each copy to identify pertinent materials, products or models. Show dimensions and clearances required. Show performance characteristics and capacities, wiring diagrams and controls.
 3. Product Data shall be stamped and signed by the Contractor certifying accuracy, completeness and COMPLIANCE with contract requirements PRIOR TO SUBMITTING to the MDOT Architectural Services Unit.
- D. Samples: Provide physical examples to illustrate materials, equipment or workmanship and to establish standards by which completed Work is judged.
1. Provide two copies each of sufficient size and quantity to clearly illustrate functional characteristics of products or material with integrally related parts and attachment devices and full range of color samples.
 2. Samples remain the property of the Architectural Services Unit until completion of construction of the Project.
 3. Samples (except for color charts/samples) will not be required when specified product is submitted.
 4. If a specified product color is discontinued, Contractor shall notify Project Engineer promptly to determine if it affects other color selections.

- E. Field Samples and Mock-Ups: Erect on Project Site at location acceptable to Project Engineer.
1. Construct each sample or mock-up complete, including Work of all trades required in the finished Work. Field Samples are used to determine standards in materials, color, texture, workmanship, and overall appearance.
 2. Work shall not be allowed using these materials until the mock-up is approved.
 3. The mock-up shall not be destroyed, until after the Work it represents is finished, without permission of the Project Engineer. This mock-up shall be used as a standard to compare to the Work it represents for color, craftsmanship, overall appearance, and how the different materials make up the whole system.
- F. Contractor Responsibilities:
1. Review shop drawings, product data, and samples prior to submission.
 2. Verify field measurements, construction criteria, catalog numbers and other data.
 3. Coordinate each submittal with requirements of Work and Contract Documents.
 4. Contractor's responsibility for errors and omissions in submittals is not relieved by MDOT Architect's / Consultant's review of submittals.
 5. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by review of submittals unless written acceptance of specific deviations is given.
 6. Notify the Project Engineer in writing at the time of submission, of deviations in submittals from requirements of Contract Documents.
 7. Do not order materials or begin Work requiring submittals until the return of submittals bearing MDOT Architect / Consultant's stamp and initials indicating review.
 8. After MDOT Architect / Consultant's review, distribute copies.
- G. Submission Requirements:
1. Schedule submission with ample time given to review submittals prior to being needed.
 2. Submit Seven (7) COPIES of shop drawings and product data with additional number of copies, if required, by Contractor for distribution.
 3. Partial submittals are NOT ACCEPTABLE, will be considered non-responsive, and will be returned without review.
 4. Submit number of samples specified in each Specification Section.
 5. Accompany submittals with transmittal letter, containing data, project title and number; Contractor's name and address; the number of each Shop Drawings, product data and samples submitted; notification of deviations from Contract Documents; and other pertinent data. Submittals shall be sent to MDOT Architect for review or distribution to Consultants, with copy of Transmittal Letter sent to Project Engineer.
 6. Each copy of submittal shall include a cover page with the following requirements:
 - a. Date and revision dates.
 - b. Project title and number.
 - c. The names of Project Engineer, Contractor, Supplier, Manufacturer, and separate detailer, when pertinent.
 - d. Identification of product or material.
 - e. Relation to adjacent structure or materials and COMPLETE dimensions.
 - f. Field dimensions, clearly identified as such.
 - g. SPECIFICATION SECTION NUMBER.
 - h. Applicable standards such as ASTM Number or Federal Specification.
 - i. A blank space, 2 inches by 3 inches for the Reviewer's stamp.

- j. Identification to deviations from Contract Documents.
 - k. Contractor's stamp, initialed or signed, certifying the review of submittal, verification of field measurements, and compliance with Contract Documents.
- H. Resubmission Requirements:
- 1. Shop Drawings: Revise initial Drawings as required and resubmit as specified for initial submittal. Indicate on Drawings, all changes that have been made other than those required by the Reviewer.
 - 2. Product Data and Samples: Submit new data and samples as required for initial submittal.
- I. Distribution of Submittals after Review:
- 1. Distribute copies of Shop Drawings and product data which carry MDOT Architect's / Consultant's stamp to: Project Engineer's File, Architectural Services Unit File, Architect's File(as required) / Electrical / Mechanical / Structural Engineer's File (as required), Materials' File (if concrete), Contractor's File, Job Site File, and Subcontractor, Supplier and/or Fabricator as necessary.
 - 2. Distribute samples as directed. The Project Engineer, MDOT Architect and Consultant (as required) shall retain one of each.
- J. MDOT Architect / Consultants' Duties:
- 1. Review submittals with reasonable promptness.
 - 2. Review for design concept of Project and information given in Contract Documents.
 - 3. Review of separate item does not constitute review of an assembly in which item functions.
 - 4. Affix stamp and initial, or signature, certifying the review of submittal.
 - 5. Return submittals to the Architectural Services Unit, which will retain one copy and forward one copy to the Project Engineer, one copy to the Materials Engineer (if concrete), and the remainder to the Contractor.
 - 6. Retain one copy of reviewed submittals.
- K. Delays attributable to untimely submittals, submittals not approved, or time taken to resubmit WILL NOT serve as a basis for a Contract Time extension.
- L. Acceptance of submittal items will not preclude rejection of these items upon discovery of defects in them prior to final acceptance of completed Work.
- M. After an item has been accepted, no change in brand, make, manufacturer's catalog number, or characteristics will be considered unless:
- 1. Satisfactory written evidence is presented to and approved by the Project Engineer, that manufacturer cannot make scheduled delivery of accepted item, or;
 - 2. Item delivered has been rejected and substitution of a suitable item is an urgent necessity, or;
 - 4. Other conditions became apparent which indicates acceptance of such substitute item to be in the best interest of the Owner.

PART 2 - PRODUCTS & PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 35 16

ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDE

- A. Project coordination and assignment of the work of all Parties and the scheduling of all elements of alterations and renovation work by procedures and methods to expedite completion of the Work for each Part.
- B. The Work to be assigned, coordinated and scheduled includes, but is not limited to, the following:
 - 1. The work of each Division and Section of the Specifications as shown on the Drawings and in the Specifications.
 - 2. The procedures and activities required under the provisions of this Section.

1.02 PROJECT COORDINATION

- A. Definition: Project Coordination is the process utilized to guide all participants in the Project's construction and includes assigning, scheduling, expediting, reviewing, and modifying, as appropriate, the activities required to produce the total Work to the designated quality and within the assigned time.
- B. Responsibility: Except otherwise provided by the Contract Documents, all Project Coordination shall be the entire responsibility of the Contractor. The Contractor shall set forth procedures and conditions for coordination of the Work and shall personally be responsible for the implementation of the required coordination which shall include the following:
 - 1. Communications: Establish lines of authority and communication at the Job Site.
 - 2. General Coordination: Closely coordinate all work of Project participants to effect quality construction and steady progress in all phases and aspects of the Work with a minimum of delays and interference.
 - 3. Special Coordination: Give additional careful attention to the work of the following:
 - a. Mechanical / Electrical Subcontractors and be responsible for the following:
 - 1) Establishment of locations, clearances and precedence for all piping, conduit and ductwork (underground and above ceilings).
 - 2) Submittal of Schematic Drawings giving location and clearance information for Architect / Engineer review.
 - 4. Supervision: Supervise the activities of every phase of the Work of the Project. Make frequent inspections of the Work to determine progress and quality; proceed immediately to remedy problems and to effect changes needed in the construction process and personnel.
 - 5. Interpretations of Contract Documents:
 - a. Consultation: Consult with MDOT Architect to obtain interpretations.
 - b. Assistance: Assist in resolution of any questions.
 - c. Stop all work not in accordance with the requirements of the Contract Documents.
 - 6. Division One: Coordinate requirements of Division One and specifically as follows:
 - a. Testing: Coordinate all required testing. Refer to Section 01 45 29.

- b. Temporary Facilities and Controls: Allocate, maintain and monitor all temporary facilities. Refer to Section 01 50 00.
 - c. Cutting and Patching: Supervise and control all cutting and patching. Refer to Section 01 73 29.
 - d. Cleaning: Direct and execute a continuing cleaning program throughout the construction, requiring each trade to dispose of their own debris, except as otherwise provided in the Contract Documents. Refer to Section 01 74 00.
 - e. Project Record Documents: Maintain up-to-date project record documents. Refer to Section 01 78 39.
- 7. Enforce all safety requirements.
 - 8. Maintain quality control of all work.

1.03 QUALITY CONTROL

- A. Assign all elements of the work to trades qualified to perform each type of work.
- B. Patch, repair and refinish existing work using skilled mechanics that are capable of matching existing quality of workmanship. Quality of patched or extended work shall be not less than that specified for new work.

1.04 PROJECT MEETINGS

- A. When required by Project Engineer / MDOT Architect or by individual Specification Sections, convene meetings to coordinate the Work and / or to review conditions at the Site and to outline procedures by which the Work will be performed. Refer to Sections 01 31 00 and 01 31 19.
- B. Require attendance by all affected Parties.

1.05 CONSTRUCTION ACCESS: Access to construction area for construction materials and exit way for demolition debris shall be as directed by the Project Engineer.

1.06 PROTECTION OF WORK

- A. Protect from damage, existing finishes, equipment, adjacent work scheduled to remain, and all new work.
 - 1. Protect existing and new work from temperature extremes. Maintain interior work above 60 degrees F.
 - 2. Provide heat and humidity control as needed to prevent damage to existing work and new work.
 - 3. Provide dust partitions as needed to prevent damage to existing work and new work.

1.07 CUTTING AND PATCHING

- A. Scope: Provide the necessary cutting, fitting and patching required to complete all elements of the Work including, but not limited to, the following procedures:
 - 1. To integrate with other work, to fit properly together.
 - 2. To uncover work to provide for installation of ill-timed work.
 - 3. To remove and replace defective and / or non-conforming work.
 - 4. To remove installed material for testing.
 - 5. To provide openings for penetration of mechanical and electrical work.

- B. Preparation: Prior to commencing cutting and patching, examine existing conditions (including structure and elements subject to movement) and advise Project Engineer in writing of any condition that could be adversely affected by cutting and patching.
 - 1. Submit written request in advance of cutting or alteration that affects:
 - a. Structural integrity of any element of the Project.
 - b. Integrity of weather-exposed or moisture-resistant element.
 - c. Efficiency, maintenance, or safety of any operational element.
 - d. Visual qualities of sight exposed elements.
 - e. Work of User or separate contractor.
 - 2. Include in the request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work, and products to be used.
 - e. Alternatives to cutting and patching.
 - f. Effect on work of User or separate contractor.
 - g. Written permission of affected separate contractor.
 - h. Date and time work will be executed.
- C. Procedures: Perform cutting and patching as required in Part 3 Execution of this Section.
 - 1. Proceed only when permitted and after temporary supports and other devices are in place to ensure structural integrity and to protect other portions of the Project from damage.
 - 2. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
 - 3. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior approval from the Project Engineer.
 - 4. Restore work with new products in accordance with requirements of the Contract Documents.
 - 5. Fit work air tight to pipes, sleeves, ducts, conduits and other penetrationsthrough surfaces.
 - 6. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
 - 7. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

1.08 WORK RESTRICTIONS

- A. Project participants shall not perform any work on any Sunday or any Legal Holidays (as defined in Section 3-3-7, Mississippi Code of 1972, Annotated) except as required by emergency conditions and approved by the Project Engineer.
- B. "No Smoking" shall be observed in the work areas.

PART 2 - PRODUCTS

2.01 SALVAGED MATERIALS

- A. Coordinate with Project Engineer in identifying salvageable materials. The Owner has first right of refusal for all items.

- B. Contractor shall take proper care in removing and placement where directed in designated area on Site.
- C. Salvage sufficient quantities of cut or removed material to replace damaged work of existing construction, when material is not readily obtainable on current market.
 - 1. Items not required for use in repair of existing work to remain shall be discarded if of no value to the Owner.
 - 2. Do not incorporate salvaged or used material in new construction unless approved in writing by the Project Engineer.

2.02 PRODUCTS FOR PATCHING, EXTENDING AND MATCHING

- A. Provide products or types of construction same as in existing structure, as needed to patch, extend or match existing work to make work complete and consistent to standards of quality of connected and / or similar adjacent construction. Except otherwise indicated all products shall be new.
- B. Where Contract Documents do not define products or standards of workmanship in existing construction, Contractor shall determine products by inspection and any necessary testing, and upgrade by use of the existing as a sample of comparison.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that demolition is complete and areas are ready for beginning of repairing, refinishing and new construction.

3.02 PREPARATION

- A. Cut, move, or remove existing construction as necessary for access to alterations and renovations work; repair, replace, and restore where existing affected construction is to remain a part of final completed work.

3.03 ADJUSTMENTS

- A. Where partitions are removed, patch floors, walls, and ceilings for installation of new materials.
- B. Where removal of partition(s) results in adjacent spaces becoming one space, rework floor surfaces and ceilings to provide smooth planes without breaks, steps, or bulkheads.
- C. Where extreme change of plane occurs, request instructions from MDOT Architect as to method of making transition.
- D. Where new work adversely affects existing conditions beyond work limits defined, new work shall extend to facilitate proper joining and finishing of work.

3.04 DAMAGED SURFACES

- A. Patch and replace any portion of an existing finished surface which as a result of this construction, is found to be damaged, lifted, discolored, or shows other imperfections, with matching material.
 - 1. Provide adequate support of substrate prior to matching the finish.
 - 2. Refinish patched portions of painted or coated surfaces in a manner to produce uniform color and texture over entire surface.
- B. Patch and replace any portion of an existing surface to be refinished as a finished surface that is found to be damaged, lifted, discolored or show imperfections that renders surface or substrate unsuitable for application of new finish material.
 - 1. Refinish patched portion to match existing adjacent surface in order to produce a uniform color and texture.
- C. Where new or existing wall is patched or damaged, the wall surface shall be patched and refinished from base to ceiling and end to end, or nearest natural break, and shall match new work in quality.

3.05 TRANSITION FROM EXISTING TO NEW WORK

- A. When new work abuts or finishes flush with existing work, make a smooth and workmanlike transition. Patched work shall match existing adjacent work in texture and appearance.
- B. When finished surfaces are cut in such a way that a smooth transition with new work is not possible, terminate existing surface in a neat manner along a straight line at a natural line of division.

3.06 CLEANING – PERIODIC AND FINAL

- A. General Requirements:
 - 1. Maintain the Project Space, including areas used for passage of Project personnel and materials, in a neat, clean and orderly condition at all times.
 - 2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for the Work.
 - 3. Provide adequate storage for all items awaiting removal from Site, observing all requirements for fire prevention and protection of the environment.
- B. Periodic Cleaning, as follows:
 - 1. Daily and more often if necessary, inspect the Project Space and pick up all scrap, debris, and waste material; remove to designated storage.
 - 2. At completion of work of each trade, clean area and make surfaces ready for work of successive trades.
 - 3. One each week, more often if necessary, remove all stored waste material and legally dispose of off the Site.
- C. Final Cleaning: Under provision of Section 01 74 00.

END OF SECTION

SECTION 01 42 19

REFERENCES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Basic Contract Definitions.
- B. Identification and purpose of Reference Standards.
- C. Administrative procedures and responsibility for the use of Reference Standards..

1.02 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Reviewed": The term "Reviewed", when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The terms "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.
- J. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 1. Using a term such as "carpentry" does not imply that accredited or unionized individuals of a corresponding generic name, such as "carpenter", must perform certain construction activities. It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

- K. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.03 IDENTIFICATION AND PURPOSE

- A. Identification: Throughout the Contract Documents are references to nationally known and recognized Codes, Reference Standards, Reference Specifications, and similar documents that are published by Regulatory Agencies, Trade and Manufacturing Associations and Societies, Testing Agencies and others. References also include certain Project Documents or designated portions.
- B. Purpose: All named and otherwise identified "Reference Standards" are "by reference" hereby incorporated into these Specifications as though fully written and hereby serve to establish specific requirements and pertinent characteristics for materials and workmanship as well as methods for testing / reporting on compliance thereto.

1.04 PROCEDURES AND RESPONSIBILITIES

- A. Compliance with Laws and Codes of governmental agencies having jurisdiction shall be mandatory and take precedence over the requirements of all other Reference Standards. For products or workmanship specified by Associations, Trade, or Federal Standards, comply with the requirements of the standard, except when supplemented instructions indicate a more rigid standard and / or define more precise requirements. Should specified reference standards conflict with regulatory requirements or the Contract Documents, request Architect's clarification before proceeding.
- B. The Contractor (including any and all Parties furnishing and / or installing any portion of The Work) shall be familiar with the indicated codes and standards. It shall be the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify (and provide written certification, when required) that the items procured for use in this Work (and their installation, as applicable) meet or exceed the specified requirements.
- C. When date of Reference Document is not specified, conform to latest edition of said Document except when earlier editions are specifically required by Codes.
- D. The contractual relationship of the Parties to the Contract shall not be altered from the requirements of the Contract Documents by mention or inference otherwise in any reference document.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 43 00

QUALITY ASSURANCE

PART 1 - GENERAL

1.01 WORK QUALITY

- A. Shop and field work shall be performed by mechanics, craftspersons, artisans, and workers skilled and experienced in the fabrication and installation/application of the work involved. The Work of this Project shall be performed in accordance with the Drawings, reviewed and approved shop drawings, and these Specifications. Quality of work shall conform to the highest established standards and practices of the various trades involved.
- B. All work shall be erected and installed plumb, level, square, and true, or true to indicated angle, and in proper alignment and relationship to the work of other trades. Finished work shall be free from defects and damage.
- C. Nothing specified in these Specifications shall be construed as relieving the Contractor of any responsibility for the quality of the finished work. Surfaces on which specified finishes are to be applied shall be in proper condition in every respect for superior finished work and long life without defects.
- D. The Contractor's performance of the work hereunder shall be to the satisfaction of the Architect. The Architect reserves the right to reject materials and work quality which are not considered to be up to the accepted high standards of the various trades involved. Such inferior material or work quality shall be repaired or replaced, as directed by the Architect, at no additional cost to the Owner.

1.02 MANUFACTURERS' SPECIFICATIONS AND INSTRUCTIONS

- A. Unless otherwise indicated or specified, manufactured materials, products, processes, equipment, systems, assemblies, and the like shall be erected, installed, or applied in accordance with the manufacturers' instructions, directions, or specifications. Said erection, installation, or application shall be in accordance with printed instructions furnished by the manufacturer of the material or equipment concerned for use under conditions similar to those at the jobsite. Two copies of such instructions shall be furnished to the Architect, and the Architect's acceptance therefore shall be obtained before work is begun.
- B. Any deviation from the manufacturers' printed recommendations shall be explained and acknowledged as correct and appropriate for the circumstances, in writing, by the particular manufacturer. Any deviations must be reviewed by the Architect prior to any action by the Contractor. The Contractor will be held responsible for installations contrary to the respective manufacturers' recommendations.

1.03 SPECIALIST APPLICATOR/INSTALLER

- A. Materials, equipment, systems, and assemblies requiring special knowledge and skill for the application or installation of such materials, equipment, systems, or assemblies shall be applied or installed by the specified product manufacturer or its authorized representative or by a skilled and experienced subcontractor qualified and specializing in the application or installation of the specified product with at least five years of successful experience in the type of work indicated and specified.

- B. The installation subcontractor shall be approved by the product manufacturer, as applicable, and a copy of the installer's approval letter from the manufacturer shall be submitted to the Architect.

1.04 MANUFACTURER'S FIELD SERVICES

- A. The manufacturer of a product, system, or assembly which requires special knowledge and skill for the proper application or installation of such product, system, or assembly shall provide appropriate field or job service at no additional cost to the Contractor or Owner. The manufacturer shall inspect and approve the application or installation work.
- B. The Contractor shall make all necessary arrangements with the manufacturer of the products to be installed to provide onsite consultation and inspection services to assure the correct application or installation of the product, system, or assembly.
- C. The manufacturer's authorized representative shall be present at the time any phase of this work is started.
- D. The manufacturer shall inspect and approve all surfaces over which, or upon which the manufacturer's product will be applied or installed.
- E. The manufacturer's representative shall make periodic visits to the site as the work proceeds as necessary for consultation and for expediting the work in the most practical manner.

1.05 TOLERANCES

- A. Walls: Finished wall surfaces shall be plumb and shall have a maximum variation of 1/8 inch in 8 feet when a straightedge is laid on the surface in any direction, and no measurable variation in any 2-foot direction.
- B. Ceilings: Finished ceiling surfaces shall present true, level, and plane surfaces, with a maximum variation of 1/8 inch in 8 feet when a straightedge and water level are laid on the surface in any direction and no measurable variation in any 2-foot direction.
- C. Concrete floors: Tolerances for concrete floors and pavement are specified in Division 3.
- D. Wood and Plywood Subfloors: Subfloor surfaces shall be level and shall have a maximum variation of plus or minus 1/8 inch in 10 feet. An additional tolerance of plus 1/4 inch per 2 feet of unsupported span will be allowed for camber.
- E. Finished Floors: Level to within plus or minus 1/8 inch in 10 feet for hardwood and resilient floor coverings.

1.06 PROTECTION OF WOOD

- A. Provide protection of all wood materials and products, whether or not installed, including erected and installed wood framing and sheathing, from water and moisture of any kind until completion and acceptance of the project.
- B. The Contractor shall keep informed of weather conditions and forecasts, and when there is a likelihood of rain, shall protect installed and exposed framing and sheathing and stored lumber exposed to the elements with suitable water-repellent coverings, such as canvas tarpaulins and polyethylene sheeting.

- C. Likewise, millwork and trim, paneling, cabinets, shelving, and products manufactured from wood shall be kept under cover and dry at the shop until time for delivery. Such materials shall not be delivered to the site until the building is roofed, and exterior walls are sheathed and protected with building paper as a minimum, the doors and windows are installed and glazed, and there is ample interior storage space for such materials and products. Delivery shall not occur during periods of rain, heavy dew, or fog.
- D. Wood materials or products which become wet from rain, dew, fog, or other source will be considered to have moisture damage and will be rejected, requiring replacement by the Contractor with new, dry materials or products at no increase in the Contract Price. Excepted materials: installed exterior wood siding, exterior wood trim, exterior wood doors, and exterior wood windows, after specified treatments, such as exterior wood stain or paint, have been applied.

1.07 GROUT FILL

- A. In applications where the grout installation may be subjected to moisture, the manufacturer shall submit a letter stating that the entire grout matrix does not contain any of the following:
 - 1. Added gypsum.
 - 2. Plaster-of-paris.
 - 3. Sulfur trioxide levels in a portland cement component exceeding ASTM C 150's published limits.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 45 29

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 SUMMARY

- A. Scope: The Contractor shall use testing laboratory services of the Mississippi Department of Transportation for all testing required in this Section. These services will be provided to the Contractor by the MDOT at no charge. Use of said services shall in no way relieve the Contractor of his obligation to perform Work in accordance with the Contract.
- B. Inspection, Sampling and Testing are required for:
 - 1. Section 31 23 12, Excavation, Fill and Grading.
 - 2. Section 03 20 00, Concrete Reinforcing.
 - 3. Section 03 30 00, Cast-In-Place Concrete.

1.02 LABORATORY'S DUTIES

- A. Materials will be inspected and sampled in accordance with current Mississippi Department of Transportation SOP pertaining to inspecting and sampling.
- B. Prepare reports of inspections and tests including:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing laboratory, name and address.
 - 4. Name and signature of inspector.
 - 5. Date of inspection or sampling.
 - 6. Record of temperature and weather.
 - 7. Date of test.
 - 8. Identification of product and Specification Section.
 - 9. Location of Project.
 - 10. Type of inspection or test.
 - 11. Observations regarding compliance with Contract Documents requirements.

- C. Distribute copies of reports of inspections and tests to Project Engineer and one copy to the MDOT Architect.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel to provide to laboratory in required quantities preliminary representative samples of materials to be tested.
- B. When required, furnish copies of mill test reports. Furnish to laboratory, casual labor to obtain and handle samples at the site and to facilitate inspections and tests.
- C. Provide facilities for laboratory's exclusive use for storage and curing of test samples.
- D. Notify laboratory in advance of operations to allow for assignment of personnel and scheduling of tests.

1.04 MATERIAL CERTIFICATIONS AND CERTIFIED TEST REPORTS

- A. All certifications shall meet the following requirements:
1. Have letterhead of the manufacturer, producer, supplier, or fabricator.
 2. Include the project number.
 3. Itemized list of materials covered by the certification.
 4. Contain a material conformance statement, which certifies that the materials conform to the specific specification requirements.
 5. Certification for all steel and steel wire products must also include a certified statement by the manufacturer that all of the manufacturing processes are of domestic origin.
 6. Signature of a responsible company official.
- B. All certified test reports shall meet the following requirements:
1. Have letterhead of the manufacturer, producer, supplier, fabricator, or laboratory.
 2. Include name and description of material, lot, batch, or heat number, etc., as applicable.
 3. Show results of each required test, and state that the test was run according to the test method specified.
 4. Test reports for all steel and steel wire products must also include a certified statement by the manufacturer that all of the manufacturing processes are of domestic origin.
 5. Signature of a responsible laboratory official.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 GENERAL

- A. Establish and initiate use of each temporary facility at time first reasonably required for proper performance of the Work. Terminate use and remove facilities at earliest reasonable time, when no longer needed or when permanent facilities have, with authorized use, replaced the need.

1.02 FIELD OFFICE AND STORAGE FACILITIES

- A. The Contractor shall not be responsible for construction of a field office. The Contractor shall provide, maintain, and remove when directed, suitable substantial and watertight temporary field office and storage shed(s), in locations on the site as directed by the Project Engineer, or his authorized representative and best suited for their respective uses, as follows:
 - 1. Field Office: The Contractor is not required to furnish a field office, but shall provide at the job site duplicates of all correspondence, shop drawings, plans, specifications, samples, etc. required to administer the Project. These duplicates will be permanently kept as reference and shall not be used in the field. Contractor shall provide the Project Engineer and the MDOT Architect with job site and emergency telephone numbers.
 - 2. Storage Facilities: It shall be the Contractor's option to provide watertight storage facilities for storage of cement, lime, and / or other materials subject to water damage. If storage facilities are used, it shall be of sufficient size to hold all materials required for logically grouped activities on the site at one time, and shall have floors raised at least 6 inches above the ground on heavy joists or sleepers. Fully enclosed trailer is allowed, but location must be coordinated with Project Engineer.

1.03 FURNISHING AND MAINTENANCE OF EQUIPMENT

- A. Furnish and maintain all equipment such as temporary stairs, ladders, ramps, scaffolds, hoists, runways, derricks, chutes, elevators, etc. as required for proper execution of the Work of all trades. All such apparatus, equipment and construction shall meet all the requirements of the Labor Law and other applicable State or local laws

1.04 ELECTRIC LIGHTS AND POWER

- A. Supply lights and power when necessary for the progress of the Work. The operating costs shall be borne by the Owner. Temporary wiring, where required, shall be run in conduits.

1.05 WATER

- A. Supply water service. The operating costs shall be borne by the Owner.

1.06 ROADS AND ACCESS

- A. The drive is to remain open at all times. A flagman will be required to control traffic when construction vehicles are present.

1.07 TOILETS FOR WORKMEN

- A. Provide and maintain all necessary toilets for workmen. Toilets are to be maintained in strict accordance with the regulations of the State Board of Health. The toilets are to be located on the site as directed by the Project Engineer or his authorized representative.

1.08 SECURITY / PROTECTION PROVISIONS

- A. The types of temporary security and protection provisions required include, but are not limited to, fire protection, barricades, warning signs / lights, personnel security program (theft prevention), environmental protection, and similar provisions intended to minimize property losses, personal injuries and claims for damages at Project Site(s).
- B. Barricades and Construction Fence: Provide and erect all necessary barricades and any other protection required. Provide all necessary warning and danger lights from twilight to sunrise.
- C. Fire Extinguishers: Provide types, sizes, numbers and locations as would be reasonably effective in extinguishing fires during early stages, by personnel at project site. Provide Type A extinguishers at locations of low potential for either electrical or grease/oil flammable liquid fires: provide Type ABC dry chemical extinguishers at other locations; comply with recommendations of NFPA No. 10. Post warning and quick-instructions at each extinguisher location, and instruct personnel at Project Site, at time of their first arrival, on proper use of extinguishers and other available facilities at Project Site. Post local fire department call number on each telephone instrument at Project Site.
- D. Environmental Protection Procedures: Designate one person, the Construction Superintendent or other, to enforce strict discipline on activities related to generation of wastes, pollution of air/water/soil, generation of noise, and similar harmful or deleterious effects which might violate regulations or reasonably irritate persons at or in vicinity of Project Site.
- E. Water Control: Provide pumps as required to keep the excavation free from standing water and shall slope the excavation to prevent water from running toward existing buildings at all times.

1.09 BURNING OF TRASH

- A. No burning of trash or debris shall be done on Owner's property. All such materials shall be removed from the site and disposed of in accordance with local laws and ordinances.

1.10 POWDER ACTUATED TOOLS

- A. The use of powder actuated tools shall be prohibited from use during all phases of the construction, unless explicitly approved in writing, prior to construction, by the Project Engineer.

1.11 FIRE HAZARDS

- A. Special precautions shall be taken to reduce fire hazards where electrical or gas welding or cutting Work is done and suitable fire extinguishing equipment shall be maintained near such operations.

1.12 CONDUCT OF WORKERS

- A. Workmen, who, because of improper conduct or persistent violation of Owner's requirements, become objectionable, shall be removed at the Owner's request. Inform all workmen of Owner's requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 61 15

BASIC PRODUCT REQUIREMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The products of The Work and the requirements for their quality, delivery, handling, storage, protection and installation.

1.02 DEFINITIONS

- A. "Products". Defined as: The materials, machinery, equipment, components, and systems, in whole or in part, incorporated into The Work. "Products" does not include materials, tools, devices, machinery, equipment and systems used for the preparation, manufacture, fabrication, conveying and installation of The Work.
- B. "Level of Excellence". Defined as: The degree of quality for the Products and Workmanship of this Project. The required "degree of quality" shall be established on the basis of one or more of the following criteria which shall become the minimum acceptable "level of excellence" for the Work of this Project:
1. Products selected by Architect / Engineer.
 2. Architect's / Engineer's Specifications.
 3. Reference Standards.
 4. Manufacturer's Instructions.
 5. Industry Standards.
 - a. In the absence of all the criteria from the Specifications Section, the normal local Industry Standard shall prevail. The Party or Parties responsible for the required work shall be experienced in the work to be provided; shall have knowledge as to what, in the local area, constitutes "good and acceptable practice" in producing the completed Work of this Section, and will be expected to provide nothing less.
 - 1) Example: Masonry and Drywall Contractors are expected to know that Industry Standards, "good practice", and "common sense" dictate, to prevent cracks in the completed work, control joints must be installed at minimum distances or should be placed in certain locations where movement or other stress conditions are likely to occur. When such items are not specified or shown on the Drawings, the Contractor will be expected to request the MDOT Architect's clarification for location (primarily for esthetic considerations) and then provide not less than the minimum Industry Standard, at no additional cost to the Owner.
- C. "Standard of Quality". Defined as: A specific and particular manufacturer whose product(s) has / have been selected by the Architect as amply suitable to meet the Project requirements in one or more of the following criterions: appearance, physical attributes, performance characteristics, appropriateness for intended use, and cost.
1. The work of the individual Specification Section will be based on product(s) of the "Standard of Quality Manufacturer" and the product(s) of that manufacturer, designated within the Specifications Section by catalog number(s) (or other identification), shall become "Standard of Quality Product(s) and the basis by which the product(s) of "Other Acceptable Manufacturers", and any substitutions, are judged.
 2. In the absence of the designation "Standard of Quality", such as for generic product, material or system, then the specified item (product, material or system) shall be the reference standard and shall become the "Standard of Quality".
- D. "Equivalent Products". Defined as: Products having a level of excellence which, in the MDOT Architect's judgment, is equal to the level of excellence established by the product(s) selected as Architect's / Engineer's "Standard of Quality".

- E. "Manufacturer". Defined as: An entity whose principal business is the manufacturing, fabricating, assembling, and / or supplying of products / systems from off site for incorporation (in whole, or in part, such as components of a system) into the construction at the Project Site.
1. The Architect's / Engineer's selection of a particular manufacturer usually is on the basis of the manufacturer's reputation within the Construction Industry, and / or "track record" with the Architect / Engineer, for producing quality products on time, and providing responsive follow-up and reliable warranties.
 2. The terms "Fabricator" and "Supplier" used in these Specifications shall be synonymous with "manufacturer".
- F. "Other Acceptable Manufacturers". Defined as: Manufacturers who have qualifications and products similar to those of the "Standard of Quality" Manufacturer (see above) selected by Architect / Engineer and are therefore "acceptable" to offer any of their products considered to be "equivalent" to the specified product(s).
1. To the best of the Architect's / Engineer's knowledge, information and belief, the manufacturers, listed as "Other Acceptable Manufacturers", now have products available that are considered to be "equivalent" to the specified product (or selection) of the "Standard of Quality" Manufacturer. Where no "Standard of Quality" is indicated then any of the "Acceptable Manufacturers" listed may offer products complying with the specified requirements.
 2. The inclusion of particular manufacturers as "Other Acceptable Manufacturers" does not signify that other (that is, unlisted) manufacturers are not acceptable or that they do not have equivalent products nor does the omission of any manufacturer's name indicate unacceptability for any reason.
 3. Manufacturers, who are not listed in the Contract Documents, and who desire consideration, must submit their product under provisions of Section 01 62 14 - Product Options and Substitutions Procedures.

1.03 QUALITY ASSURANCE – GENERAL

- A. The quality of all products and workmanship shall be in accordance with the provisions of this Section and the requirements of the individual Specifications Section.
- B. Whenever a "level of excellence" higher than the minimum industry standard is expected for products and workmanship, the more rigid standards and precise requirements will be indicated within individual Specifications Sections.
1. Example: For whatever reason, the Architect may specify a "dry film thickness (DFT)" for a coating that is more than the manufacturer's recommendation or than normally available in a three coat system. It shall be the Contractor's responsibility to achieve the required DFT with one or more additional coats, none of which shall be more than the manufacturer's recommendation for wet film thickness, for a single coat, when applied.
- C. Establishing and maintaining Project Quality Control shall be the responsibility of the Contractor.

1.04 QUALITY ASSURANCE – PRODUCTS

- A. All products incorporated into The Work shall be new except where otherwise provided by the Contract Documents and shall comply with the requirements of the individual Specifications Sections and as supplemented herein. All products incorporated into the Work shall be asbestos free. Products containing asbestos are not acceptable and will be considered as defective material. Whenever these products containing asbestos are discovered, they shall be removed from the Work at no cost to the Owner. Contractor shall certify that all materials incorporated into the Work are asbestos free, refer to Section 01 77 00 - Closeout Procedures.

B. Matching / Mating of Products:

1. Products required in quantity within a Specifications Section shall be the same, and shall be interchangeable.
2. All manufactured products exposed to view, especially those considered as "Finishes" (including, but not limited to, items as floor material, wall coverings, glass, paint ceiling tile, that are installed or applied directly from manufacturer's containers), shall be of the same factory "run".
3. The Contractor is expected to secure a sufficient quantity with initial purchase to avoid running short. Materials within an area that do not match, as a result of such failure, will be cause to reject all materials and will not be grounds for additional compensation.

C. Extra Materials: When required by individual Specifications Sections, provide products, spare parts and maintenance material in condition and quantities required. All "extra materials" shall be of the same factory "run" as installed materials. Deliver to Project Site, properly store in appropriate locations, and obtain receipt from authorized person prior to Final Payment.

1.05 QUALITY ASSURANCE – WORKMANSHIP

A. Comply with the "level of excellence" required by individual Specifications Sections. In the absence of specific requirements, comply with product(s) manufacturer's instructions and Industry Standards.

B. Use only suitably qualified craftsmen to produce work of the specified quality.

1. Craftsmen shall be of excellent ability, thoroughly trained and experienced in types of work required, completely familiar with the quality standards, procedures and materials required.
2. In the acceptance or rejection of manufactured and / or installed work, the MDOT Architect will make no allowance for the lack of skill on the part of workmen.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

D. Provide finishes to match approved samples.

E. Adjusting of Operating Products: As follows:

1. Adjust moving parts of product / equipment (including, but not limited to, doors, drawers, hardware, appliances, mechanical and electrical equipment) to ensure smooth and unhindered operation and movement at time when Owner assumes control of item's use.
2. All items shall be properly set, calibrated, balanced, lubricated, charged, and otherwise prepared and ready for intended use.
3. Starting of Systems: When specified in individual Sections, require manufacturer's representative to be present at the Site to inspect, check, and approve equipment installation prior to start-up; to supervise placing equipment in operation; and to certify by written report that equipment has been properly installed, adjusted, lubricated, and satisfactorily operated under full load conditions.
4. Equipment/systems Demonstrations and Personnel Instruction: When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems and to instruct Owner's personnel on proper operation and maintenance manuals as basis of instruction and demonstration. Include start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at schedule times, at equipment location.

1.06 TRANSPORTATION AND HANDLING

- A. Transport products by means and methods to avoid product damage; deliver in undamaged condition in manufacturers' unopened containers or packaging, keep dry.
- B. Provide equipment and personnel to handle products by means to prevent soiling or damage.
- C. Promptly inspect shipments for compliance with requirements, quantities, and damage.

1.07 STORAGE AND PROTECTION

- A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weathertight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions. Protect prefinished surfaces from damage or deterioration by acceptable means; do not use adhesive papers, sprayed or strippable coatings that bond when exposed to sunlight or weather.
- B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering (do not use "Visqueen" or other polyethylene sheeting when subject to direct sunlight); provide ventilation to avoid condensation.
- C. Store loose granular materials on solid surface in a well-drained area; prevent mixing with foreign matter.
- D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under specified conditions and are fit for use.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 62 14

PRODUCT OPTIONS AND SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

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

1.02 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standards, select any product meeting standards by any manufacturer.
- B. For products specified by naming several (minimum of three) products or manufacturers, select any product and manufacturer named. Contractor must submit request, as required for substitution, for any product not specifically named and give reasons for not using product specified. Substitutions WILL NOT be granted unless reasons are considered justified.
- C. For product specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or approved equal" after specified product, Contractor must submit request, as required for substitution, for any product not specifically named.
- D. For products specified by naming only one product and manufacturer, an equivalent product will always be accepted if it is equal in all respects (size, shape, texture, color, etc.). The Contractor must submit a request for substitution as set forth in this section
- E. For products specified by naming only one product and manufacturer and stating no substitutions will be accepted, there is no option and no substitutions will be allowed.

1.03 PRODUCT SUBSTITUTION LIST

- A. The Architect will NOT consider requests for substitutions during bidding.
- B. Within 45 days after Notice to Proceed, submit to the MDOT Architect 4 copies of complete list of all proposed product substitutions. Substitutions WILL NOT be considered if received after this time.
- C. Tabulate list by each Specification Section.
- D. For named products specified with 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.

- D. Proposed product will be reviewed for incorporation into the Project. Contractor will be notified for substitution rejection if not allowed, or will be instructed to submit in standard substitution submittal process for approval. See attached Substitution Request Form.

1.04 SUBSTITUTIONS

- A. The MDOT Architect will consider formal written requests from Contractor for substitution of products in place of those specified. **ONLY ONE REQUEST** per product will be allowed. Refer to Section 01 33 00 - Submittal Procedures. Include in request:

1. Complete data substantiating compliance of proposed substitutions with Contract Documents.
2. For products:
 - a. Product identification including manufacturer's name and address.
 - b. Manufacturer's literature: Submit literature of actual product specified and literature of proposed substitution with all comparable features or components highlighted. Highlighted information is to include, but shall not be limited to, product description, performance, test data and reference standards.
 - c. Samples of the proposed substitution.
 - d. Name and address of 3 similar projects on which product was used and date of installation.
3. For construction methods:
 - a. Detailed description of proposed method.
 - b. Drawings illustrating methods.
4. Itemized comparison of proposed substitution with product or method specified.
5. Data relating to changes in construction schedule.
6. Accurate cost data on proposed substitution in comparison with product or method specified.

- B. In making request for substitution, Contractor represents:

1. He has personally investigated proposed product or method, compared the product specified with the proposed substitution, and determined that it is equal or superior in all respects to that specified.
2. He will provide the same guarantee for substitution as for product or method specified.
3. He will coordinate installation of accepted substitution into Work, making such changes required of Work to be complete in all respects.
4. He waives all claims for additional costs related to substitution that consequently becomes apparent.
5. Cost data is complete and includes all related costs under his Contract.

- C. Substitutions WILL NOT be considered if:

1. They are 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.
3. In the MDOT Architect's judgment, the product or material is not equal.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRODUCT SUBSTITUTION REQUEST FORM (AS FOLLOWS)

SUBSTITUTION REQUEST FORM

PROJECT: _____ PROJECT NO. _____

OWNER: _____

CONTRACTOR: _____

ARCHITECT: _____

CONTRACTOR'S REQUEST, WITH SUPPORTING DATA

1. Section of the Specifications to which this request applies:

Product data for specified item and proposed substitution is attached (description of product, reference standards, performance and test data).

Sample is attached

2. Itemized comparison of proposed substitution with product specified.

ORIGINAL PRODUCT

SUBSTITUTION

Name, brand _____

Catalog No. _____

Manufacturer _____

Significant variations: _____

3. Proposed change in Contract Sum:

Credit to Owner: \$ _____

Additional Cost to Owner: \$ _____

4. Effect of the proposed substitution on the Work:

Contract Time: _____

Other Contracts, if any: _____

CONTRACTORS STATEMENT OF CONFORMANCE OF PROPOSED
SUBSTITUTION TO CONTRACT REQUIREMENTS

I / We have investigated the proposed substitution. I / We

1. Believe that it is equal or superior in all respects to originally specified product, except as stated in 2. above;
2. Will provide same warranty as required in Contract Documents;
3. Have included all cost data and cost implications of proposed substitution; including, if required, costs to other contractors, and redesign and special inspection costs caused by use of proposed substitution;
4. Will coordinate incorporation of proposed substitution in the Work;
5. Will modify other parts of the Work as may be needed, to make all parts of the Work complete and functioning;
6. Have verified that use of this substitution conforms to all applicable codes.
7. Waive future claims for added cost to Owner caused by proposed substitution.

CONTRACTOR _____ DATE: _____
Signature

ARCHITECT'S REVIEW AND ACTION

- ___ Accepted
- ___ Not Accepted
- ___ Provide more information in the following categories and resubmit _____
- ___ Sign Contractor's Statement of Conformance and resubmit
- ___ Proposed substitution is accepted, with the following conditions:

Change Order will make the following changes:

(Add to) (Deduct from) Contract Sum: \$ _____

(Add to) (Deduct from) Contract Time: _____ days

ARCHITECT: _____ DATE _____

OWNER: _____ DATE _____

_____ Accepted

_____ Not accepted

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Scope: To set forth broad general conditions covering cutting and patching that applies to everyone and everything on the job.
- B. Execute cutting including excavating, fitting or patching or work required to:
 - 1. Make several parts fit properly.
 - 2. Uncover work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to Contract requirements.
 - 5. Install specified work in existing construction.
- C. In addition to Contract requirements, upon MDOT Architect's written instructions:
 - 1. Uncover work for observation of covered work.
 - 2. Remove samples of installed materials for testing.
 - 3. Remove work to provide alteration of existing work.
- D. Do not cut or modify work of another Contractor without his consent.
- E. Payment for Costs: Costs caused by ill-timed, defective or work not conforming to the Contract will be borne by party responsible for ill-timed, defective or non-conforming work.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Materials for replacement of work removed shall comply with individual Specifications Sections for type of work to be done.

PART 3 - EXECUTION

3.01 GENERAL

- A. Inspection: Inspect existing conditions of work, including elements subject to movement or damage during cutting and patching.
- B. Preparation prior to cutting: Provide shoring, bracing and supports required to maintain structural integrity. Provide protection for other portions of project and protection from the elements.

C. Performance:

1. Execute cutting and demolition of methods that prevent damage to other work and will provide surfaces to receive installation of repairs and new work.
2. Execute excavating and backfilling by methods that prevent damage to other work and prevent settlement
3. Restore work that has been cut or removed install new products to provide completed work in accordance with requirements of the Contract Documents.
4. Refinish entire surfaces as necessary to provide an even finish. Refinish continuous surfaces to the nearest intersection and assemblies.

END OF SECTION

SECTION 01 74 00 CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Scope: Maintain premises and public properties from accumulations of waste, debris, and rubbish, caused by operations. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials and clean all sight-exposed surfaces; leave project clean and ready for occupancy.
- B. Dispose of all waste, debris and rubbish in accordance with the Owner's requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use only cleaning materials recommended by the manufacturer of surface to be cleaned, but cross reference cleaning materials used on surfaces to insure they are recommended by the cleaning material manufacturer.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute cleaning to insure that structure, grounds, and surrounding properties are maintained free from accumulations of waste materials and rubbish. Wet down dry materials and rubbish to lay dust and prevent blowing dust. Clean site and surrounding properties at reasonable intervals during progress of Work, and remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off MDOT owned property. Handle materials in a controlled manner with as few handling as possible; do not drop or throw materials from heights. Schedule cleaning operations so that dust or other contaminants resulting from cleaning process will not fall on wet or newly painted surfaces.
- B. No materials may be disposed of by dumping them in the sanitary or storm sewer systems without specific approval by the Owner.
- C. Washdown of cement trucks will be done at locations determined by the Project Engineer.

3.02 FINAL CLEANING

- A. Employ experienced workmen, or professional cleaners, for final cleaning. In preparation for Inspection of structure, conduct final inspection of sight-exposed surfaces and concealed spaces. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed finished surfaces. Repair, patch and touch up marred surfaces to specified finish to match adjacent surfaces.
- B. Remove temporary fencing and leave in same condition as surrounding landscaped areas.
- C. Broom clean paved surfaces; rake clean other surfaces of grounds. Keep Project clean until occupied by Owner.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Scope of Work required under this Section consists of the Final Inspections, submitting of all closeout Documents and related items to complete the Work indicated on the Drawings and described in the Project Manual.

1.02 FINAL INSPECTIONS

- A. Engineer and Architect's Inspection: The Contractor shall make written request for a Final Inspection to the Project Engineer and MDOT Architect. Notice is to be given 10 calendar days prior to this inspection. At the day of inspection, the Contractor shall have in hand 6 copies of the HVAC Test and Balance Report, Reference Specification Sections in Division 23 and 6 copies of a list prepared by the Contractor of deficiencies, which will be edited by the Project Engineer, MDOT Architect and Consultants. A copy of these composite lists will be given to the Contractor for correcting the Work. Within 15 calendar days after this revised list is received, the Contractor shall make all corrections of the items listed. If, in the Project Engineer and MDOT Architect's judgment, the Project is not ready for an Inspection, the Project Engineer may schedule another inspection.
- B. Owner's Inspection: After the Project Engineer and MDOT Architect have determined the Project to be Complete and all punch list items have been corrected, an Owner's Inspection will be scheduled. The Contractor shall submit a letter that states all items have been corrected and submit required closeout Documents. The Owners may add to the punch list items; if it is determined that corrective work still needs to be done. Within 15 calendar days after this revised list is received, the Contractor shall make all corrections of the items listed.
- C. Correction of Work before Final Payment: Contractor shall promptly remove from the Owner's premises, all materials condemned for failure to conform to the Contract, whether incorporated in Work or not, and Contractor shall, at his own expense, replace such condemned materials with those conforming to the requirements of the Contract. Failure to remedy such defects after 10 days written notice will allow the Owner to make good such defects and such costs shall be deducted from the balance due the Contractor or charged to the Contractor in the event no payment is due.
- D. Should additional inspections by the MDOT Architect's Consultants of the Work be required due to failure of the Contractor to remedy defects listed, the Project Engineer may deduct the expense of additional Consultants inspections from the Contract Sum in the Owner / Contractor Agreement. The additional expense will be based on the rate shown for services in the Consultants' Architect or Engineering Services Contract.

1.03 FINAL ACCEPTANCE

- A. The Mississippi Department of Transportation does not recognize the term "Substantial Completion". The Project Engineer shall determine when the building is complete to the point it can be used for its intended purpose and occupied. This date shall be the Date of Completion.
- B. All Warranties and Extended Warranties shall use this Date of Completion as the starting date of Warranty Period.

- C. Final Payment shall not be made until items covered in Closeout Procedures are satisfied. This date shall be the Date of Final Acceptance.

1.04 CLOSEOUT DOCUMENTS

- A. Unless otherwise notified, the Contractor shall submit to the Owner through the Project Engineer to the MDOT Architect 2 copies the following before final payment is made:
 - 1. Request for Final Payment: AIA Document G702, current edition, completed in full or a computer generated form having similar data.
 - 2. Contractor's Affidavit of Payment of Debts and Claims: AIA Document G706, current edition, completed in full.
 - 3. Release of Liens and Certification that all Bills Have Been Paid: AIA Document G706A, current edition, completed in full or a sworn statement and affidavit from the Contractor to the Owner stating that all bills for this project have been paid and that the Owner is released from any and all claims and / or damages.
 - 4. Consent of Surety Company to Final Payment: AIA Document G707, current edition, completed in full by the Bonding Company.
 - 5. Power of Attorney: Closeout Documents should be accompanied by an appropriate Power of Attorney.
 - 6. Guarantee of Work: Sworn statement that all Work is asbestos free and guaranteed against defects in materials and workmanship for one year from Date of Completion, except where specified for longer periods.
 - a. Word the guaranty as follows: "We hereby guarantee all Work performed by us on the above captioned Project to be free from asbestos and defective materials. We also guarantee workmanship for a period of one (1) year or such longer period of time as may be called for in the Contract Documents for such portions of the Work".
 - b. All guarantees and warranties shall be obtained in the Owner's name.
 - c. Within the guaranty period, if repairs or changes are requested in connection with guaranteed Work which, in the opinion of the Owner, is 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 wherein 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.
 - d. 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.
 - e. All special guaranties 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.

7. Project Record Documents: Furnish all other record documents as set forth in Section 01 78 39 - Project Record Documents.
 - a. Provide all certificates, warranties, guarantees, bonds, or documents as called for in the individual Sections of the Project Manual. The Contractor is responsible for examining the Project Manual for these requirements
8. Additional Documents Specified Within the Project Manual:
 - a. General: Provide all Operational and Maintenance documents as called for in the individual Sections of the Project Manual. The Contractor is responsible for examining the Project Manual for these requirements.
 - b. Maintenance Stock: Deliver to Owner all required additional maintenance materials as required in the various Sections of the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Emergency manuals.
 - 2. Operation manuals for systems, subsystems, and equipment.
 - 3. Maintenance manuals for the care and maintenance of products, materials, a finishes systems and equipment.
- B. Related Sections include the following:
 - 1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
 - 3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 4. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.02 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.03 SUBMITTALS

- A. Initial Submittal: Submit 2 draft copies of each manual with request for Final Inspection. Include a complete operation and maintenance directory. MDOT Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit 2 copies of each manual in final form at least 5 days before Owner's Final Inspection. MDOT Architect will return one copy with comments (if required) within 15 days after Owner's Final Inspection.
 - 1. Correct or modify each manual to comply with MDOT Architect's comments. Submit 2 copies of each corrected manual within 15 days of receipt of MDOT Architect's comments.

1.04 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.01 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name, address, and telephone number of Contractor.
 6. Name and address of Architect.
 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 inches by 11 inches paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL", Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.

4. Supplementary Text: Prepared on 8-1/2 inches by 11 inches white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.02 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. Chemical release or spill.
 8. System, subsystem, or equipment failure.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable
 1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

2.03 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 1. System, subsystem, and equipment descriptions.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.

8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.04 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
 - E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
 - F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds. Include procedures to follow and required notifications for warranty claims.
- 2.05 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL
- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
 - B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
 - C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard printed maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
 - D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training videotape, if available from manufacturers / suppliers.

- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.01 MANUAL PREPARATION

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work.
 - 1. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 2. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."
- F. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope: To set forth the minimum procedure and requirements for keeping the Project Record Documents. One of these Documents is to be kept on site throughout the Project.

1.02 MAINTENANCE OF DOCUMENTS

- A. Maintain 2 copies of all: Half-size Contract Drawings, Project Manual (Proposal), Addenda, Change Orders, Warranties, Certificates, Guarantees, Bonds, reviewed Shop Drawings, reviewed submittals (materials, fixtures, appliances, etc.), hardware schedules, field and laboratory test records, equipment brochures, spare parts lists, maintenance and operation manuals and other modifications to the Contract.
- B. Store Record Documents apart from Documents used for construction.
- C. Maintain Record Documents in clean, dry, and legible condition. Do not use Record Documents for construction purposes.
- D. Make Record Documents available at all times for inspection by the Project Engineer, MDOT Architect and Owner.

1.03 RECORDING

- A. General: Mark all modifications in red pencils. Keep Record Documents current. Review log at Progress Meetings. Do not permanently conceal any Work until required information has been accurately recorded.
- B. Contract Drawings: Legibly mark to record actual construction:
 - 1. Horizontal and vertical location of underground and overhead utilities with their connections referenced to permanent surface improvements.
 - 2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - 3. Field changes that involve dimension and detail.
 - 4. Changes made by Supplemental Agreement (Change Order) or Field Order.
- C. Project Manual (Proposal) and Addenda: Legibly mark up each Section to record manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
- D. Shop Drawings: Maintain as Record Documents; legibly mark Drawings to record changes made after review.

1.04 SUBMITTALS

- A. Furnish two (2) copies of all Record Documents.
- B. The information, except Contract Drawings, shall be arranged and labeled by corresponding Specification Section, neatly bound in three ring binders, indexed, and all drawings readable without being removed or unstapled.
- C. The name and address of each subcontractor and material supplier shall be listed in front of each binder along with the Project Manual (Proposal).
- D. Sufficient information, such as as-built control drawings for air handling system and variable drive controls, shall be furnished to allow qualified personnel to service equipment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. Extent of demolition Work is indicated on Drawings. Demolition requires selective removal and subsequent offsite disposal. The building is occupied and it will be necessary for materials stored in building to be relocated to different locations during the demolition and construction.
- B. Types of Demolition Work include, but are not limited to the following items:
 - 1. Portions of building structure indicated on Drawings and as required to accommodate new construction.
 - 2. Removal of portions of exterior brick veneer as indicated on Drawings.
 - 3. Removal of all or portions of interior or exterior partitions as indicated on Drawings.
 - 4. Removal of all exterior building or site items indicated on Drawings.
 - 5. Removal of doors and frames indicated "remove".
 - 6. Removal and protection of existing fixtures and equipment items indicated "salvage".

1.02 REMOVAL WORK SPECIFIED ELSEWHERE

- A. Cutting non-structural concrete floors and walls for piping, ducts, and conduit is included with the Work of the respective Plumbing, HVAC and Electrical Divisions 22, 23 and 26 Specification Sections.
- B. Remodeling and patching is included within the respective sections of Specifications, including removal of materials for re-use and incorporated into remodeling or new construction.
- C. Relocation of pipes, conduits, ducts, fans, other mechanical and electrical work are specified by respective trades.

1.03 SUBMITTALS

- A. At least 7 calendar days prior to beginning demolition submit schedule indicating proposed methods and sequence of operations for selective demolition Work to Project Engineer 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 other requirements.

1.04 JOB CONDITIONS

- A. Owner will vacate the existing building after the Contractor has finished "blacking-in" of the new addition. Provide minimum of twenty-one (21) calendar days advance notice to Owner of demolition activities to proceed in the existing building.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished. 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 operations prior to start of selective demolition Work.

- C. Partial Demolition and Removal: Items indicated to be removed but of salvable value to Contractor may be removed from structure as Work progresses. Items indicated to be removed and turned over to Owner are to be removed from structure as Work progresses and stored as directed by Owner. Items requested at time of Pre-Construction Meeting to be turned over to Owner are to be removed from structure as Work progresses and stored as directed by Owner. Transport salvaged items not indicated to be turned over to Owner from site as they are removed. Storage or sale of removed items not indicated to be turned over to Owner on site will not be permitted.

1.05 PROTECTIONS

- A. 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.
- B. Provide protective measures as required providing free and safe passage of Owner's personnel and general public to and from occupied portions of building.
- C. 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.
- D. Protect from damage existing finish Work that is to remain in place and becomes exposed during demolition operations.
- E. Protect floors with suitable coverings when necessary.
- F. Construct temporary insulated solid dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks if required.
- G. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to insure that no water leakage or damage occurs to structure or interior areas of existing building.
- H. Remove protections at completion of work.

1.06 DAMAGES

- A. Promptly repair damages caused to adjacent facilities by demolition Work at no cost to Owner.

1.07 TRAFFIC

- A. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, corridors, and other adjacent occupied or used facilities.
- B. Do not close, block or otherwise obstruct streets, walks, entrances, canopies, 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 Owner.

1.08 EXPLOSIVES

- A. Use of explosives will not be permitted.

1.09 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

- B. 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.

1.10 ENVIRONMENTAL CONTROLS

- A. 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.
- B. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 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 Project Engineer prior to starting Work.

3.02 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. Cease operations and notify the Project Engineer immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
- B. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
- C. Provide weatherproof closures for exterior openings resulting from demolition Work.
- D. Locate, identify, stub out and disconnect utility services that are not indicated to remain. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of other buildings on site. Provide minimum of 7 calendar days advance notice to Owner if shutdown of service is necessary during changeover. Schedule electrical shut-offs to begin at 6:00 a.m., Saturdays, unless indicated otherwise by Project Engineer.

3.03 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. Schedule demolition at times acceptable to the Owner, which may include after-hours or weekends.
- B. All cutting and patching shall be done in such a manner that at all times the building shall remain dust free and dry at no additional cost to the Owner. All patching upon completion shall meet the following requirements:
 - 1. Blend with the existing materials.
 - 2. Shall be painted.
 - 3. Shall have trim, gaskets, and / or sealant for water and vermin tight construction.
- C. Caution and protective measures shall be used and in place before cutting of any metal or other materials that might spark a fire from combustible oils, dusts, rags, etc.

- D. Demolish concrete in small sections. Cut concrete at junctures with construction to remain using power-driven masonry saw or hand tools. Do not use power-driven impact tools.
 - E. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
 - F. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
 - G. If unanticipated 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 Project Engineer 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.
- 3.04 SALVAGE MATERIALS
- A. Where indicated on drawings as "Salvage" or "To be Reused", carefully remove indicated items, clean, store and protect for later reuse and installation.
 - B. As directed in the Pre-Construction meeting as specific items to be salvaged and given to the Owner, carefully remove indicated items and store where directed by Project Engineer.
- 3.05 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.
 - B. 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.
 - C. Burning of removed materials is not permitted on project site.
 - D. Contractor is required to provide a dumpster for this Project and is not to use the Owners dumpster at any time. Location of the Contractor's dumpster is to be coordinated with the Project Engineer.
- 3.06 CLEAN-UP AND REPAIR
- A. Upon completion of demolition Work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.
 - B. 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

SECTION 03 10 00 CONCRETE FORMING AND ACCESSORIES

PART 1- GENERAL

1.01 SECTION INCLUDES

- A. All concrete formwork and other related items necessary to complete project indicated by Contract Documents unless specifically excluded.

1.02 RELATED ITEMS SPECIFIED ELSEWHERE

- A. Section 03 20 00 – Concrete Reinforcing.
- B. Section 03 30 00 – Cast-in-Place Concrete.

1.03 PROJECT CONDITIONS

- A. Contractor shall examine the substrate over which concrete forms are installed and advise the Project Engineer of conditions detrimental to the installation of concrete formwork. Do not proceed until unsatisfactory conditions have been corrected.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Wood forms: 3/4 inch exterior grade plywood on studs and joists.
- B. Form Ties: Standard snap ties, 1-1/2 inch break-back.
- C. Form Oil: Approved non-staining type, "Noxcrete" or equal. Oil must not affect bonding of finishes on exposed concrete.

PART 3 - EXECUTION

3.01 FORM CONSTRUCTION

- A. Forms shall be properly aligned, adequately braced and mortar tight to produce concrete shapes required by Drawings. Align forms so that the actual surface does not vary from true surface more than 1/8 inch. The surface shall be clean, undamaged, and free of offsets and irregularities at joints. Adequately brace and frame to retain true shapes under vibration and placing strains without leaks, bowing, or deflection.
- B. Studs, girts, and walls shall not be less than 2 by 4's, S4S, construction of standard grade Douglas fir, or equal, selected for straightness. All walls shall consist of at least two 2 by 4's. Studs shall not be spaced more than 16 inches, girts not more than 24 inches and ties not more than 27 inches, on center.
- C. Lightly oil wood forms prior to placing reinforcing, and with oil not permitted on the reinforcing. Where oil form is used, remove excess before pouring concrete.
- D. Meet recommendations of "Recommended Practice for Concrete Form work" ACI 347 unless specified herein otherwise.

3.02 INSERTS AND FASTENING DEVICES FOR OTHER WORK

- A. Provide for installation of inserts, hangers, metal ties, anchors, bolts, dowels, nailing strips, grounds and other fastening devices required for attachment of other Work
- B. Locate partitions for other trades prior to pouring concrete in order that conduits, sleeves and inserts required by others will be installed in the proper locations
- C. Do not install sleeves in any concrete beams or piers except upon approval of the Project Engineer.
- D. Do not put aluminum conduits in concrete.

3.03 FORM REMOVAL

- A. Grade beam and column forms may be removed 24 hours after a pour is completed.
- B. Floor slab wood forms may be removed 10 days after pour, providing compressive strength has reached a minimum of 2500 psi based on job cast cylinders.

END OF SECTION

SECTION 03 20 00 CONCRETE REINFORCING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. All concrete reinforcing and the related items necessary to complete the Project indicated by the Contract Documents unless specifically excluded.

1.02 RELATED ITEMS SPECIFIED ELSEWHERE

- A. Section 03 10 00 – Concrete Forming and Accessories.
- B. Section 03 30 00 – Cast-in-Place Concrete.

1.03 SUBMITTALS

- A. Submit reinforcing steel shop drawings and materials list prior to placement for MDOT Architect's approval. Shop drawings shall include complete DIMENSIONED placing plans including control joint locations, order lists, bend diagrams, and DETAILS SHOWING DIMENSIONS WITH CLEARANCES. Submittals not including this requirement will be considered as an incomplete submittal and will be returned to Contractor for re-submittal.
- B. Furnish mill certificates for steel bar reinforcement, to the Project Engineer certifying that each shipment meets specifications. The fabricator will furnish certificates with bar lists to designate location of shipment and the time steel is delivered to the project.

1.04 QUALITY ASSURANCE

- A. Reinforcing bars shall conform to ASTM A 615 "Deformed Billet-Steel Bars for Concrete".
- B. Mesh reinforcement shall conform to ASTM A 185 "Welded Steel Wire Fabric for Concrete Reinforcement".
- C. Accessories shall conform to American Concrete Institute ACI 301 "Specifications for Structural Concrete for Buildings".
- D. Placement shall be in accordance with approved shop drawings and ACI 318 "Standard Building Code Requirements for Reinforced Concrete".
- E. Comply with ACI 315 "Manual of Standard Practice of Detailing Reinforced Concrete Structures".

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Reinforcing bar steel and mesh shall be handled, shipped and stored in a manner that will prevent distortion or other damage.
- B. Materials shall be stored in a manner to prevent excessive rusting and fouling with dirt, grease, or other bond-breaking coatings.

1.06 PROJECT CONDITIONS

- A. Coordinated placement of concrete reinforcing with installation of concrete formwork, vapor barriers, concrete inserts, conduit and all other items occurring in the area.

PART 2 - PRODUCTS

2.01 STEEL BAR REINFORCEMENT

- A. Bar reinforcement shall conform to ASTM A 615, grade 60, of domestic manufacture. Bars shall be new; free from rust, scale, oil, or other coatings that will prevent bond.

2.02 WELDED STEEL WIRE FABRIC

- A. Shall conform to ASTM A 185, new, free from rust and other coatings that will prevent bond.

2.03 ACCESSORIES

- A. Metal accessories as required shall support reinforcing bars and comply with ACI 315. Chairs and bolsters for use in exposed concrete shall have plastic coated or stainless steel legs or shall be plastic.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Fabricate and place reinforcement in accordance with the latest requirements of the American Concrete Institute and the approved shop drawings. Fabrication shall not proceed until MDOT Architect's approval is obtained.
- B. Reinforcing for one day's pour shall be completely placed and an inspection made by the Project Engineer / MDOT Architect prior to starting the pour.
- C. Concrete Protection for Reinforcement: Minimum coverage shall be as follows unless shown otherwise on drawings:
 - 1. Footings
(bottom and sides) 3 inches clear
 - 2. Slabs 1-1/2 inches clear top and 3/4 inch clear bottom
 - 3. Beams 1-1/2 inch clear to stirrups
 - 4. Walls 2-1/2 inches clear
 - 5. Columns 2 inches clear to verticals
- D. Steel Dowels for successive work shall be wired in correct position before placing concrete. The "sticking" of dowels after placing concrete will not be permitted.
- F. Lap all bars 24 bar diameters at corners, splices and intersections.
- G. INTERRUPT REINFORCING steel at control joints in floor slabs.
- H. Do not weld reinforcing steel unless specifically approved by the Project Engineer.

END OF SECTION

SECTION 03 30 00 CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. All cast-in-place concrete and other related items necessary to complete Project indicated by Contract Documents unless specifically excluded.

1.02 RELATED SECTIONS

- A. Section 03 10 00 – Concrete Forming and Accessories.
- B. Section 03 20 00 – Concrete Reinforcing.
- C. Section 07 26 00 – Vapor Retarders.
- D. Section 09 90 00 – Painting and Coating.

1.03 SUBMITTALS

- A. Submit concrete mix design, concrete compression test reports and product data and manufacturer's installation instructions for concrete curing compound.

1.04 TESTING LABORATORY SERVICES

- A. The Owner will provide testing as specified in Section 01 45 29.

1.05 QUALITY ASSURANCE

- A. Concrete work shall conform to all requirements of ACI 301, Specifications for Structural Concrete for Buildings and ACI 318 Building Code Requirements for Reinforced Concrete, latest editions, except as modified by supplemental requirements herein.
- B. Concrete mix design proportioning shall be by a certified MDOT Class III technician and submitted to the Project Engineer prior to placing concrete. Mix proportions shall meet the requirements of the 804.02.10 Section of the MDOT's Standard Specifications, 2004 Edition, except concrete requiring a trowel finish shall not be air entrained. Concrete shall be sampled according to ASTM C 172 and compression test cylinders made and cured according to ASTM C 31. Control of mixes is to be maintained at the Ready-Mix Plant and on the job site. Adjustments of the mix proportions shall meet the requirements of Section 804.02.10.4 of MDOT's Standard Specifications, 2004 Edition.
- C. The Owner will provide testing as specified in Section 01 45 29 – Testing Laboratory Services. Cylinders, 3 specimens from each sample, are to be cast on the job in accordance with ASTM C 31. Specimens will be tested in accordance with ASTM C 39. One cylinder from each location will be tested at 7 days for information and the other two at 28 days for acceptance. Owner is to make at least one strength (average of two cylinders) for each class of concrete placed on any one day and an additional one strength test for each 100 cubic yards, or fractions thereof, of concrete placed in any one day. Copies of all test reports shall be furnished to the ready mixed concrete producer and as directed by the Project Engineer.

1.06 COORDINATION

- A. Verify that all pipes under grade have been installed and tested before being covered. Check and verify materials and locations of inserts, anchors, and items required by other trades before pouring concrete. Concerned subcontractors shall be notified of date of pour in sufficient time to allow for completion of their work.
- B. The Contractor shall notify the Project Engineer upon completing formwork and all reinforcing steel for the next intended pour, and shall not commence pouring operation until all forms and reinforcing steel are approved by the Project Engineer.
- C. Project Engineer shall have free access to all materials used, and the required samples are to be furnished by the Contractor, as directed.
- D. Inspection and written approval from the floor-covering subcontractor is required for slab finish receiving floor covering.

PART 2 - PRODUCTS

2.01 CONCRETE

- A. All concrete, unless otherwise specifically approved in writing by the Project Engineer, shall be transit-mixed in accordance with ASTM C94. Control of concrete shall be under supervision of testing laboratory as described in Section 01 45 29.
- B. All concrete shall have 3,500-psi minimum compressive strengths at 28 days, unless noted otherwise.
- C. Maximum slump for normal weight concrete shall be 4 inches. Slump may be increased to 6 inches with an approved mid-range water reducer and up to 8 inches with an approved high-range water reducer.

2.02 CONCRETE MATERIALS

- A. Portland Cement: ASTM C-150, Type I.
- B. Water: From an approved source.
- C. Structural Concrete Aggregate: Nominal maximum aggregate size 57 shall be used and shall meet the requirements of MDOT Standard Specifications, 2004 Edition.
- D. Admixtures: Admixtures shall be from the MDOT Approved List. Non-uniform addition of mixtures that result in erratic setting of the concrete will cause rejection of the concrete with subsequent removal from the structure at the concrete producer's expense.

2.03 RELATED MATERIALS

- A. Preformed Expansion Joint Fillers: Provide pre-molded, asphalt impregnated board in widths and thickness required by conditions (1/2-inch minimum). Joint fillers shall conform to ASTM D994, D1751 or D1752.
- B. Chemical Hardener (Sealer): Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent containing not less than 2 pounds of fluosilicates per gallon. Sealer shall not interfere with floor finish.

- C. Curing Compound: Clear bond, manufactured by Guardian Chemical Co., Kure-N-Seal, manufactured by Sonneborn, Safe-Cure, manufactured by Dayton Superior Corp. or approved equal. Compound shall not interfere with bonding or floor finish.
- D. Non-shrink Grout: Shall be one part Portland cement to 2-1/2 parts of fine aggregate or Cement grout ASTM C 387 Dry Package mixtures similar and equal to Masterflow 713, Master Builders; Sonnogrout, Sonneborn; Five Star Grout, U.S. Grout Company.

2.04 CONCRETE MIXES

- A. The ready-mix concrete shall be mixed and delivered in accordance with requirements of ASTM C 94. Uniformly and accurately control proportions of material weight. Slump tolerances given in ASTM C 94 apply. Calcium chloride shall not be used.
- B. Failure of concrete to meet the specified requirements may result in rejection with subsequent removal and replacement or re-testing (including coring, load test, etc.) at the supplier's expense. Concrete exhibiting adverse reaction as a result of the presence of deleterious substances shall be removed and replaced or repaired in a manner completely satisfactory to the Project Engineer. All cost of such corrective action, including all necessary testing, shall be borne by the concrete producer.
- C. The Contractor may request adjustment to concrete mix design when characteristics of materials, job conditions, weather, test results, or circumstances warrant, at no additional cost to the Owner and as approved by the Project Engineer. Laboratory test data for revised mix designs and strength results must be submitted to and approved before using in the Work.

PART 3 - EXECUTION

3.01 PLACING CONCRETE

- A. Concrete shall be placed so as to avoid segregation of materials and to prevent cold joints by avoiding re-handling, by keeping pours generally level, and by adequate vibration. Placing is not to be started during rain or snow, and if placing is underway when such conditions occur, continue operations only long enough to provide a suitable construction joint.
- B. During hot weather or periods of low humidity combined with a definite breeze, rapid loss of moisture shall be discouraged by thorough wetting of forms and by using a fine fog spray when finishing. At these times particular attention shall be given to providing an adequate number of finishers to expedite this operation. During cold weather fresh concrete shall be protected from freezing.
- C. Prior to placing, forms shall be cleaned free of foreign material and shall be washed down with water. Placing shall be a continuous operation between planned construction joints with fresh cement mixed only with plastic concrete already in place. Avoid cold joints.
- D. Vibration shall be thorough, using vibrators small enough to work within reinforcing. The vibrator shall be inserted at many points about 24 inches apart. Avoid over-vibration and transporting concrete in form by vibration. A spare vibrator, which will operate, shall be kept on the job during all placing operations.

3.02 CONSTRUCTION JOINTS

- A. Locate construction joints and provide shear keys as directed by the Project Engineer / MDOT Architect. Allow concrete to set for 24 hours before an adjoining pour is started. Slabs across the joint shall be level and the surface shall be level and shall not be feathered. Before proceeding with the following pour at a joint, thoroughly clean the joint, remove all loose material, and brush in a thick cement slurry.

3.03 CURING

- A. Keep all concrete moist for 5 days after placing by covering with concrete curing paper, by leaving forms in place or by using curing compound. All combined with regular wetting as necessary.

3.04 PATCHING

- A. Honeycombed and defective concrete shall be removed and replaced, or repaired, as directed by the Project Engineer. Form tie holes and minor areas, as determined by the Project Engineer, shall be repaired as follows:
 1. Completed patch shall be indistinguishable from surrounding surfaces in color and texture.
 2. Patching mixture, using same cement sand as used in concrete shall consist of 1 part cement to 2-parts sand, with just enough mixing water to permit placing. Premix mixture, allow standing at least 30 minutes before using, stirring with trowel during this period.
 3. Remove material to sound concrete, dampen surface and brush thick 1 to 1 cement sand bond coat into surface.
 4. When bond coat begins to lose water sheen, thoroughly pack patching mixture in place, leaving it somewhat higher than adjacent surface. Embed pieces of gravel by hand into patch.

3.05 FINISHES FOR FLATWORK

- A. Trowel finish floor surfaces scheduled as concrete finish walking surfaces, or floor surfaces scheduled to receive floor covering. Trowel finished surfaces shall be true planes within 1/8 inch in 10 feet as determined by a 10 foot straightedge placed anywhere on the slab in any direction.
- B. Smooth trowel finish after the surface is screeded and floated. Start troweling when all water has disappeared from the surface to first level the surface, then start final troweling when concrete has set where it no longer shows indentation from finger pressure. Trowel to a hard, smooth surface free of marks. Dusting of cement or cement and sand will not be permitted.
- C. Interior floors, with concrete finish scheduled, shall receive an application of hardener compound applied according to manufacturer's published instructions. Concrete surfaces to receive ceramic floor tile or brick shall receive float finish.
- D. Exterior walks and ramps shall have smooth trowel and fine broom finish.

- E. Exterior sign base shall have a Class 2, Rubbed Finish as follows:
1. After removal of forms, the Class 1 finish shall be completed and the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for at least three hours.
 2. Surfaces shall be rubbed with a medium course Carborundum stone using a small amount of mortar on its face. The mortar shall be composed of cement and sand mixed in the proportions used in the concrete being finished. Rubbing shall be continued until all form marks, projections, and irregularities have been removed, all voids filled, and a uniform surface has been obtained.
 3. The final finish shall be obtained by rubbing with a fine Carborundum stone and water. This rubbing shall continue until the entire surface is a smooth texture and uniform color.
 4. After the final rubbing is completed and the surface has dried, it shall be rubbed with burlap to remove loose powder and objectionable marks.

3.06 FINISHES FOR GRADE BEAMS

- A. Exposed grade beam faces shall have a smooth form finish obtained by using selected form facing plywood, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with all fins or other projections completely removed and smoothed. Provide grout cleaned finish consisting of 1 part Portland Cement to 1-1/2 parts fine sand by column, and mix with water to the consistency of thick paint. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that the final color of dry grout will closely match adjacent concrete surfaces.
- B. Thoroughly wet concrete surfaces and apply grout immediately 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.

END OF SECTION

SECTION 03 54 00

CAST UNDERLAYMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. A specially formulated, medium-bed self-leveling cementitious underlayment, to level and repair concrete floors up to one inch thickness prior to installation of finished flooring.

1.02 SUBMITTALS

- A. Submit manufacturer's technical product data and installation instructions for materials required.

1.03 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in cementitious underlayment systems with 10 years minimum experience and have continuing in-house quality control system to assure highest standards of quality.
- B. Installer: Company with 3 years minimum experience, with a record of successful in-service performance, who is thoroughly familiar with manufacturer's installation requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination of materials by water, freezing, foreign matter or other causes.
- B. Deliver and store materials on site at least 24 hours before work begins.
- C. Provide heated and dry storage facilities on site.

1.05 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with manufacturer's printed recommendations.
- B. Maintain temperatures at not less than 50 degrees F during installation and 7 days after completion unless higher installation standards are required by manufacturer's written instructions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Mapei Corporation, 1501 Wall Street, Garland, Texas 75401-4046 Tel. (800) 992-6273.

- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Ardex Engineered Cements, Aliquippa, PA. Tel. (724) 203-5000.
 - 2. Hacker Industries, Inc., Newport Beach, CA. Tel. (800) 642-3455.
 - 3. Maxxon Corporation, Hamel, MN. Tel. (800) 356-7887
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures

2.02 MATERIALS

- A. Shall be equal to ULTRA/PLAN M. B., medium bed cement-based self-leveling underlayment, as manufactured by Mapei Corporation.

2.03 MIXES

- A. Site mix self-leveling underlayment with clean water in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Installer must examine areas and conditions under which this Work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the installer and are in compliance with manufacturer's instructions.

3.02 PREPARATION

- A. Prepare substrate in accordance with manufacturer's printed instructions.

3.03 INSTALLATION

- A. Install underlayment in strict accordance with manufacturer's printed instructions.

3.04 PROTECTION

- A. Protect from foot traffic for a minimum of 3 hours after installation.
- B. Protect from general traffic, dirt and dust from other trades until final flooring surface has been completely laid.

END OF SECTION

SECTION 04 01 25

UNIT MASONRY RESTORATION AND CLEANING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The extent of masonry restoration and cleaning required is shown on the drawings. The work of this section includes the following:
 - 1. Cleaning exposed brick masonry and cast stone surfaces.
 - 2. Replace deteriorated brick.
 - 3. Repointing brick masonry and cast stone joints.
 - 4. Coat upper surfaces of cast stone columns and wash joints.
 - 5. Waterproofing existing brick masonry and cast stone surfaces.
 - 6. Sealing joints at cast stone columns and masonry cracks.
 - 7. Sealing building expansion joints.

1.02 RELATED SECTIONS

- A. Section 04 20 00 – Unit Masonry
- B. Section 07 92 00 – Joint Sealants

1.03 QUALITY ASSURANCE

- A. Work shall be performed by a restoration contractor with not less than 5 years successful experience in masonry restoration projects similar in size and scope to the work of this project. The contractor shall employ personnel skilled in the restoration processes and operations indicated. The restoration contractor shall be licensed by the State of Mississippi as a masonry / restoration contractor.
- B. Prior to start of general masonry restoration, prepare the following sample panels on building where directed by MDOT Architect. Obtain MDOT Architect's acceptance of visual qualities before proceeding with the work.
 - 1. Prepare one sample area of approximately 3 feet high by 6 feet wide for waterproofing, demonstrating methods of surface preparation and waterproofing application. Tests shall be applied using the same equipment as for job application.
 - 2. Prepare on sample area of approximately 3 feet by 3 feet for sealing joints in cast stone columns, demonstrating methods of joint preparation and sealant application.
 - 3. Prepare one sample area of approximately 3 feet high by 6 feet wide for cleaning masonry surfaces, demonstrating methods of cleaning. Tests should be applied using the same equipment as for job application.
- C. Obtain materials for masonry restoration from a single source for each type material required (cement, sand, etc.) to ensure match of quality, color, pattern, and texture to the existing building.

1.04 SUBMITTALS

- A. Submit manufacturer's technical data (not material safety data sheets) for each product indicated including recommendations for their application and use. Include reports and certifications substantiating that products comply with requirements.

- B. Submit restoration contractor's and manufacturer's sample warranties prior to application for MDOT Architect's approval.
- C. Submit restoration contractor's qualifications including list of completed projects.
- D. Submit written program for each phase of restoration process including protection of surrounding materials on building and site during operations.
- E. Submit samples of the following prior to erection of mock-up:
 - 1. Mortar for pointing and masonry rebuilding and repair, in form of 6 inch long by 1/2 inch wide sample strips of mortar set in aluminum or plastic channels or on-site samples.
 - 2. Chemical cleaning material.
 - 3. Breathable masonry coating in form of 12 inch by 12 inch sample on plywood.
 - 4. Caulking.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original and unopened containers and packaging, bearing labels indicating type and names of products and manufacturers.
- B. Protect masonry restoration materials during storage and construction from wetting by rain, snow, or ground water, and from staining or intermixture with earth or other types of materials.

1.06 PROJECT CONDITIONS

- A. Clean masonry surfaces only when air temperatures are 40 degrees F. and above and will remain so until masonry has dried out, but for not less than 7 days after completion of cleaning.
- B. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 degrees F. and 80 degrees F. and will remain so for at least 48 hours after completion of work.
- C. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.
- D. Protect sills, ledges and projections from mortar droppings.

1.07 SEQUENCING/SCHEDULING

- A. Perform masonry restoration work in the following sequence:
 - 1. Rake out mortar from brick masonry and cast stone joints.
 - 2. Replace deteriorated brick.
 - 3. Seal joints at cast stone and masonry cracks.
 - 4. Coat upper surfaces of cast stone and wash joints.
 - 5. Repoint brick masonry and cast stone joints.
 - 6. Seal building expansion and control joints.
 - 7. Clean exposed brick masonry and cast stone surfaces.

8. Waterproof existing brick masonry surface and cast stone surfaces.
9. Clean and/or repair adjacent finishes damaged or soiled during the progress of the work.

1.08 WARRANTIES

- A. Masonry restoration work shall be guaranteed for a period of 5 years. The guarantee period shall begin upon issuance of notice of completion. This shall be a notarized guarantee from the Restoration Company performing this work stating that their work will be guaranteed for this period. This guarantee is to include labor and material with no cost to the Owner.
- B. A 10-year water repellant material warranty shall be issued by manufacturer upon completion.

PART 2 - PRODUCTS

2.01 MASONRY MATERIALS

- A. Portland Cement: ASTM C 150, Type 1
- B. Hydrated Lime: ASTM C 207, Type S
- C. Aggregate for Mortar: ASTM C 144. Match size, texture and gradation of existing mortar as closely as possible.
- D. Colored Mortar Pigment: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes to match existing mortar. Use only pigments with record of satisfactory performance in masonry mortars which are clean, free of oils, acids, alkalis and organic matter.

2.02 CLEANING MATERIALS AND EQUIPMENT

- A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
- B. Brushes: Fiber bristle only.
- C. Acidic Cleaner: Manufacturer's standard strength acidic masonry restoration cleaner composed of hydrofluoric acid blended with other acids including trace of phosphoric acid and combined with special wetting systems and inhibitors. Equal to Sure Klean Restoration Cleaner by ProSoCo, Inc.
- D. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, if any, at rates indicated for pressure, measured at spray tip, and for volume.
- E. For spray application of chemical cleaners, provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray-tip.
- F. For spray application of water, provide fan-shaped spray-tip which disperses water at an angle of not less than 15 degrees.
- G. Unless otherwise indicated, dilute chemical cleaning materials with water to produce solutions of concentration indicated but not greater than that recommended by chemical cleaner manufacturer.

2.03 MORTAR MIXES

- A. Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.
- B. Mix pointing mortar in strict accordance with manufacturer's written instructions.
- C. Where colored mortar pigments are indicated do not exceed pigment-to-cement ration of 1 to 10, by weight.
- D. Do not use admixtures of any kind in mortar, unless otherwise indicated.
- E. Mortar Proportions:
 - 1. Comply with ASTM C 270, Proportion Specification, Type N, unless otherwise indicated with cementitious material content limited to portland cement-lime.
 - 2. Add colored mortar pigment to produce mortar colors required.

2.04 SEALANT MATERIALS

- A. Bond Breaker Tape: Equal to that manufactured by Trimco.
- B. Sealant: 1 part urethane equal to Sonolastic NP 1 manufactured by Rexnord Chemical Products, Inc., a Sonneborn building product. Color to match mortar.
- C. Backer Rod: Equal to Sonofoam Backer Rod by Sonneborn.

2.05 WATERPROOFING MATERIALS

- A. An alkyd-alkoxy base high solids coating equal to Weather Seal Siloxane by ProSoCo, Inc.

2.06 MASONRY COATING

- A. Pigmented water based breathable coating equal to Breathable Masonry Coating by ProSoCo, Inc. Use recommended primer where required.

2.07 MATERIALS FOR CAST STONE REPAIR

- A. Adhesive for Injection: Epoxy equal to Perm-Inject by Permagile Industries, Inc., 101 Commercial Street, Plainview, NY 11803.
- B. Adhesive for other repairs: Epoxy PG-2130 by Permagile Industries.
- C. Patching compound: Thorite as manufactured by Standard Drywall. 5743 PSI after 28 days.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.

- B. Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, and surrounding buildings from injury resulting from masonry restoration work.
- C. Prevent cleaning and waterproofing solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces which could be injured by such contact.
- D. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.
- E. Protect glass, unpainted metal trim and polished stone from contact with acidic chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.
- F. Protection can be eliminated subject to Project Engineer's approval, if testing demonstrates no detrimental effect from exposure to cleaning solutions.

3.02 CLEANING

- A. Proceed with cleaning in an orderly manner. Work from top to bottom of each scaffold width and from one end of each elevation to the other. Use only those cleaning methods indicated for each masonry material and location. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area at each stage or scaffold setting.
- B. Water Application Methods
 - 1. Spray Applications: Spray-apply water to masonry surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume and equipment. Unless otherwise indicated, hold spray nozzle not less than 6 inches from surface of masonry and apply water from side to side in overlapping bands to produce uniform coverage and an even effect.
 - 2. Low Pressure Spray: 100-400 psi, 3-6 gallons per minute.
- C. Chemical Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations using brush or spray application methods, at Contractor's option, unless otherwise indicated. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.

3.03 MORTAR REMOVAL

- A. Joint Raking: Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1/2 inch nor less than that required to expose sound, unweathered mortar.
- B. Remove mortar from brick masonry and cast stone within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar or caulk. Brush, vacuum or flush joints to remove dirt and loose debris.
- C. Do not spall edges of brick masonry or cast stone units or widen joints. Repair any units which become damaged.

- D. Cut out old mortar by hand with chisel and mallet, unless otherwise indicated. No power tools will be allowed.

3.04 REPLACING DETERIORATED BRICK

- A. Preparatory Work: The Contractor shall determine the areas where deteriorated brick will be replaced and review the work at the building with the Project Engineer and MDOT Architect. No bricks shall be replaced prior to the approval of the Project Engineer and MDOT Architect.
- B. Replacement of deteriorated brick shall be as specified in Section 04200, Masonry.

3.05 REPOINTING BRICK MASONRY

- A. Rinse brick masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water is evaporated or run off, and joint surfaces are damp but free of standing water.
- B. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.
- C. After joints have been filled to a uniform depth, place remaining pointing mortar in 3 layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint-hard before applying next layer. Where existing bricks have rounded edges recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.
- D. When mortar is thumbprint-hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
- E. Where repointing work precedes cleaning of existing masonry allow mortar to harden not less than 21 days before beginning cleaning work.

3.06 SEALING MASONRY JOINTS

- A. Cut out existing mortar. Surface to receive sealant must be structurally sound, dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, membrane materials, and other foreign substances.
- B. All oil and grease should be removed by using toluol xylol, then wiped clean and dry until no solvent film or fingerprints remain.
- C. Apply bond breaker tape at the back of joint.
- D. Apply sealant in accordance with manufacturer's instructions. Additional requirements are found in Section 07920 – Joint Sealants. Caulking and sealing shall be performed when temperatures are above 40 degrees F (+4 degrees C) in order to avoid application to moisture laden surfaces. Moisture on substrates will adversely affect adhesion.

3.07 SEALING BUILDING EXPANSION/CONTROL JOINTS

- A. Remove any existing backer rod and sealant. Surface to receive sealant to be dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, and membrane materials, and other foreign substances.
- B. All oil and grease should be removed by using toluol, xylol, then wiped clean and dry until no solvent film or fingerprints remain.
- C. Apply backer rod at back of joint.
- D. Apply sealant in accordance with manufacturer's instructions. Additional requirements for execution are found in Section 07920 – Joint Sealants. Caulking and sealing shall be performed when temperatures are above 40 degrees F (+4 degrees C) in order to avoid application to moisture laden surfaces. Moisture on substrates will adversely affect adhesion.

3.08 COATING SURFACES

- A. Clean the existing surfaces. Apply primer for masonry coating. Apply in strict accordance with manufacturer's instructions. Allow to dry 10 hours.
- B. Protect adjacent surfaces from overspray or splash of primer. Remove splashes promptly using mineral spirits.
- C. Apply two coats of breathable masonry coating, with brush, roller, or spray in strict accordance with manufacturer's instructions. Allow 24 hours between coats.
- D. Strip existing sealer on all interior brick floors and apply three coats of approved glossy sealer.

3.09 WATERPROOFING

- A. Waterproofing contains blended solvents and should be handled accordingly. Do not use near fire or extreme heat and provide good ventilation to avoid buildup of solvent fumes.
- B. Adjoining glass, metal and painted surfaces shall be protected from overspray and splash of waterproofing. Inadvertent splashes shall be removed using mineral spirits before the solution has dried on the surface.
- C. Surface Preparation: Surface cracks and voids of more than 1/16 inch shall be tuckpointed or patched prior to application of waterproofing. All caulks and sealants should be in place and cured prior to application.
- D. The surface should be clean and free of surface dirt, dust, oil or other surface contaminants. Use proprietary cleaning compounds where necessary followed by thorough rinsing with water. Surfaces to be treated may be damp but should be absorbent to assure good penetration of waterproofing.
- E. Waterproofing shall be applied as packaged. Do not dilute or alter material. Preferred method of application is with low pressure (20 PSI) airless spray equipment or with a heavily saturated brush or roller. Sprayer should be fitted with solvent resistant hoses and gaskets.

- F. Apply waterproofing in a flooding application, from the bottom up with sufficient material applied to produce a 6 inches to 8 inches rundown below the contact point of spray pattern with the surface. Allow the first application to penetrate the surface (approximately three to five minutes) and reapply in the same saturating manner. Less material will be required to saturate the surface on the second application.
- G. When using brush, or rollers, care should be taken to assure that enough solution is applied. Apply sufficient material to thoroughly saturate the surface making sure to brush out heavy runs or drips that do not penetrate.
- H. When applying to horizontal surfaces, waterproofing shall be applied in a single saturating application with sufficient material applied so that the surface remains wet for a few minutes before penetrating into the masonry. Surface residues, pools and puddles shall be broomed out thoroughly until they completely penetrate into the surface.
- I. Porosity and texture of the surface will affect the amount of material necessary for effective treatment. Use manufacturer's guidelines for estimating material requirements for various surfaces. Always test on actual surface to get precise consumption rates.

3.10 REPAIRING DAMAGED CAST STONE

- A. Carefully remove loose stone fragments. Reuse only pieces of spalled stone which are in sound condition.
- B. Remove soil, loose stone particles, mortar, and other debris and foreign material from surfaces to be bonded.
- C. Apply adhesive to comply with adhesive manufacturer's directions. Coat bonding surfaces of building stone and fragment with adhesive completely filling all voids and covering all surfaces. Fit fragments onto building stone while adhesive is still tacky and hold fragment securely in place until adhesive has cured.
- D. Clean any residual adhesive from edges. Wet stone and fill any chipped areas deeper than 1/8 inch with patching mortar. Avoid featheredging. Patched areas to match texture of and be level with adjoining stone surfaces. Keep patching mortar damp for 72 hours.
- E. All hairline cracks to be cut out to a depth of 1 inch and refilled with patching compound.
- F. In areas where original stone is missing, rebuild with patching compound to match contours and finish of original stone. Apply in accordance with manufacturer's instructions.

END OF SECTION

SECTION 04 20 00 UNIT MASONRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Brick masonry cavity wall work as shown on the Drawings and schedules.

1.02 RELATED SECTIONS

- A. Section 09 05 15 – Color Design.

1.03 SUBMITTALS

- A. Submit product data, specifications and other data for each type of masonry unit and accessory required, including certification that each type complies with the specified requirement. Include instructions for handling, storage, installation, cleaning and protection of each. Indicate by transmittal that the Installer has received a copy of each instruction.

1.04 QUALITY ASSURANCE

- A. Fire-rated Masonry: Wherever a fire-resistance classification is shown or scheduled for unit masonry construction (4 hour, 3 hour, and similar designations), comply with the requirements for materials and installation established by the American Insurance Association and other governing authorities for the construction shown.
- B. Job Mock-up: Prior to installation of masonry work, erect sample wall panel mock-up materials, bond and joint tooling shown or specified for final Work. Provide special features as directed for caulking and contiguous work. Build mock-up at the site, where directed, of full thickness and approximately 4 feet by 3 feet unless otherwise shown, indicating the proposed range of color, texture and workmanship to be expected in the completed Work. Obtain Project Engineer / MDOT Architect's acceptance of visual qualities of the mock-up before start of masonry work. Retain mock-up during construction as a standard for judging completed masonry work. Do not alter, move or destroy mock-up until Work is completed. Provide mock-up panel for each type of exposed unit masonry work.

1.05 PROJECT CONDITIONS

- A. Protect partially completed masonry against weather, when Work is not in progress, by covering top of walls with strong, waterproof, non-staining membrane. Extend membrane a minimum of 2 inches down both sides of walls and anchor securely in place.
- B. Protect masonry against freezing when the temperature of the surrounding air is 40 degrees F. and falling. Heat materials and provide temporary protection of completed portions of masonry work. Comply with the requirements of the governing code and with the "Construction and Protection Recommendations for Cold Weather Masonry Construction" of the Technical Notes on Brick and Tile Construction by the Brick Institute of America (BIA).

PART 2 - PRODUCTS

2.01 ACCEPTABLE BRICK MANUFACTURERS

- A. Equivalent products by the following manufacturers are acceptable:
 - 1. Boral Brick, Hattiesburg, Mississippi
 - 2. Columbus Brick, Columbus, Mississippi
 - 3. Old South Brick & Supply Company, Jackson, Mississippi
 - 4. Tri-State Brick & Tile Company, Inc., Jackson, Mississippi
- B. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 MASONRY UNITS

- A. Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.

2.02 BRICK, GENERAL

- A. Unless otherwise shown or specified, provide modular size brick (7-5/8 inches long by 2-1/4 inches high by 3-3/4 inches wide) for exposed vertical brickwork. At Contractor's option, provide solid or cored brick for vertical brickwork. Do not use cored brick with net cross-sectional area less than 75 percent of gross area in the same plane or with core holes closer than 3/4 inch from any edge. Use solid brick in locations where the cores in cored bricks are exposed to view.
- B. Face Brick: Brick exposed to view, ASTM C 216, Grade SW for exterior exposures.
- C. Building (Common) Brick: Brick not exposed to view, ASTM C 62, Grade SW for exterior exposures and Grade NW for interior masonry which will be concealed by other work. Select from manufacturer's standard colors and textures.

2.04 CONCRETE MASONRY UNITS, GENERAL

- A. Manufacturer's standard units with nominal face dimensions of 16 inches long by 8 inches high (15-5/8 inches by 7-5/8 inches actual), unless otherwise shown. Provide special shapes where shown and where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions. Provide UL certified units where indicated.
- B. Hollow Load-Bearing: Provide units complying with ASTM, C 90. Provide lightweight units using ASTM C 331 aggregate for a dry net weight of not more than 105 lbs. per cubic foot.
- C. Classification: Curing shall comply with ASTM C 90, Type II, Nonmoisture-Controlled Units.
- D. Exposed Face: Provide manufacturer's standard color and texture, unless otherwise indicated.

2.05 MORTAR MATERIALS

- A. Mortar mixes shall comply with the requirements of ASTM C 270 Standard Specification for Mortar for Unit Masonry. Type S mortar shall be used for exterior Work. Type N mortar shall be used for interior Work. Mortar color for face brick shall be as selected by the Project Engineer / MDOT Architect from manufacturer's standard colors. Mortar color for building (common) brick shall be natural color or white cement as required to produce the required standard mortar color.
- B. Portland Cement: ASTM C 150 Type I, except Type III may be used for cold weather protection.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Sand: ASTM C 144, except for joints less than 1/4 inches, use aggregate graded with 70 to 100 percent passing the No. 16 sieve.

2.06 MASONRY ACCESSORIES

- A. Provide welded wire units prefabricated in straight lengths of not less than 10 feet, with matching corner and tee units. Fabricate from Cold-drawn steel wire complying with ASTM A 82, with deformed continuous side rods and plain cross-rods, crimped for cavity wall construction (if any), and a unit width of 1-1/2 inches to 2 inches less than thickness of wall or partition. Provide units fabricated with single pair of 9 gage side rods and 9-gage perpendicular cross-rods spaced not more than 16 inches on center. For composite exterior walls with concrete masonry back up, fabricate units with additional side rod spaced for embed in inside face of back up wythe. All units shall be hot-dip galvanized after fabrication and shall conform to ASTM A 153 Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware, Class B-2.
- B. Anchoring Devices for Masonry: Provide straps, bars, bolts and rods fabricated from not less than 16 gage sheet metal or 3/8 inch diameter rod stock, unless otherwise indicated.
- C. Concrete Inserts for Masonry:
 - 1. Furnish dovetail shots with filler strips, where masonry abuts concrete. Fabricate from 24 gage galvanized steel unless otherwise indicated.
 - 2. For installation of concrete inserts, see concrete sections of these Specifications. Advise concrete installer of specific requirements regarding his placement of inserts, which are to be used, by the masonry installer for anchoring of masonry Work.

2.07 EMBEDDED MASONRY CAVITY WALL FLASHING

- A. Through Wall Flashing: Manufacturer's standard product consisting of five-ounce copper coated with flexible asphalt or five-ounce copper reinforced with interlacing sisal fibers and asphalt bonded between two layers of heavy creped kraft paper. Use only where flashing is fully concealed in masonry.
- B. Adhesives, Primers and Seam Tapes for Flashing: Flashing manufacturer's standard products or products recommended by the flashing manufacturer for bonding flashing sheets to each other and to substrate.

- C. Equivalent products by the following manufacturers are acceptable:
 - 1. Advanced Building Products, Inc., Springvale, ME. Tel: (800) 252-2306.
 - 2. AFCO Products, Inc., Somerville, MA. Tel: (617) 623-7700.
 - 3. Fiberweb Div., Clark / Hammerbeam, Corp., Dedham, MA. Tel: (781) 461-1946.
 - 4. York Manufacturing, Inc., Sanford, ME. Tel: (800) 551-2828.
- D. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.08 MASONRY MAT & WEEP VENTS

- A. Manufacturer and Type: Products equal to CavClear Masonry Mat and CavClear Weep Vents as manufactured by Archovations, Inc., PO Box 241, Hudson, WI 54016. Telephone (888) 436-2620.
 - 1. Description: Airspace maintenance and drainage system for masonry cavities to prevent mortar from making contact with the backup to ensure water management. The system shall be fluid conducting, non-absorbent, mold and mildew resistant polymer mesh consisting of 100 percent recycled polymer with PVC binder. Weep Vents shall have "M" notched bottom. Color to be selected by the MDOT Architect from full range of standard colors
 - 2. Mat Size: 1-1/4 inch thick by 16 inches high by 8 feet long.
 - 3. Weep Vent Size: 1/2 inch thick by 2-1/2 inches high by 3-1/2 inches wide.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Advanced Building Products, Inc., Springvale, ME. Tel: (800) 252-2306.
 - 2. Colbond Geosynthetics, Enka, NC. Tel. (800) 664-6638.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.09 RIGID INSULATION

- A. Provide 1 inch thick rigid (extruded) polystyrene insulation board, equal to Dow Chemical Company "Styrofoam" Cavity Mate Plus, conforming to the following:
 - 1. Thermal Resistance: R of 5.0 per inch per ASTM C 518.
 - 2. Board size: 16 inches by 96 inches.
 - 3. Compressive Strength: Minimum 25 psi per ASTM D 1621.
 - 4. Water Absorption: In accordance with ASTM C 272, 0.2 percent by volume max.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Owen Corning, Toledo, Ohio
 - 2. Pactiv Building Products, Atlanta, Georgia.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Masonry installer must examine the areas and conditions under which masonry is to be installed and notify the Project Engineer and the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to masonry installer.

3.02 INSTALLATION

- A. Building masonry construction to the full thickness shown, except, build single-wythe walls 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 inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.
- C. Cut masonry units with motor-driving saw designed to cut masonry with clean, sharp, un-chipped edges. Cut units as required to provide pattern shown and to fit adjoining Work neatly. Use full units without cutting wherever possible.
- D. Wet brick having ASTM C67 absorption rates greater than 0.025 oz. per sq. inch per minute. Determine absorption by drawing a circle the size of a quarter on typical units and place 20 drops of water inside the circle. Wet brick units only if water is absorbed within 1-1/2 minutes. The units shall be wetted thoroughly 3 to 24 hours prior to their use so as to allow moisture to become distributed throughout the unit. The units shall be surface dry when laid.
- E. Do not wet concrete masonry units.
- F. Frozen Materials and Work: Do not use frozen materials or materials mixed or coated with ice or frost. For masonry, which is specified to be wetted, comply with the BIA recommendations. Do not use calcium chloride in mortar or grout.
- G. Pattern Bond: Lay masonry work in a running bond unless indicated otherwise.
- H. 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 corner, jambs and wherever possible at other locations. Lay-up walls plumb and true and with courses level, accurately spaced and coordinated with other work.
- I. Stopping and Resuming Work: Rack back 1/2 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.
- J. Built-in Work: As the work progresses, built-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items. Fill space between hollow metal frames and masonry solidly with mortar.

3.03 MORTAR BEDDING AND JOINTING

- A. Mix mortar ingredients for a minimum of 5 minutes in a mechanical batch mixer. Use water clear and free of deleterious materials, which would impair the work. Do not use mortar, which has begun to set, or if more than 2-1/2 hours has elapsed since initial mixing. Re-temper mortar during 2-1/2 hour period as required restoring workability.
- B. Lay brick and other solid masonry units with completely FILLED BED AND HEAD JOINT; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- C. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout.
- D. Joints: Maintain joints widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints. Cut joints flush for masonry walls that are to be concealed or to be covered by other materials. Tool exposed joints slightly concave. Rake out mortar in preparation for application of caulking or sealant where shown.
- E. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units that have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

3.04 CAVITY WALLS

- A. Keep cavity clean of mortar droppings during construction. Strike joints facing cavity, flush.
- B. Tie exterior wythe to back-up with continuous horizontal joint reinforcing embedded in mortar joints at not more than 16 inches on center vertically.
- C. Place Masonry Mat continuously full height in exterior masonry cavity prior to construction of exterior wythe; follow manufacturer's installation instructions.
 - 1. Install horizontally between wall ties or joint reinforcement.
 - 2. Stagger end joints in adjacent rows.
 - 3. Butt adjacent pieces to moderate contact. Fit to perimeter construction and penetrations without voids.
 - 4. Use multiple layers at bottom of wall and above through-wall flashings when air space depth exceeds masonry mat thickness by more than 3/8 inch.
 - 5. Extend extra mat at least to top of base flashing.
- D. Place Weep Vents in head joints at exterior wythe of cavity wall located immediately above ledges and flashing, spaced 24 inches on center, unless otherwise shown.
 - 1. Install with notched side down.
 - 2. Leave the side of the masonry units forming the vent space un-buttered and clear from mortar.

3. Slide vent material into joint once the two masonry units forming the weep vent are in place.
4. Install the Weep Vents as the wall is being erected so joints do not become filled with mortar or debris.

3.05 HORIZONTAL JOINT REINFORCING

- A. Provide continuous horizontal joint reinforcing as shown and specified.
 1. Fully embed longitudinal side rods in mortar for their entire length with a minimum of cover of 5/8 inch on exterior side of walls and 1/2 inch at other locations.
 2. Lap reinforcement a minimum of 6 inches at ends of units.
 3. Do not bridge control and expansion joints with reinforcing except at wall openings.
 4. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections.
 5. Cut and bend units as directed manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
- B. Space continuous horizontal reinforcing as follows:
 1. For multi-wythe walls (solid or cavity) where continuous horizontal reinforcing also acts as structural bond or tie between wythes, space reinforcing as required by code but not less than 16 inches on center vertically.
 2. For single-wythe walls, space reinforcing at 16 inches on center vertically, unless otherwise shown.
 3. Reinforce masonry opening greater than 12 inches wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8 inches apart, both immediately above the lintel and immediately below the sill. Extend reinforcing a minimum of 24 inches beyond jambs of the opening, bridging control joints where provided.

3.06 ANCHORING MASONRY WORK

- A. Provide anchoring devices of the type shown and as specified. If not shown or specified, provide standard type for facing and back-up involved. Anchor masonry to structural members where masonry abuts or faces such members to comply with the following:
 1. Provide an open space not less than 1/2 inch 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 tie sections unless otherwise shown. Space anchors as shown, but not more than 24 inches on center horizontally.

3.07 LINTELS

- A. Install loose lintels of steel and other materials where shown.

3.08 CONTROL AND EXPANSION JOINTS

- A. Provide vertical expansion, control and isolation joints in masonry. Build-in related masonry accessory items as the masonry work progresses. Rake out mortar in preparation for application of caulking and sealants.
- B. Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 50'-0" on center for concrete masonry wythes if reinforced, or 25'-0" on center if not reinforced. Locate control joints at points of natural weakness in the masonry work.

3.09 FLASHING OF MASONRY WORK

- A. Provide concealed flashing in masonry work as shown. Prepare masonry surfaces smooth and free from projections, which might puncture flashing.
 - 1. Place through-wall flashing on bed of mortar and cover with mortar. Seal flashing penetrations with mastic before covering with mortar.
 - 2. Terminate flashing 1/2 inch from face of wall, unless otherwise shown. Extend flashing beyond edge of lintels and sills at least 4 inches and turn up edge on sides to form pan to direct moisture to exterior.
 - 3. Provide weep holes in the head joints of the first course of masonry immediately above concealed flashing, spaced 24 inches on center, unless otherwise shown.
- B. Install reglets and nailers for flashing and other related Work where shown to be built into masonry Work.

3.10 RIGID INSULATION

- A. Install the insulation boards horizontally beginning at the bottom of the inner wythe, after application of dampproofing. Secure the insulation to the exterior of the inner wall using wall ties.
- B. Install subsequent courses of insulation by applying boards directly above underlying courses with staggered joints. Board should be tightly abutted.
- C. Keep the insulation above the level of the outer wall during installation to assure adequate room to manipulate or adjust the insulation as required.
- D. Cut and shape insulation with a knife, handsaw or other cutting tool as required to fit around wall penetrations, projections or openings and to accommodate conduit or other services within the cavity. Seal around cutouts with construction adhesive.

3.11 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 units and install with 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. Good workmanship and job housekeeping practices shall be used to minimize the need for cleaning the masonry. Clean exposed brick masonry surfaces as recommended by BIA Technical Notes 20 "Cleaning Clay Products Masonry" and masonry manufacturer.
1. Clean exposed masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings.
 2. Protect the base of the wall from mud splashes and mortar droppings.
 3. Should additional cleaning be required apply chemical (MURIATIC ACID IS NOT ACCEPTABLE) or detergent cleaning solutions in accordance with the masonry and chemical manufacturers' recommendations.

END OF SECTION

SECTION 05 50 00 METAL FABRICATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. All miscellaneous metal work. The Work includes, but is not limited to, pipe railings, steel lintels, ornamental metalwork and miscellaneous framing & supports.

1.02 RELATED SECTIONS

- A. Section 09 05 15 – Color Design.
- B. Section 09 90 00 - Painting and Coating: Painting for all ferrous metal exposed to view.

1.03 SUBMITTALS

- A. Prepare and submit shop drawings for all work under this section. Indicate profiles, sizes, materials connection details, attachments, reinforcing, anchorage, size and type of fasteners, including every hole, and accessories. Include erection drawings, with plans, elevations, and details where applicable.

PART 2 - PRODUCTS

2.01 MATERIALS: Structural shapes shall be standard sections conforming to the American Society for Testing Materials Specification A-36. Punch and drill as necessary for work of others. Provide all bearing plates and all anchors, bolts, and etc. The Work shall be true and free of twists, bends and open joints between component parts. Materials shall be thoroughly straightened in the shop before laid off or worked in any way, care being used to avoid injury to the material.

- A. Gray cast iron shall conform to ASTM A48-83, class 30. All castings shall be of uniform quality, free from blowholes, shrinkage defects, swells, cracks or other defects. Castings shall be free of fins, burrs and slag.
- B. Expansion bolts shall be equal to Phillips Red Head or "cinch" bolts as manufactured by the National Lead Company. Hilti Fasteners, Rawlplug Company and Wej-it Corporation are acceptable manufacturers. Use toggle type bolts or similar for all anchorage into hollow construction.
- C. Bolt or weld connections: Provide necessary lugs and brackets for anchorage. Welding shall be in accordance with current "Code of Fusion, Welding and Gas Cutting in Building Construction, Part A - Structural Steel" issued by the American Welding Society, both for fabrication and erection. All welders shall have certification, as a result of tests prescribed by the American Welding Society.
- D. Detail metal Work for ample size, strength and stiffness and as indicated. Countersink and provide reinforcement where necessary; drill or punch holes for bolts and screws. At the proper time furnish the necessary templates, patterns and items of miscellaneous metal, such as sleeves, inserts and similar items to be built into adjoining Work.
- E. Fabricate metal Work with sharp lines and angles, with smooth true surfaces and clean edges. Form exposed joints to exclude water. Furnish certificates from manufacturers stating that materials comply with the specification requirements.

- F. Provide as necessary holes of proper number and spacing for the attachment of Work of other trades. Do not use cutting torch in field without permission of the Project Engineer / MDOT Architect.
- G. Anchor bolts, washers, nuts and clamps shall be furnished where indicated on the Drawings and where necessary for properly securing Work in place. All bolts and anchors used on the exterior of the building or built into exterior walls shall be cadmium plated. Miscellaneous angles and plates not indicated or specified otherwise shall not be less than 1/4 inch thick.
- H. Shop paint and field touch up shall be ICI Devflex 4020, Rustoleum 769, Tnemec 99, Southern Coatings 476, or approved equal. Shop coat shall be compatible with finish coats specified in Section 09900 – Paints and Coatings.
- I. Fastenings shall be invisible where possible. Where exposed, screws, bolts, and the like shall be vandal-proof. All welded exposed joints on steel manufactured items; etc. shall be ground smooth and filled to receive paint.

2.02 METAL PRIMER

- A. Where materials come in contact with dissimilar materials which may cause harmful reaction, where exposed to moisture, or such as aluminum to cement mortar or concrete, the surface shall be protected by zinc chromate primer or approved paint.

2.03 PIPE RAILINGS

- A. Fabricate railings and posts from 1-1/4 inch round tube steel, ASTM A 53, Type E or S, Grade A, Schedule 40. Shop prime after fabrication. 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-inch, unless otherwise shown.
- B. Welded Connections: Cope intersections of rails and posts, weld joints and grind smooth. Butt weld end-to-end joints of railings or use welding connectors, at fabricator's option. At connections to steel supports, weld post directly to steel supports, unless otherwise indicated.
- C. Anchorage: Use type of bracket with pre-drilled hole for exposed bolt anchorage. For stud partitions and framing use lag bolts set into wood backing between studs and framing members. Coordinate with stud installations for accurate location of backing members.
- D. Expansion: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches of posts.

2.04 LOOSE LINTELS

- A. Provide loose steel lintels for openings and recesses in masonry walls and partitions. Weld adjoining members together to form a single unit where indicated. Provide a minimum of 8 inches bearing at each side of openings.

2.05 ORNAMENTAL METALWORK

- A. Provide ornamental metalwork in shapes and sizes as shown on Drawings. Aluminum soffit vents shall be equal to Architectural Grille 77-14th Street, Brooklyn, NY 11215, Tel. (800) 387-6267; equal products are acceptable by Hi-Tech Metals, Inc., Maspeth, NY, Tel. (718) 894-1212 or Robinson Iron, Alexander City, AL, Tel. (256) 329-8486.
- B. Soffit Vents and Panels: Majestic No. 225, aluminum with insect screen, size as indicated on Drawings. Finish shall be Powder Coated. Color as selected by the Project Architect to match soffit.

2.06 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete Work.
- B. Fabricate miscellaneous units to sizes, shapes, and profiles indicated, or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricate from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
- C. Galvanize exterior miscellaneous frames and supports.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Perform cutting, drilling and fitting required for installation; set Work accurately in location, alignment and elevation measured from established lines and levels. Provide anchorage devices and fasteners where necessary for installation to other Work.
- B. Set loose items on cleaned bearing surfaces, using wedges or other adjustments as required. Solidly pack open spaces with bedding mortar, consisting of 2 part Portland Cement to 3 parts sand and only enough water for packing and hydration, or use commercial non-shrink grout material.
- C. Framing above soffit vents to be painted black.
- D. Touch-up shop paint after installation. After cleaning field welds, bolted connections and abraded areas, apply same type paint as used in shop. Color to be selected from standard colors available. Use galvanizing repair paint on damaged galvanized surfaces.

END OF SECTION

SECTION 06 10 00 ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Concealed wood grounds and blocking to frame openings, form terminations, to provide anchorage and / or support of other interior and exterior locations; plywood and rough hardware.

1.02 RELATED SECTIONS

- A. Section 03 10 00 - Concrete Forming and Accessories.
- B. Section 06 40 00 - Architectural Woodwork.
- C. Section 08 71 00 - Door Hardware.

1.03 COORDINATION

- A. 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.

1.04 QUALITY CONTROL

- A. Factory mark each piece of lumber and plywood to identify the type, grade, agency providing the inspection service, the producing mill and other qualities as specified.

1.05 DELIVERY, STORAGE AND PROTECTION

- A. Keep materials dry during delivery and storage. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks. Protect installed carpentry work from damage by work of other trades until Owner's acceptance of the Work. Contractor shall comply with manufacturer's required protection procedures.

1.06 PROJECT CONDITIONS

- A. Installer must examine all parts of the supporting structure and the conditions under which the carpentry Work is to be installed, and notify the Contractor in writing of any conditions detrimental to the proper and timely completion of the Work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

PART 2 - PRODUCTS

- 2.01 LUMBER: For each use, comply with the "American Softwood Lumber Standard" PS 20 by the U.S. Department of Commerce. Nominal sizes are shown or specified; provide actual sizes complying with the minimum size requirements of PS20 for the moisture content specified for each use. Provide dressed lumber, S4S, unless otherwise shown or specified. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and complying with dry size requirements of PS 20, unless otherwise specified.

2.02 FRAMING LUMBER

- A. Where wood framing is shown or scheduled, provide lumber complying with grading rules which conform to the requirements of the "National Grading Rule for Dimension Lumber" of the American Lumber Standards Committee established under PS 20.
- B. For Light Framing: Standard Grade.
- C. For Structural Framing: (4 inches and wider and from 2 inches to 4 inches thick), provide the following: No. 1 Grade; Douglas Fir (WCLB or WWPA), Southern Pine (SPIB). Fb (minimum extreme fiber stress in bending); 1,250 psi. E (minimum modulus of elasticity); 1,700,000 psi.

2.03 BOARDS

- A. Where lumber less than 2 inches in nominal thickness and 2 inches or more in nominal width is shown or specified, provide boards complying with dry size requirements of PS 20.
- B. Concealed Boards: Where boards will be concealed by other work, provide the following:
 - 1. Moisture Content: 19 percent maximum, mark boards "S- Dry".
 - 2. Species and Grade: Provide one of the following:
 - a. Southern Pine (SPIB) No. 2 boards.
 - b. WCLB (any species) No. 3 boards.

2.04 PLYWOOD

- A. For each use, comply with the requirements for "Softwood Plywood/Construction and Industrial" PS 1 by the U.S. Department of Commerce.
- B. Concealed Plywood: Where plywood will be concealed by other work, provide 5/8-inch minimum thickness Interior Type plywood C-D Plugged Grade, unless otherwise specified or shown on Drawings. For backing panels for electrical or telephone equipment, provide 3/4 inch thick fire-retardant treated Standard grade plywood with exterior glue.
- C. Exposed Plywood: Where plywood will be exposed to view, provide 5/8 inch minimum thickness Interior Type plywood B-C Plugged Grade, unless otherwise specified or shown on Drawings. Unless specifically stated otherwise, all exposed plywood shall be painted or stained from standard colors as selected by Project Engineer / MDOT Architect.
- D. Exterior Plywood: Exterior type, medium density, C Grade for concealed faces.
 - 1. Roof sheathing: 3/4 - inch thick.
 - 2. Wall sheathing: 1/2 - inch thick.

2.05 ANCHORAGE AND FASTENING MATERIALS

- A. For each use, select proper type, size, material, and finish complying with the applicable Federal Specifications. Zinc electroplated steel fasteners for high humidity and treated wood locations. All nails shall be coated.

2.06 TREATED WOOD

- A. Complete fabrication of treated items prior to treatment, wherever possible. If cut after treatment, coat cut surfaces with heavy brush coat of same fire-retardant chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.
- B. Preservative Treatment: Where lumber or plywood is indicated as "Treated", or is specified herein to be treated, comply with the applicable requirements of the American Wood Preservers Institute (AWPI). Mark each treated item to comply with the AWP Quality Mark requirements for the specified requirements.
 - 1. Pressure-treat aboveground items with water-borne preservatives complying with AWPI P-2. After treatment, kiln-dry to maximum moisture content of 15 percent. Treat indicated items and the following:
 - a. Wood cants, nailers, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
 - b. Wood sills, sleepers, blocking, furring stripping and similar concealed members in contact with masonry or concrete.
- C. Fire-Retardant Treatment: Where "PR-S" lumber or plywood is shown or scheduled, comply with the AWPI Specification C-208 for pressure impregnation with fire-retardant chemicals to achieve a flame-spread rating of not more than 25 when tested in accordance with UL Test 723, ASTM E A4, or NFPA Test 355. Where treated items are indicated to receive a transparent or paint finish, use a fire-retardant treatment that will not bleed through or adversely affect bond of finish.

2.07 FELT: Refer to Section 07 26 00 – Vapor Retarders for weather-resistive barrier on exterior face of wall sheathing.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Use only sound, thoroughly seasoned materials of the longest practical lengths and sizes to minimize jointing. Use materials free from warp that cannot be easily corrected by anchoring and attachment. Sort out and discard warped material and material with other defects that would impair the quality of the Work.
- B. Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.
- C. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

3.02 ATTACHMENT AND ANCHORAGE

- A. Use common wire nails, except as otherwise shown or specified. Use finishing nails for finish Work. 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.

- B. Exposed Plywood: Panel ends and edges shall have spacing of 1/8 inch maximum, unless otherwise indicated by the panel manufacturer. Fasten 6 inches on center along supported panel edges and 10 inches on center at intermediate supports
- C. Plywood Sheathing: Panel ends and edges shall have spacing of 1/8 inch, unless otherwise indicated by the panel manufacturer. Nail 6 inches on center along supported panel edges and 12 inches on center at intermediate supports with 6d common nails for panels 1/2 inch thick and 8d nails for panels 3/4 inch thick. Provide closer spacing where required by local codes.

3.03 WOOD GROUND NAILERS, BLOCKING, AND SLEEPERS

- A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Set true to line and level, plumb with intersections true to required angle. Coordinate location with other Work involved.
- B. Attach to substrates securely with anchor bolts and other attachment devices as shown as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Building into masonry; anchor to formwork before concrete placement.
- C. Provide grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2 inch wide and of the thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

3.04 WOOD FURRING

- A. Install plumb and level with closure strips at all edges and openings. Shim with wood as required.
- D. Suspended Furring: Provide of size and spacing shown, complete including hangers and all attachment devices. Level to a tolerance of 1/8 inch in 12 feet.

3.05 WOOD FRAMING

- A. Set wood framing accurately to required lines and levels. Provide framing members of sizes and on spacing shown, and frame openings as shown, or if not shown, comply with the recommendation of the "Manual for Housing Framing" of the National Forest Products Association. Cut, join, and tightly fit framing around other Work. Do not splice structural members between supports unless otherwise detailed.
- B. Anchor and nail as shown, or if not shown, to comply with the "Recommended Nailing Schedule - Table 1 of the "Manual of House Framing" and other recommendations of the N.F.P.A.

END OF SECTION

SECTION 06 40 00 ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Architectural woodwork as shown on the Drawings and schedules. Architectural woodwork is defined to include (in addition to items so designated on the Drawings) miscellaneous exposed wood members commonly known as "Finish Carpentry" or "Millwork", except where specified under another Section of these Specifications. The types of architectural woodwork include, but are not limited to Standing and Running Trim, Cabinets with stain or for paint finish, Countertops, Shelving, and Miscellaneous work.

1.02 RELATED SECTIONS

- A. Section 05 50 00 – Metal Fabrications.
- B. Section 06 10 00 – Rough Carpentry.
- C. Section 09 05 15 – Color Design.
- D. Section 09 90 00 – Painting and Coating

1.03 DEFINITIONS

- A. Terms used in this Section are in accordance with terminology of the Architectural Woodwork Institute, Architectural Woodwork Quality Standards, Eighth Edition, Version 1.0, 2003.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, specifications, and installation instructions for each item of Factory-fabricated woodwork prior to fabrication.
- B. Shop Drawings: Submit Shop Drawings for Lumber, Panel Products, Standing and Running Trim, Cabinets, Countertops, Shelving, and miscellaneous work. Shop Drawings shall show location of elevations, large-scale details, attachment devices and other components.

1.05 QUALITY ASSURANCE

- A. Unless otherwise shown or specified, comply with specified provisions of the Architectural Woodwork Institute (AWI) and approved "Quality Standards".
- B. Quality Marking: Mark each unit of architectural woodwork with mill's or fabricator's identification and grade marks, located on surfaces which will not be exposed after installation.
- C. Quality Standards: For the following types of architectural woodwork, comply with the indicated standards as applicable.
 - 1. Lumber: AWI Section 100.
 - 2. Standing and running trim: AWI Section 300.
 - 3. Shelving: AWI Section 600.
 - 4. Miscellaneous work: AWI Section 700.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration. Do not deliver woodwork until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.07 PROJECT CONDITIONS

- A. The Installer shall examine the substrates and conditions under which the work is to be installed; and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Conditioning: The Installer shall advise the Contractor of temperature and humidity requirements for woodwork installation areas. Do not install woodwork until the required temperature and relative humidity have been stabilized and will be maintained in installation areas.
- C. Maintain temperature and humidity in installation area as required to maintain moisture content of installed woodwork within a 1.0 percent tolerance of the optimum moisture content, from the date of installation through the remainder of the construction period. The fabricator of the woodwork shall determine the optimum moisture content and required temperature and humidity conditions.

PART 2 - PRODUCTS

2.01 BASIC MATERIALS AND FABRICATION METHODS

- A. Except as otherwise indicated, comply with the following requirements for architectural woodwork not specifically indicated as pre-fabricated or pre-finished standard products.
- B. Wood Moisture Content: Provide kiln-dried lumber and maintain optimum 8 to 13 percent range (damp region) moisture content in solid wood (hardwood and softwood) through fabrication, installation, and finishing operations of interior Work.
- C. Wood for Painted Finish: Comply with AWI quality standards for selection of species, grade and cut (fabricator's option, except as otherwise indicated). Wood for trim shall be maple or other closed-grain hardwood subject to Project Engineer/ MDOT Architect's prior approval.
- D. Design and Construction Features: Comply with the details shown for profile and construction for architectural woodwork; and where not otherwise shown, comply with applicable Quality Standards, with alternate details at fabricator's option.
- E. Pre-Cut Openings: Fabricate architectural woodwork with pre-cut openings, wherever possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams for proper size and shape. Smooth the edges of cut outs and where located in countertops and similar exposures, seal the edges of cut outs with a water resistant coating.

- H. Measurements: Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain measurements and verify dimensions and shop drawing details as required for accurate fit. Where sequence of measuring substrates before fabrication would delay the project, proceed with fabrication (without field measurements) and provide ample borders and edges to allow for subsequent scribing and trimming of woodwork for accurate fit.

2.02 ARCHITECTURAL WOODWORK TYPES

- A. Running and Standing Trim: Provide wood molding in profiles to match existing and as indicated on Drawings. Specie shall be Spanish cedar for exterior and poplar for interior.
- B. Bead Board Ceiling: Provide 5/8 inch by 4 inch tongue and groove Southern Yellow Pine, No. 1 bead board with center bead as indicated on the Drawings.
- C. Wood Shutters: Provide Custom Grade Spanish cedar shutters to match existing, where required.

2.03 CABINET FINISH FOR ARCHITECTURAL WOODWORK

- A. Refer to Section 09 90 00 – Painting and Coating.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.
- B. Deliver concrete inserts and similar anchoring devices to be built into substrates, well in advance of the time substrates are to be built. Prior to installation of architectural woodwork, examine shop fabricated work for completion, and complete work as required, including back priming and removal of packing.

3.02 INSTALLATION

- A. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8-inch in 8 feet for plumb and level (including countertops); and with 1/16-inch maximum offsets in revealed adjoining surfaces. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- B. Secure woodwork with anchors or blocking built-in or directly attached to substrates. Attach to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where pre-finished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.
- C. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners, and comply with Quality Standards for joinery.

3.03 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth ready for painted or stained finishes.

3.04 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION

- A. Repair damaged and defective woodwork wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean hardware, lubricate and make final adjustments for proper operation. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.
- C. Refer to Section 09 90 00 for final finishing of installed painted and stained architectural woodwork.
- D. Protection: The Installer of architectural woodwork shall advise the Contractor of final protection and maintenance conditions necessary to ensure that the Work will be without damage or deterioration at the time of acceptance.

END OF SECTION

SECTION 07 26 00

VAPOR RETARDERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Vapor retarder under concrete floor slab.
- B. Concrete curing paper on top of freshly poured concrete floor slab.
- C. Weather-resistive barrier on exterior face of wall sheathing.
- D. Floor protection paper used for positive protection of finished floors.

1.02 RELATED SECTIONS

- A. Section 07 65 00 - Flexible Flashing.

1.03 SUBMITTALS

- A. Submit manufacturer's technical product data, installation instructions and recommendations for products specified.

1.04 WARRANTIES

- A. Provide Manufacturer's standard 10 year material and labor warranty for weather-resistive barrier materials.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Fortifiber Corporation, 300 Industrial Drive, Fernley, NV 89408. Tel. (800) 773-4777.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Grace Construction Products, Cambridge, Ma. Tel: (800) 444-6459.
 - 2. Griffolyn ® Division, Reef Industries, Inc., Houston, TX. Tel: (800) 231-6074.
 - 3. Stego Industries LLC, San Juan Capistrano, CA. Tel: (877) 464-7834.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 VAPOR RETARDER

- A. Membrane shall be a 15 mil polyolefin film meeting ASTM E-1745-97 Class A Test Method, equal to Fortifiber Corporation, Moistop® Ultra™ 15, including Moistop® tape and sealants with the following characteristics:
 - 1. Moisture Vapor Permeance: ASTM E-154, Section 7 (E-96, Method A) = .02 perms.
 - 2. Tensile Strength: ASTM E-154, Section 9 (Method D-882) = (70lb f/in min)-MD & CD.

3. Puncture Resistance: ASTM D-1709, Method B = 3,000 Grams.

2.03 CONCRETE CURING PAPER

- A. Laminated tri directional glass fiber reinforced long fibered kraft curing papers with double coating of high-melting-point asphalt, meeting ASTM C-171 Test Method, equal to "Orange Label Sisalkraft®".

2.04 WEATHER-RESISTIVE BARRIER

- A. Membrane shall be a single ply, asphalt saturated kraft 60 minute Grade D breather type sheathing paper, meeting ASTM E-1677-95 Type I Test Method, equal to "Fortify®" with the following characteristics:
 1. Water Vapor Transmission: ASTM E-96 (A), 75 grams, 11 perms (MVT).
 2. Water Resistance: ASTM D-779, 60 minutes.
 3. Tensile Strength: ASTM D-828, MD-70lb f/inch, CD-60lb. f/inch.

2.05 FLOOR PROTECTION PAPER

- A. Non-staining reinforced floor protection paper consisting of two heavy kraft sheets and glass reinforcing fibers laminated with a non-staining adhesive, meeting ASTM D 828 and ASTM D 781 Test Methods, equal to "Seekure®".

PART 3 - EXECUTION

3.01 PREPARATION

- A. Ensure items that pass through building paper / membrane are properly and rigidly installed, substrate is free of projections and irregularities that may be detrimental to proper installation of building paper / membrane.

3.02 INSTALLATION

- A. Vapor Retarder: Unroll underslab vapor retarder over thoroughly compacted subgrade and turn down at inside perimeter of grade beams. Seal joints watertight, with a pressure sensitive tape as recommended by manufacturer, allowing a minimum overlap of 6 inches. Apply tape evenly over seams and rub out wrinkles formed during application. Seal pipes and conduits passing through the membrane with Moistop boot and tape. Inspect membrane thoroughly and repair all punctures immediately before placing concrete. Equipment, tools, and procedures that might puncture the membrane shall not be used while placing and finishing the concrete. Comply with manufacturer's recommendations and installation procedures as outlined in ASTM E-1643.
- B. Curing Paper: Unroll concrete curing paper over the entire surface once the concrete has set sufficiently hard to permit application without marring the surface. Lap joints 4 inches and seal with pressure sensitive tape. Apply tape evenly over seams and rub out wrinkles formed during application. Ensure that all tears or penetrations are repaired.
- C. Weather-Resistive Barrier: Install weather-resistive barrier in weather-board fashion over approved exterior sheathing, lapping horizontal joints a minimum of 3 inches and lapping vertical joints a minimum of 6 inches. Seal lapped joints with Fortify Tape. Seal tears and punctures with Fortify Tape and/or Moistop Sealant. Comply with Manufacturer's recommendations.

- D. Floor Protection Paper: Apply floor protection paper immediately after floor covering is installed. Do not remove until final completion and acceptance by the Project Engineer. Lay paper in widest practical width with 6-inch laps to provide complete coverage of flooring. Seal joints with minimum 2 inch wide pressure sensitive tape.

3.03 CLEANING

- A. Inspect vapor barrier membrane thoroughly and keep clean. Remove dirt, oils, mud, debris, etc. prior to placing concrete.

END OF SECTION

SECTION 07 61 00

SHEET METAL ROOFING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes factory formed, prefinished standing seam metal roof panels with concealed fasteners and related accessories, valleys, hips, ridges, eaves, corners, rakes, miscellaneous flashing, underlayment and attaching devices as shown and / or required for a complete weathertight metal roofing system.

1.02 RELATED SECTIONS

- A. Section 07 62 00 – Sheet Metal Flashing & Trim.
- B. Section 09 05 15 – Color Design.

1.03 REFERENCES

- A. ASTM A-525 General Requirements for Steel Sheet, Zinc-Coated (Galvanized).
- B. ASTM A-653 Steel Sheet, Zinc-Coated (Galvanized) by Hot Dip Process, Structural Physical Quality.
- C. ASTM E-1646: Static Water Infiltration.
- D. ASTM E-1680: Static Air Infiltration.
- E. Spec Data Sheet - Galvalume Sheet Metal by Bethlehem Corp.
- F. SMACNA - Architectural Sheet Metal Manual.
- G. UL 90 Rating (minimum) : Wind Uplift Approval Conforming to Underwriters Lab. (UL) Section 580 Specifications and Complying with 2009 International Building Code requirements and local codes, whichever are more stringent.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of roofing material and accessory required.
- B. Shop Drawings: Submit detailed drawings showing layout of panels and fasteners, anchoring details, joint details, trim, flashing, and accessories. Show details of weatherproofing terminations, and penetrations of metal work. Indicate material type, Thickness, finish and color.
- C. Samples: Submit a two-foot by two-foot representative sample of each type of panel and accessory indicating panels, standing seams, closure, edge trim and flashing complete with factory finish and color if product is not one of those specified.
- D. Submit certification prepared, signed, and sealed by a Professional Engineer registered in the State of Mississippi, verifying that roof system meets or exceeds wind uplift requirements as specified herein.
- E. Submit certification indicating compliance with minimum requirements of the Water Infiltration - ASTM E-1646 performance tests.
- F. Submit sample copies of the Paint Finish Guarantee and Weather Tightness Warranty prior to fabrication and installation for MDOT Architect's approval. DO NOT start roofing installation without MDOT Architect's approval of Guarantee and Warranty.
- G. Submit written proof from manufacturer that installer is approved to install their materials.

- H. Submit executed Warranty per Section 01 77 00 - Closeout Procedures for Owners signature.
- 1.05 QUALITY ASSURANCE
 - A. Manufacturer: Company specializing in Architectural Sheet Metal Products with 10 years minimum experience.
 - B. Installer: Company specializing in Architectural Sheet Metal Products, with 5 years minimum experience, who has completed work similar to that indicated for this project and with a record of successful in-service performance. Submit identification of at least 3 projects of similar scope and complexity along with name, address, and telephone number of the Architect, Owner and General Contractor. Installer shall be approved by the roofing manufacturer in writing to install their materials.
- 1.06 DELIVERY, STORAGE AND HANDLING
 - A. Upon receipt of panels and other materials, installer shall examine the shipment for damage and completeness. Panels should be stored on edge in a clean, dry place. One end shall be elevated to allow moisture to run off. Panels with strippable film must not be stored in the open exposed to the sun. Stack all materials to prevent damage and to allow for adequate ventilation.
- 1.07 WARRANTY
 - A. Paint Finish: Paint finish shall have a 20-year, non-prorated, guarantee against cracking, peeling and fade (Not to exceed 5 N.B.S. units).
 - B. Special Weather Tightness Warranty: The entire installation (clips, panels, fasteners, rakes, eaves, ridge/valley flashing conditions, roof to wall conditions as well as all materials specified as supplied by the manufacturer) shall be guaranteed weather tight for a MINIMUM OF 20 YEARS. This warranty shall be identified as neither Non-Depreciating, Non-prorated, (No Dollar Limit) nor have exclusions that identify valleys, curbs, and flashings. Provide written warranty, signed by metal roofing manufacturer and his authorized installer, agreeing to replace / repair defective materials and workmanship during the warranty period with NO COST to the Owner.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
 - A. Drawings and Specifications are based on products manufactured by Firestone Metal Products/ Una-Clad, Jackson, MS. Tel: (800) 426-7737.
 - B. Equivalent products by the following manufacturers are acceptable:
 - 1. Englert, Inc., Perth Amboy, NJ, Tel: (732) 826-8614.
 - 2. Innovative Metals Company (IMETCO), Tucker, GA. Tel (800) 646-3826.
 - 3. MBCI, Hernando, MS, Tel: (800) 206-6224.
 - C. Alternate manufacturers: Products produced by other manufacturers that fully meet or exceed the specified requirements may be considered under provisions of Section 01 62 14-Product Options and Substitution Procedures.
- 2.02 SHEET MATERIALS
 - A. Materials: Sheet Steel shall be Una-Clad 24 gage-minimum, G-90 Galvanized ASTM A 653, or (24 gage-minimum, prefinished Galvalume ASTM 792 Grade 50B with an AZ-50 coating).

- B. Finish: Finish shall be full strength (70% PVDF) Kynar 500 Fluorocarbon coating applied by the manufacturer on a continuous coil coating line. Top side dry film thickness of 0.70 to 0.90 mil over 0.25 to 0.35 mil prime coat, to provide a total dry film thickness of 0.95 to 1.25 mil. Bottom side shall be coated with primer with a dry film thickness of 0.25 mil. Finish shall conform to all tests for adhesion, flexibility, and longevity as specified by the finish supplier.
- C. Color: Shall be as indicated in Section 09 05 15 for color selection. Color design selected from standard and premium colors of Peterson Aluminum. Substituted systems, if submitted, shall match selected color.
- D. Film: Strippable film shall be applied to the top side of the painted coil to protect the finish during fabrication, shipping and field handling. This strippable film shall be removed before installation.

2.03 ACCESSORY MATERIALS

- A. Concealed fastening clips: G-90 galvanized steel, spaced 18-inches on center, unless closer spacing is required by design wind loads.
- B. Fasteners: 1-inch # 10 pancake head wood screw with a # 2 Phillips head size. Minimum 2 fasteners per clip.
- C. Sealant: Extruded vinyl weatherseal
- D. Underlayment: Peel and Stick Membrane shall be installed over entire roof substrate. Membrane shall be equal to Certainteed Wintergard™ HT, Grace Ice & water Shield HT, Henry Blueskin® PE 200 HT, Imetco Dry Dek™, or Tamko® TW Metal and Tile Underlayment. Provided underlayment must be approved and warranted as part of the complete roofing system.

2.04 FABRICATION

- A. Panels: All panels shall be seamless. Panels beyond 60 feet must be manufactured at the project location by factory personnel using manufacturer's roll forming equipment.
- B. Panels fabricated by a portable roll former will require Project Engineer / MDOT Architect's prior approval.
- C. All exposed adjacent flashing and accessories shall be of the same material and finish as the roof panels. All flashing, hem exposed edges on underside 1/2 inch. Fabricate in accordance with standard SMACNA procedures and details. All roof sections requiring flashing less than 25 feet should be continuous lengths. Roof sections requiring closures greater than 25 feet shall be flashed using the fewest pieces possible.

2.05 PREFORMED METAL ROOFING SYSTEM

- A. Systems shall be equal to Firestone/Una-Clad Integral Snap Lock systems and shall include, but is not limited to, the following components:
 - 1. Standing Seam Metal Roof Panels with Striations.
 - 2. Preformed Metal Valley Flashing.
 - 3. Preformed Metal Hip Flashing.
 - 4. Preformed Metal Vented Ridge Cap.
 - 5. Concealed fastening clips and fasteners.
 - 6. Metal Fascia and Cladding.
 - 7. Miscellaneous Metal Trim Necessary for a Complete System Installation.
- B. Integral Snap Lock Model UC-14 roof panels with striations shall have 16 inches on center seam spacing, roll-formed in continuous lengths from eave to ridge, with a minimum standing seam height of 1-3/4 inches.

- C. Certification shall be submitted, based on independent testing laboratory, indicating no measurable water penetration or air leakage through the system when tested in accordance with ASTM E-1646 and ASTM E-1680

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine wood trusses to ensure proper attachment to framing.
- B. Inspect roof structure to verify deck is clean and smooth, free of depressions, waves or projections, properly sloped to valleys or eaves.
- C. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
- D. Installer shall examine substrate and conditions under which Work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF UNDERLAYMENTS

- A. Install using methods recommended by manufacturer in accordance with local building code.
- B. Peel and Stick Membrane: Install one layer of membrane lapped, staggered, and applied horizontally from eave to ridge over approved roof substrate. Run membrane underlayment horizontally lapped so water sheds; secure in place. Lap ends 4 inches minimum; stagger end laps of each layer 36 inches minimum. Repair or replace any torn membrane to maintain a continuous membrane ahead of installation of metal roofing.
- C. Vent Pipes: At vent pipes, install a 24 inch minimum square piece of Peel and Stick Membrane lapping over roof deck underlayment; seal tightly to pipe.
- D. Vertical Walls: At vertical walls, install leak barrier membrane extending 6 inches minimum up the wall and 12 inches minimum on to the roof surface lapping over roof deck underlayment.
- E. Metal Drip Edge: At rake edges, install metal drip edge flashing over Peel and Stick Membrane and roof deck underlayment; set tight to rake boards; lap joints 2 inches minimum and seal with plastic cement; secure with nails.

3.03 INSTALLATION OF PANELS

- A. Comply with Drawings, manufacturers instructions, and conform to standards set forth in the Architectural Sheet Metal Manual published by SMACNA, in order to achieve a watertight installation.
- B. Install panels in such a manner that horizontal lines are true and level and vertical lines are plumb.
- C. Install starter and edge trim before installing roof panels.
- D. Remove protective strippable film prior to installation of roof panels.
- E. Attach panels using manufacturer's standard clips and fasteners, spaced in accordance with approved shop drawings.
- F. Install sealants for preformed roofing panels as specified on shop drawings.
- G. Do not allow panels or trim to come into contact with dissimilar materials.

- H. Do not allow traffic on completed roof. If required, provide cushioned walk boards.
 - I. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
 - J. Thoroughly clean and touch-up areas scarred during installation with a touch-up paint approved by panel manufacturer. Only minor scratches and fastener heads shall be touched-up; all other damaged material shall be replaced.
- 3.04 CLEANING
- A. Clean grease, finger marks, and stains from panels in accordance with manufacturer's recommendations.
 - B. Remove all scrap and construction debris from the site.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Flashing and sheet metal work as indicated on the Drawings and provisions of this specification. The types of work include the following:
 - 1. Metal flashing and counter flashing.
 - 2. Embedded masonry cavity wall flashing.
 - 3. Copper gutters and downspouts.

1.02 RELATED SECTIONS

- A. Section 09 05 15 – Color Design.

1.03 SUBMITTALS

- A. Submit manufacturer's product data, technical specifications, installation instructions and general recommendations for each specified sheet material and fabricated product for Project Engineer / MDOT Architect's approval.
- B. Samples: Submit 2 samples, eight inch square, of specified sheet materials to be exposed as finished surfaces. Submit 2 twelve inches long, completely finished units of specified factory-fabricated products exposed as finished work. Submit 2 color charts of manufacturer's complete line of standard colors available.
- C. Shop Drawings: Submit shop drawings showing layout, joining, profiles, and anchorage of fabricated work, including major counter flashing and expansion joint systems, and roof accessories; layouts at 1/4 inch scale, details at 3 inch scale.
- D. Qualification Data: Submit 2 copies for firms and persons that demonstrate capabilities and experience. Include a list with ten completed Project names and addresses, and name and addresses of Architects and Owners.

1.04 PROJECT CONDITIONS

- A. Coordinate with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer, with 5 years minimum experience, who has completed sheet metal work similar to that indicated for this project and with a record of successful in- service performance.
- B. Mock-Up: Prior to installing, construct mock-up to demonstrate aesthetic effects as well as qualities of materials and execution.

PART 2 - PRODUCTS

2.01 FLASHING AND SHEET METAL MATERIALS

- A. Shall be 24 gage G-90 Galvanized Steel ASTM A 653 fabricated in accordance with SMACNA standards to sizes and profiles shown on the drawings. Pre-finished steel, colors as selected, Kynar 500 (70% PVDF), 20 year coating. Equal to Petersen Aluminum Corp., Tel. (800) 722-2523. Use galvanized finish where concealed from view only.

2.02 EMBEDDED MASONRY CAVITY WALL FLASHING

- A. Through Wall Flashing: Manufacturer's standard product consisting of five-ounce copper coated with flexible asphalt or five-ounce copper reinforced with interlacing sisal fibers and asphalt bonded between two layers of heavy creped kraft paper. Use only where flashing is fully concealed in masonry.
- B. Adhesives, Primers and Seam Tapes for Flashing: Flashing manufacturer's standard products or products recommended by the flashing manufacturer for bonding flashing sheets to each other and to substrate.
- C. Equivalent products by the following manufacturers are acceptable:
 1. Advanced Building Products, Inc., Springvale, ME. Tel: (800) 252-2306.
 2. AFCO Products, Inc., Somerville, MA. Tel: (617) 623-7700.
 3. Fiberweb Div., Clark / Hammerbeam, Corp., Dedham, MA. Tel: (781) 461-1946.
 4. York Manufacturing, Inc., Sanford, ME. Tel: (800) 551-2828.
- D. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.03 GUTTERS AND DOWNSPOUTS

- A. Materials: Provide gutters and downspouts in shapes and sizes as indicated on the Drawings, fabricated from cold rolled 16 ounce copper sheet.
- B. ACCESSORIES: Provide heavy duty fixed brass and adjustable copper strap hangers and supports.
- C. Equivalent products by the following manufacturers are acceptable:
 1. Atlanta Products, Inc., Mableton, GA. Tel: (800) 554-1097.
 2. Berger Bros. Co., Feasterville, PA. Tel: (800) 523-8852.
 3. Copper Craft, Keller, TX. Tel: (800) 486-2723.
- D. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 METAL FASCIAS

- A. Materials: Provide fascia in profiles as indicated on the Drawings of same material and finish as metal roof.
- B. Corners: Provide corner and end pieces with mitered, welded joints.

2.03 MISCELLANEOUS MATERIALS

- A. Solder: Solder for use with steel or copper, provide 50 – 50 tin / lead solder ASTM B 32, with rosin flux.
- B. Fasteners: Same metal as flashing / sheet metal or, other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
- C. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed; comply with FS TT-S-007, TT-S-00230, or TT-S-001543.
- D. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size and gage required for performance.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

- A. Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual". Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

3.02 ACCESSORIES INSTALLATION

- A. Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight.
- B. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
- C. Gutter supports shall be spaced at 30 inches on center, constructed of same material as gutters.
- D. Downspout straps shall be spaced 6 feet on center maximum (minimum of 3 required per downspout) and be same material as downspout.
- E. Separate metal from incompatible metal or corrosive substrates by coating concealed surfaces with asphalt mastic as recommended by manufacturer.

3.03 FLASHINGS FOR MASONRY

- A. Install in accordance with installation specifications in Division 4 sections and with manufacturers instructions with applicable materials approved by the manufacturer for the specific installation shown.

3.04 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances, which might cause corrosion of metal or deterioration of finishes.
- B. Protection: Installer shall advise Contractor of required procedures for surveillance and protection of flashings, sheet metal work, and accessories during construction, to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.
- C. Flashings and sheet metal with any cuts, abrasions, or imperfections will not be acceptable and is to be replaced.

END OF SECTION

SECTION 07 65 00 FLEXIBLE FLASHING

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Self-adhesive flashing used to seal around exterior windows, doors, and where required to weatherproof the building.
- B. Waterproof membrane flashing used to seal around exterior door and window heads and sills, brick ledges, copings at masonry walls, common through-wall penetrations such as hose bibbs, vents, electrical boxes, exterior lights, and where required to waterproof the building.

1.02 RELATED SECTIONS

- A. Section 07 26 00 – Vapor Retarders (for weather-resistive barrier).

1.03 SUBMITTALS: Submit manufacturer's technical product data, installation instructions and recommendations for product specified.

1.04 WARRANTIES

- A. Provide Manufacturer's standard 10 year material and labor warranty.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on product manufactured by Fortifiber Corporation, 300 Industrial Drive, Fernley, NV 89408. Tel. (800) 773-4777.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Grace Construction Products, Cambridge, MA. Tel: (800) 444-6459.
 - 2. Griffolyn ® Division, Reef Industries, Inc., Houston, TX. Tel: (800) 231-6074.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 SELF-ADHESIVE FLASHING

- A. Membrane shall be a multi-layer composite employing polyethylene, fiberglass membrane and self-adhesive backing, meeting ASTM E-2112, equal to "Moistop E-Z Seal®" with the following characteristics:
 - 1. Water Vapor Permeance: ASTM E-96 (Method A), ASTM F-1249, < 0.1 perms.
 - 2. Water Resistance: ASTM D-779, 150 hours.
 - 3. Tensile Strength: ASTM D-882, MD-30lb. f/inch, CD-35lb. f/inch.
 - 4. Adhesion: PSTC-1, Plywood -5lbs./inch, Backing-6lbs./inch.
 - 5. Mold Growth: ASTM G-21, 0 Fungal Growth.

2.03 WATERPROOF MEMBRANE FLASHING

- A. Membrane shall be a self-sealing SBS modified asphalt waterproof membrane laminated to high density, cross-laminated polyethylene film reinforcement and self-adhesive backing, equal to "FortiFlash 40®" with the following characteristics:
 - 1. Water Vapor Permeance: ASTM E-96, < 0.05 perms.
 - 2. Water Resistance: ASTM D-779, >200 hours.
 - 3. Puncture Resistance: ASTM E-154, 40 lbf.
 - 4. Lap Adhesion: ASTM D-903, 10lb. f/inch.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Ensure items that pass through membrane are properly and rigidly installed, substrate is free of projections and irregularities that may be detrimental to proper installation of membrane.
- B. Prior to installation, window, door flanges, brick ledges and base materials shall be dry and cleaned free of any dirt or other substances that may interfere with adhesion.

3.02 INSTALLATION

- A. The self-adhesive flashing shall first be applied at the sill of window openings. Moistop Sealant is then applied to the back of the window flanges and windows are installed. E-Z Seal flashing is next applied over the window flanges at jambs and then the head, completing the installation. Flashing around door openings is similar to window application. To apply, peel away the release paper and place E-Z Seal over the substrate or window and door flanges. Apply firm pressure along the entire adhesive strip to ensure a continuous seal.
- B. To apply FortiFlash flashing, peel away the release paper and press membrane firmly over substrate, applying sufficient pressure along the entire membrane to ensure a continuous seal. If adhesion is inadequate, prime the surface with a polymer-emulsion-based primer designed specifically for SBS self-adhered membranes, in accordance with the manufacturer's instructions.

3.03 CLEANING

- A. Inspect membrane and substrate thoroughly and keep clean. Remove any dirt, oils, mud, debris, etc. prior to installation.

END OF SECTION

SECTION 07 84 00 FIRESTOPPING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Firestopping as indicated on the drawings, specified herein, and/or required for completion of the work. Firestopping shall be required at all rated fire and smoke "fire barrier" walls and at floors.

1.02 SUBMITTALS

- A. Submit manufacturer's product data, specifications and installation procedures for each type of firestopping and accessory required. Submit detailed location where each will be used. Submit UL data for assemblies where shown on the Drawings.

1.03 QUALITY ASSURANCE

- A. Penetrations and miscellaneous openings in rated fire and smoke "fire barrier" walls shall be protected in accordance with NFPA 101, Life Safety Code, Chapter 6, Features of Fire Protection. All openings for air-handling ductwork or air movement, pipes, conduits, bus ducts, cables, wires, air ducts, pneumatic tubes and ducts and similar building service equipment that pass through or penetrate in any way a rated fire or smoke "fire barrier" wall or floor shall be protected. All firestopping materials used shall conform to ASTM E814, ASTM E119, and UL 1479 and tested in accordance with NFPA 90A and NFPA 251 as part of a rated assembly.

1.04 FIRE AND SMOKE PARTITIONS AND RELATED ASSEMBLIES

- A. Based on Underwriters Laboratories (UL) systems and tests and are designed in accordance with UL fire resistance ratings. Contractor shall comply with the applicable UL requirements for fire and smoke partitions and assemblies shown on the drawings.
- B. Materials not conforming to these firestopping specifications shall not be used. Materials that are not UL rated and approved shall not be allowed. Materials containing asbestos are not acceptable and shall not be used in this project.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver packaged materials in manufacturer's original unopened containers and store in weathertight enclosure. Handle and store all materials so as to prevent inclusion of foreign materials, breakage or damage by water.

1.04 WORKMANSHIP

- A. Materials and workmanship not conforming to provisions of the Specifications and manufacturer's printed instructions shall be rejected at any time during the course of the work. Rejected materials shall be removed from the site at the time of rejection. Rejected workmanship shall be corrected immediately after rejection.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equivalent products by the following manufacturers are acceptable:
 - 1. Hilti, Inc., Tulsa, OK. Tel. (800) 879-8000.
 - 2. International Protective Coatings Corp., Hatfield, PA. Tel. (800) 334-8796.
 - 3. 3M Fire Protection Products, Saint Paul, MN. Tel. (800) 328-1687.
 - 4. United States Gypsum Company, Chicago, IL. Tel. (880) 874-4968.
- B. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 SEALANT

- A. Equal to Hilti, Inc. FS-One.

2.03 CAULKING AND PUTTY

- A. Equal to 3M Brand Fire Barrier CP- 25 Caulk and Putty 303.

2.04 PENETRATION SEALANTS

- A. Equal to 3M Fire Barrier Penetration Sealing Systems 7902 and 7904 series as required.

2.05 INSULATION

- A. Equal to United States Gypsum Company "Therafiber" Safing Insulation, 4 pcf density, unfaced.

2.06 INTUMESCENT FIRESTOPPING

- A. Equal to Hilti, Inc. FS-One, CP 642 and FS 657 Fire Block as required.

2.07 ACCESSORIES

- A. Provide backing / filling materials, retainers, collars, clamps, sleeves, primers and other necessary items of types and duration required by regulatory requirements and / or as recommended by product manufacturer for the specific substrates, surfaces and applications.

2.08 FINISHES

- A. Concealed locations: Manufacturer's Standards.
- B. Exposed to View Locations: "Custom" Colors as selected by Project Engineer / MDOT Architect unless Manufacturer's Standards closely matches finish of penetrated surfaces.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation of firestopping materials for small openings, cracks, crevices, and penetrations shall be in accordance with manufacturer's printed instructions.
- B. Verify application required and location for each type of firestopping to be used and conform to manufacturer's exact instructions for specific applications.
- C. After installation of all Work, including but not limited to ductwork, fire and smoke dampers, communication cabling, electrical conduit, etc., properly seal all openings, cracks, crevices and penetrations throughout the entire project, to maintain fire ratings shown.
- D. Install fireproof sealant at all penetrations through rated walls and floors and at top and bottom on each side of rated walls.
- E. Install approved metal sleeves with fireproof sealant at all communication and control wiring passing through rated walls throughout the entire project.
- F. Install firestopping at fire and smoke walls and floors where construction passes through those areas.

END OF SECTION

SECTION 07 92 00 JOINT SEALANTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Preparation of substrate surfaces to receive materials.
- B. Sealant and joint backing (backer rod) materials and installation in the following general locations (even though not shown on the Drawings):
 - 1. Exterior and interior wall joints, including control / expansion joints and abutting like or similar materials (in walls, ceilings, and roof construction) that have spaces between in excess of 3/16 inch (except where less restrictive tolerances are indicated or where the condition is specifically the responsibility of others).
 - 2. Abutting dissimilar materials, exterior and interior.
 - 3. Exterior and interior wall openings (including at perimeter doors, exterior thresholds, windows, louvers, and penetrations required by piping, ducts, and other service and equipment, except for sealants provided by Section 07 84 00-Firestopping).
 - 4. Joints in pavement and walks.
 - 5. Other locations, not included above but, specifically required by manufacturers of installed materials / products (except that sealing materials for glazing are under provision of other Section.).
- C. Accessories: Including, but not limited to, primer, cleaner, backer rod, bond breaker, and masking tape.

1.02 RELATED SECTIONS

- A. Section 01 33 00 – Submittal Procedures and Section 09 05 15 – Color Design.

1.03 DEFINITIONS

- A. Wherever the words "caulk" or "seal" occur, they shall be interpreted to mean "effectively seal the indicated joint with a material to render it air and watertight." "Caulk" shall indicate the use of the interior materials specified hereinafter and "Seal" shall indicate the use of the exterior materials.

1.04 WORK OF OTHER SECTIONS

- A. Caulking and sealing may be performed as Work of other Sections when specified. However, all Work shall conform to the requirements of this Section.

1.05 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions for each type of sealant required. Product data shall include chemical characteristics, limitations, and color availability.

1.06 QUALITY ASSURANCE

- A. Applicator: Company specializing in the work of this Section with minimum 3 years documented satisfactory experience.
- B. Manufacturer's Certificate: Provide manufacturer's letter of certification that products meet or exceed specified requirements and are appropriate for uses indicated.
- C. Installation: Conform to Sealant and Waterproofers Institute requirements.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver caulking and sealant material to the site in original unopened packages with manufacturer's labels, instructions and product identification and lot numbers intact and legible.
- B. Store materials under cover, protected from inclement weather and adverse temperature extremes, in original containers or unopened packages, in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on products manufactured by Pecora Corporation, 165 Wambold Road, Harleysville, PA 19438. Tel: (800) 523-6688.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Dow Corning Corporation, Midland, MI. Tel: (800) 322-8723
 - 2. GE Silicones, Waterford, NY. Tel: (518) 233-2639.
 - 3. Sonneborn Building Products, Shakopee, MN. Tel: (800) 433-9517.
 - 4. Tremco, Inc., Beachwood, OH. Tel: (800) 562-2728.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 SEALANT TYPES AND USE SCHEDULE

- A. Type 1: Use for interior locations, sealing around windows, doors, louvers, drywall and other locations to be painted and where joints are less than 1/8 inch with none to slight movement anticipated: Pecora AC-20 + Silicone (Acrylic Latex Caulking Compound).
- B. Type 2: Use for sealing nonporous interior surfaces where conditions of high humidity and temperature extremes exist, including at and in conjunction with toilet fixtures, counters, vanities, thresholds and joints in tile finishes: Pecora 898 (Silicone Sanitary Sealant).
- C. Type 3: Use for horizontal floor and pavement joints: Pecora Urexpan NR-200 (two-part, self-leveling, traffic-bearing, polyurethane sealant).
- D. Type 4: Use for exterior sealing at door, louver, and window frames at masonry, and other materials: Pecora 890NST (one-part Architectural Silicone Sealant). Color(s) to be selected by the Project Engineer / MDOT Architect from manufacturer's full range of standard Architectural colors.

2.03 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Backer Rod: Open cell polyurethane foam or closed cell polyethylene foam, compatible with sealant, sized and shaped to provide proper compression upon insertion in accordance with manufacturer's recommendations.
- D. Bond Breaker: Pressure sensitive adhesive polyethylene, TEFLON, or polyurethane foam tape.
- E. Masking Tape: Pressure sensitive adhesive paper tape.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Installer must examine areas and conditions under which this Work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 PREPARATION

- A. Cleaning: Clean joint surfaces, using joint cleaner as necessary, to remove dust, dirt, oil, grease, rust, lacquers, laitance, release agents, moisture, frost or other matter that might adversely affect adhesion of sealant. Rake joints out to a depth equal to one-half the width.
- B. Masking: Mask areas adjacent to joints.
- C. Priming: If required, prime substrate surfaces following manufacturer's instructions.
- D. Mixing: When required, mix components of sealant materials in accordance with manufacturer's instructions to achieve required characteristics of sealant.

3.03 APPLICATIONS

- A. Mixing, application, surface condition, weather condition shall be as recommended by the manufacturer. Do not use material that has exceeded the recommended pot life.
- B. Install backing material in joints using blunt instrument to avoid puncturing. Do not twist the backing rod while installing. Install backing rod so that joint depth is 50 percent of joint width, but a minimum of 1/8-inch deep and a maximum of 3/8-inch deep.
- C. Apply sealant in joints using a pressure gun with nozzle cut to fit joint width. Ensure sealant is deposited in a uniform, continuous bead without gaps or air pockets.
- D. Tool joints to the required configuration within 10 minutes of sealant application. Remove masking materials immediately after tooling.

3.04 CLEANING AND REPAIRING

- A. Do not allow sealant or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces. Clean adjoining surfaces by whatever means necessary to eliminate evidence of spillage.
- B. When using flammable solvents, avoid heat, sparks and open flames. Provide necessary ventilation. Follow all precautions and safe handling recommendations from the solvent manufacturer and pertinent local, state and federal regulations.
- C. Leave finished work in a neat, clean condition with no evidence of spillovers onto adjacent surfaces.
- D. Repair or replace defaced or disfigured finishes.

3.04 CURE AND PROTECTION

- A. Cure sealant and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.
- B. Sealant Supplier / Applicator shall 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 Completion.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Hollow metal Work, including but not limited to, the following:
 - 1. Interior and exterior hollow metal doors and frames.
 - 2. Trimmed openings.
 - 3. Preparation of metal doors and bucks to receive finish hardware, including reinforcements, drilling and tapping necessary.
 - 4. Preparation of hollow metal door to receive glazing (where required).
 - 5. Factory prime painting of Work in this Section.

1.02 RELATED SECTIONS

- A. Section 08 16 16 - AMP Colonial Doors
- B. Section 08 71 00 - Door Hardware.
- C. Section 09 05 15 - Color Design.
- D. Section 09 90 00 - Painting and Coatings.

1.03 QUALITY ASSURANCE

- A. In addition to complying with all pertinent codes and regulations, manufacture labeled doors in accordance with specifications and procedures of Underwriters' Laboratories, Inc. In guarantee and shop drawings, comply with nomenclature established in American National Standards Institute publication A123.1, latest edition, "Nomenclature for Steel Doors and Steel Door Frames".
- B. Work is subject to applicable portions of the following standards:
 - 1. ANSI A115 "Door and Frame Preparation for Door Locks and Flush Bolts", American National Standards Institute.
 - 2. ANSI A123.1 "Nomenclature for Steel Doors and Steel Door Frames", American National Standards Institute.
 - 3. NFPA 80 "Fire Doors and Windows", National Fire Protection Association.
 - 4. NFPA 101 "Life Safety Code", National Fire Protection Association.
- C. Hollow metal doors and frames shall comply with the specifications for Custom Hollow Metal Doors and Frames, National Assoc. of Architectural Metal Manufacturers (NAAMM) Standard CHM 1-74, and the Steel Door Institute, SDI 100-80.

1.04 SUBMITTALS

- A. Product Data: Submit schedule and manufacturer's technical product data / literature.
- B. Shop Drawings: Shop drawings shall indicate door and frame elevations, frame configuration, anchor types and spacing, reinforcement, location of cut-outs for hardware, and glazing.

- C. Samples (not required for named products):
 - 1. Submit hollow metal frame, corner section of typical frame, of sufficient size to show corner joint, hinge reinforcement, dust cover boxes, anchors, and floor anchors.
 - 2. Submit hollow metal door section of typical door, of sufficient size to show edge, top and bottom construction, insulation, hinge reinforcement, face stiffening, corner of vision opening construction and glazing beads.

1.05 PRODUCT IDENTIFICATION

- A. Deliver doors and frames and other work of this section properly tagged and identified.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle all metal doors and frames in a manner to prevent damage and deterioration.
- B. Provide packaging, separators, banding, spreaders, and individual wrappings as required to completely protect all metal doors and frames during transportation and storage.
- C. Store doors upright, in a protected dry area, at least 4 inches off the ground and with at least 1/4 inch air space between individual pieces, protect all pre-finished and hardware surfaces.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on products manufactured by Steelcraft Manufacturing Company, 9017 Blue Ash Road, Cincinnati, OH 45242 Tel. (513) 745-6400.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Amweld Building Products, Inc., Garrettsville, OH. Tel. (330) 527-4385.
 - 2. Ceco Door Products, Brentwood, TN. Tel. (615) 661-5030.
 - 3. Republic Builders Products, McKenzie, TN. Tel. (901) 352-3383.
- C. Substitutions shall fully comply with specified requirements and Section 01 64 14-Product Options and Substitution Procedures.

2.02 FABRICATION

- A. Fabricate hollow metal units rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable. Unless otherwise indicated, provide countersunk flat Philips or Jackson heads for exposed screws and bolts.
- B. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping per final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware".

- C. Locate finish hardware in accordance with approved shop drawings.

2.03 FRAMES

- A. Frames for exterior openings shall be made of commercial grade 14 gage minimum cold rolled steel conforming to ASTM A366-68 with a zinc coating conforming to ASTM A653, with a coating designation of A60 or G60 and a minimum coating thickness of 0.60 oz. per sq. ft. minimum. Frames for interior openings shall be commercial grade cold rolled steel conforming to ASTM A366-68 or commercial grade hot rolled and pickled steel conforming to ASTM A569-66T. Metal thickness shall be 16 gage for frames in openings 4 feet or less in width; 14 gage for frames in openings over 4 feet in width.
- B. Design and Construction: Frames shall be custom made welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Knocked-down frames will not be accepted. Finished work shall be strong, rigid, and neat in appearance, square, true and free of defects, warp or buckle. Molded members shall be clean cut, straight and of uniform profile throughout their lengths. Jamb depths, trim, profile and backbends shall be as shown on Drawings. Corner joints shall have contact edges closed tight, with trim faces mitered and continuously welded, and stops mitered. The use of gussets will not be permitted.
 - 1. Stops shall be 5/8 inch deep.
 - 2. Hardware reinforcements: Frames shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates. Frames shall be reinforced for closers. Minimum thickness of hardware reinforcing plates shall be as follows:
 - a. Hinge and pivot reinforcements - 7 gage, 1 1/4 inches by 10 inches minimum.
 - b. Strike reinforcements - 12 gage.
 - c. Flush bolt reinforcements - 12 gage.
 - d. Closer reinforcements - 12 gage.
 - e. Reinforcements for surface-mounted hardware - 12 gage.
 - 5. Floor anchors: Floor anchors shall be securely welded inside jambs for floor anchorage. Where required, provide adjustable floor anchors, providing not less than 2 inches height adjustment. Floor anchors shall be 14-gage minimum.
- C. Finish: After fabrication, tool marks and surface imperfections shall be removed, and exposed faces of welded joints shall be dressed smooth. Frames shall be chemically treated to insure maximum paint adhesion and coated on accessible surfaces with rust-inhibitive primer complying with FS-TT-P-57 (Type II) or FS-TT-P-659 with 2.0 mils minimum thickness. Fully cure before shipment.

2.04 HOLLOW METAL DOORS

- A. Doors shall be made of commercially quality, level, cold rolled steel conforming to ASTM A366-68 and free of scale, pitting or other surface defects. Face sheets for interior doors shall be 18 gage minimum. Face sheets for exterior doors shall be 16-gage minimum with zinc coating conforming to ASTM A653, with a coating designation of A60 or G60 and a minimum coating thickness of 0.60 oz. per sq. ft. minimum.

- B. Design and Construction: Doors shall be custom made, of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Door thickness shall be 1-3/4 inches unless otherwise noted. Doors shall be strong, rigid and neat in appearance, free from warp or buckle. Corner bends shall be true, straight and of minimum radius for the gage of metal used.
- C. Stiffen face sheets with continuous vertical formed steel sections spanning the full thickness of the interior space between door faces. These stiffeners shall be 22 gage minimum, spaced 6 inches apart and securely attached to face sheets by spot welds 5 inches on center. Spaces between stiffeners shall be sound-deadened insulated full height of door with an inorganic non-combustible batt-type material.
- D. Join door faces at their vertical edges by a continuous weld extending full height of door. Welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
- E. Top and bottom edges of doors shall be closed with a continuous recessed 16 gage minimum steel channel, extending the full width of the door and spot welded to both faces. Exterior doors shall have additional flush closing channel at top edges and, where required for attachment of weather-stripping, a flush closure at bottom edges. Provide openings in bottom closure of exterior doors to permit escape of entrapped moisture.
- F. Edge profiles shall be provided on both vertical edges of doors as follows:
 - 1. Single-acting swing doors - beveled 1/8 inch in 2 inches.
 - 2. Double-acting swing doors - rounded on 2-1/8 inch radius.
- G. Hardware reinforcements: Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only, in accord with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation - such as top and bottom pivots, floor closures, etc.) is to be applied, doors shall have reinforcing plates. Minimum gages for hardware reinforcing plates shall be as follows:
 - 1. Hinge and pivot reinforcement - 7 gage.
 - 2. Reinforcement for lock face, flush bolts, concealed holders, concealed or surface-mounted closers - 12 gage.
 - 3. Reinforcements for all other surface mounted hardware - 16 gage.
- H. Finish: After fabrication, tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Doors shall be chemically treated to ensure maximum paint adhesion and shall be coated, on all exposed surfaces, with manufacturer's standard rust-inhibitive primer. Fully cure before shipment.
- I. Flatness: Doors shall maintain a flatness tolerance of 1/16 inch maximum in any direction, including a diagonal direction.

2.05 HARDWARE LOCATIONS

- A. Hinges:
 - 1. Top – 5 inches from head of frame to top of hinge.
 - 2. Bottom – 10 inches plus 1 inch from finished floor to bottom of hinge.
 - 3. Intermediate, centered between top and bottom hinges.
- B. Unit and integral type locks and latches – 3'- 2" to centerline of knob.
- C. Deadlocks – 5'- 0" to centerline of cross bar.
- D. Door pulls – 3'-6" to center of grip.
- E. Push-pull bars – 3'-1" to centerline of bar.
- F. Arm pulls – 3'-11" to centerline.
- G. Push plates – 4'- 0" to centerline of plate.
- H. Roller latches – 3'-9" to centerline.
- I. All of the above dimensions from paragraph 2.07(B) through 2.07(H) are from finished floor.

2.06 CLEARANCES

- A. Edge clearances:
 - 1. Between doors and frame, at head and jambs - 1/8 inch.
 - 2. At door sills: where no threshold is used - 1/4 inch maximum above finished floor; where threshold is used - 3/4 inch maximum above finished floor.
 - 3. Between meeting edges of pairs of doors - 1/8 inch.
- B. Finished floor is defined as top surface of floor.

2.09 PREPARATION FOR FINISH HARDWARE

- A. Hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to ensure correct fitting and installation. Include preparation for mortise and concealed hardware.
- B. Provide reinforcements for both concealed and surface applied hardware. Drill and tap mortise reinforcements at factory, using templates. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

2.10 REJECTION

- A. Hollow metal frames or doors which are defective, have hardware cutouts of improper size or location, or which prevent proper installation of doors, hardware or work of other trades, shall be removed. Replace rejected materials.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions where hollow metal Work is to be installed and notify Project Engineer of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install hollow metal units and accessories in accordance with approved Shop Drawings, manufacturer's data, and Specifications.
- B. Provide masonry anchorage devices where required for securing hollow metal frames to in-place concrete or masonry construction. Set anchorage devices opposite each anchor location, in accordance with details on final shop drawings and anchorage device manufacturer's instructions. Leave drilled holes rough, not reamed, and free from dust and debris.
- C. Placing frames: Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 - 1. Make field splices in frames as detailed on final Shop Drawings, welded and finished to match factory work.
 - 2. Remove spreader bars only after frames or bucks have been properly set and secured.
 - 3. Door installation: Fit hollow metal doors accurately in their respective frames, with the following clearances:
 - a. Jamb and head: 3/32 inch.
 - b. Meeting edges, pairs of doors: 1/8 inch.
 - c. Bottom: 1/4 inch, where no threshold.
 - d. Bottom: at threshold; 1/8 inch.

END OF SECTION

SECTION 08 16 16

AMP COLONIAL DOORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The extent and location of each type of AMP Colonial door is shown on the Drawings and Schedules.

1.02 RELATED SECTIONS

- A. Section 07 92 00 – Joint Sealants.
- B. Section 08 71 00 – Door Hardware.
- C. Section 09 05 15 – Color Design.

1.03 SYSTEM PERFORMANCE

- A. Provide door assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below, as demonstrated by testing manufacturer's corresponding standard system according to test methods designated.
- B. Thermal Transmission (exterior doors): "U" value of not more than 0.09 (BTU/Hr. x SF x degrees F) in accordance with AAMA 1503.01.
- C. Additional Criteria: Provide AMP doors with the following performance:
 - 1. ASTM D 256 - nominal value OF 20.0
 - 2. ASTM D 570 - nominal value of 0.20 to 0.40 percent
 - 3. ASTM D 2583 - nominal value of 50
- D. Abrasion Resistance: White face sheet to have no greater than 0.018 percent average weight loss percentage after Taber Abrasive Test – 25 cycles at 250 gram weight with H – 18 wheel. Similar results for other colors.
- E. Stain Resistance: White face sheet to be unaffected by tea, ketchup or brown shoe polish after test procedure 8129 with MacBeth Colorimeter. Similar results for other colors.
- H. Chemical Resistance: Face sheet to be unaffected after 4 hours exposure to 5.25 percent sodium hypochlorite. No discoloration will be allowed.

1.04 SUBMITTALS

- A. Product Data: Submit Manufacturer's product data, specifications and instructions for each type of door required in accordance with Section 01330 and the following:
 - 1. Include details of core, stile and rail construction, and trim for lites and all other components.
 - 2. Include details of finish hardware mounting.
 - 3. Include samples of each aluminum alloy to be used on this project. Where normal finish color and texture variations are expected, include two or more samples to show the range of such variations.

4. Include copies of sample warranty for Project Engineer / MDOT Architect's approval prior to fabrication.
 5. Include one sample of typical fabricated section, showing joints, fastenings, quality of workmanship, hardware and accessory items before fabrication proceeds.
- B. Shop Drawings: Submit shop drawings for the fabrication and installation of the doors and associated components. Details to be shown full-scale, include finish hardware schedule. Include elevations of each type door.
- 1.05 QUALITY ASSURANCE
- A. Standards: Comply with requirements and recommendations in applicable specification and standards by AAMA, except to the extent more stringent requirements are indicated.
 - B. Performance: Ten years minimum record of production of, doors and completion of similar projects in type and size.
 - C. Instruction: The manufacturer or his representative will be available for consultation, including instruction to installation personnel.
 - D. Field Measurement: Field verify information prior to fabrication and furnishing of materials.
 - E. Regulation and Codes: Comply with current edition in force at project location of local, state and federal codes and regulations, including Americans with Disabilities Act of 1992.
- 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING
- A. Deliver materials to job site in their original unopened package with labels intact. Inspect materials for damage and advise manufacturer immediately of any unsatisfactory materials.
 - B. Package door assemblies in individual corrugated cartons so no portion of the door has contact with the outer shell of the container.
- 1.07 PRODUCT WARRANTY
- A. Provide a written warranty signed by manufacturer, installer and contractor, agreeing to replace any doors or factory hardware installation that fails in materials or workmanship, within the warranty period.
 - B. Failure of materials or workmanship includes: excessive deflection, faulty operation of entrances, deterioration of finish or construction in excess of normal weathering and defects in hardware installation.
 - C. The minimum time period of warranty is 10 years from acceptance.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on model SL-18 with SpecLite3 as manufactured by Special-Lite, Inc., P.O. Box 6, Decatur, MI 49045. Tel. (616) 423-7068.

- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Fibertec Window & Door Mfg, Concord, Ontario, Canada. Tel. (888) 232-4956.
 - 2. Vistawall Architectural Products, Terrell, TX. Tel. (215) 953-1260.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 MATERIALS AND ACCESSORIES

- A. Aluminum Members: Alloy and temper as recommended by manufacturer for strength, corrosion resistant and application of required finish and control of color; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate with aluminum wall thickness of 0.125 inch.
- B. Components: Furnish door components from the same manufacturer.
- C. Fasteners: Aluminum, non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, frames, stops, hardware, finish matching the item to be fastened.

2.03 FABRICATION

- A. Sizes and Profiles: The required sizes for doors, and profile requirements are shown on the Drawings.
- B. Coordination of Fabrication: Field measure before fabrication, and show recorded measurements on final shop drawing.
- C. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to assembly. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64-inch.
- D. No welding of doors is acceptable.
- E. Maintain continuity of line and accurate relation of planes and angles. Secure attachments and support of mechanical joints, with hairline fit at contacting members.

2.04 ACRYLIC MODIFIED POLYESTER AMP COLONIAL DOORS

- A. Materials and Construction as follows:
 - 1. Construct 1-3/4 inch thickness doors of 6063-T5-aluminum alloy stiles and rails minimum 2-5/16 inches depth. Construct with mitered corners and provide joinery of 3/8-inch diameter full width tie rods through extruded splines top and bottom as standard. 0.125 inch tubular shaped stiles and rails reinforced to accept hardware as specified. Provide hex type aircraft nuts for joinery without welds, glues or other methods for securing internal door extrusions. Furnish integral reglets to accept face sheet to permit a flush appearance. Rail caps or other face sheet capture methods are not acceptable.
 - 2. Extrude top and bottom rail legs for interlocking continuous rigidity weather bar. Lock face sheet material in place with extruded interlocking edges to be flush with aluminum stiles and rails.

3. Door Face Sheeting 0.120-inch thickness acrylic modified polyester. SL-18 doors with red oak wood grain pattern in a custom color as selected by the MDOT Architect.
4. Core of Door Assembly: Minimum five pounds per cubic foot density poured-in-place polyurethane free of CFC. Minimum "R" value of 11. Meeting stiles on pairs of doors and bottom weather bars with nylon brush weather-stripping.
5. Pre-machine doors in accordance with templates from the specified hardware manufacturers and approved hardware schedule. Factory install hardware.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with manufacturer's recommendations and Specifications for the installation of the doors. Factory install hardware in doors.
- B. Set units plumb, level and true to line, without warp or rack of doors. Anchor securely in place. Separate aluminum and other metal surfaces with bituminous coatings or other means as approved by the Project Engineer / MDOT Architect.
- C. Set thresholds in a bed of mastic and backseal.
- D. Clean surfaces promptly after installation of doors, exercising care to avoid damage to the protective coatings.
- E. Ensure that the doors will be without damage or deterioration (other than normal weathering) at the time of acceptance.
- F. Provide Owner with all adjustment tools and instruction sheets. Arrange an in service session to Owner at owner's convenience. Any workmanship that is defective or deficient shall be replaced.

END OF SECTION

SECTION 08 51 13

ALUMINUM WINDOWS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Extent of aluminum windows is shown on Drawings and in Schedules. Types of aluminum windows required include fixed and operable exterior window units.

1.02 RELATED SECTIONS

- A. Section 08 80 00 – Glazing for glazing requirements of aluminum windows, including windows specified herein shall be factory pre-glazed.
- B. Section 09 05 15 – Color Design.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's sample warranty, specifications, standard details, and installation recommendations for components of aluminum window units required for project, including independent laboratory certified test reports that products tested comply with performances requirements.
- B. Shop Drawings: Submit Shop Drawings for fabrication and installation of aluminum windows, including unit elevations, full-or half-scale detail sections of typical composite members. Show anchorage locations and other components not included in manufacturer's standard data. Indicate type glazing, screening and window finish being supplied.
- C. Samples: Submit samples as follows:
 - 1. Two samples of each required aluminum finish, on a three-inch long section of an extruded shape or flat aluminum sheet.
 - 2. Additional samples, if required and as directed by the Project Engineer / MDOT Architect, to show fabrication techniques, workmanship of component parts and design of hardware and other exposed auxiliary items.

1.04 QUALITY ASSURANCE

- A. Except as otherwise indicated, requirements for aluminum windows, terminology, tolerances, standards of performance, and fabrication workmanship are those specified and recommended in AAMA/NWWDA 101/I.S. 2-97 and applicable general recommendations published by AAMA and AA.
- B. Manufacturer: Provide aluminum window units and framing system produced by a single firm with minimum 5 years successful experience in fabricating types required for this Project.
- C. Performance and Testing: Except as otherwise indicated, comply with air infiltration tests, water resistance tests and applicable load tests in AAMA/NWWDA 101/I.S. 2-97 for type and classification of window units required in each case. Where manufacturer's standard window units comply with requirements and have been tested in accordance with specified tests, provide certification by manufacturer showing compliance with such tests.

- D. Uniform Load Structural Test: Test unit in accordance with ASTM E 330 at a positive and negative static air pressure difference of 105 psf. At the conclusion of the test, there shall be no glass breakage, permanent damage.
 - E. Air Infiltration Test: Test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf. Air infiltration shall not exceed 0.1 cubic feet per square foot of crack.
 - F. Water Resistance Test: No water shall pass the interior face of the window frame and there shall be no leakage as defined in tests methods ASTM E 331 and ASTM E547.
 - G. Condensation Resistance Factor: The window shall be tested in accordance with AAMA 1503-98 standards and tests of thermal performance and shall have a condensation resistance factor of no less than 64 frame and 56 glass.
 - H. Field Measurement: Wherever possible, take field measurements prior to preparation of Shop Drawings and fabrication, to ensure proper fitting of work. However, proceed with fabrication and coordinate installation tolerances as necessary when field measurements might delay the Work.
- 1.05 DELIVERY, STORAGE, AND HANDLING
- A. Store and handle windows in strict compliance with the manufacturer's instructions.
 - B. Protect windows adequately against damage from the elements, construction activities and other hazards before, during and after installation.
- 1.06 SPECIAL PROJECT WARRANTY
- A. Provide written warranty signed by Manufacturer, Installer, and Contractor, agreeing to replace aluminum windows which fail in materials or workmanship within 3 years of acceptance. Failure of materials or workmanship includes excessive leakage or air infiltration, excessive deflections, faulty operation of entrances, deterioration of finish or construction in excess of normal weathering, and defects in hardware, weather-stripping, and other components of the Work.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on Series 4170 Thermal F-AW70 Fixed windows and Series 1905 Thermal AP-AW75 Projected windows as manufactured by Peerless Products, Inc., Lenexa, KS 66219. Tel. (800) 279-9999.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Graham Architectural Products, York, PA. Tel. (800) 755-6274.
 - 2. Winco Window Company, Saint Louis, MO. Tel. (800) 525-8089.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14 - Product Options and Substitution Procedures

2.02 MATERIALS AND ACCESSORIES

- A. Aluminum Members: All extruded aluminum sections shall be of 6063-T5 or T6 alloy and tempered. Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate. Main frame extruded members shall have a minimum depth of 4 inches.
- B. Fasteners: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum components. Do not use exposed fasteners except where unavoidable for application of hardware. Match finish of adjoining metal. Provide Phillips flat-head machine screws for exposed fasteners. Locate all fasteners so as not to bridge the thermal break construction of windows.
- C. Thermal Barrier: Exterior aluminum shall be separated from the interior aluminum by an integrally concealed, low-conductance structural thermal barrier in a manner that eliminates direct metal-to-metal contact. Thermal barrier de-bridge space shall not be less than 3/16 inch. Thermal barrier shall be poured-in-place two-part polyurethane that has been in use on similar units for a period of not less than 5 years and has been tested to demonstrate resistance to thermal conductance and condensation with adequate strength and security of glass retention.
- D. Glass and Glazing Materials: Provide glass and glazing materials that comply with requirements of Section 08800 of these Specifications.
- E. Hardware for Projected Window:
 - 1. Locking handles shall be cam type and manufactured from a white bronze alloy with a US25D brushed finish.
 - 2. Operating hardware shall be 4-bar stainless steel hinges or equal.

2.03 WINDOW CLASSIFICATION (GRADE)

- A. Except as otherwise indicated; provide window units complying with requirements of AAMA classification of F-AW 70(Fixed) and AP-AW75 (Projected).

2.04 FABRICATION

- A. Required sizes for frame units, including profile requirements, are shown on drawings. Any variable dimensions are indicated, together with maximum and minimum dimensions required to achieve design requirements and coordination with other Work. Details shown are based upon standard details by manufacturer indicated. Similar details by other manufacturers listed will be acceptable, provided they comply with other requirements, including profile limitations.
- B. Prefabrication: To greatest extent possible, complete fabrication assembly, finishing, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.
- C. Sequence: Complete cutting, fitting, forming, drilling, and grinding of metal work prior to cleaning, finishing, surface treatment, and application of finishes. Remove arises from cut edges and ease edges and corners to radius of approximately 1/64 inch.

- D. Welding: Comply with AWS recommendations to avoid discoloration; grind exposed welds smooth and restore mechanical finish.
- E. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator that will prevent corrosion.
- F. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.
- G. Fasteners: Conceal fasteners wherever possible.

2.05 SILLS

- A. Provide extruded sills equal to those manufactured by Peerless. Sizes shown on Drawings.

2.06 FINISHES

- A. Kynar 500 (70% PVDF), AAMA 2605-02, finish to be selected by Project Engineer / MDOT Architect from manufacturer's full range of standard and premium colors available. Protect finishes promptly after drying by applying clear protective coating not less than 0.5 mils dry film thickness.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of aluminum windows. Set units plumb, level, and true to line, without warp or rack of framing members. Anchor securely in place, separating aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- B. Set sill members and other members in bed of compound as shown, or with joint fillers or gaskets as shown to provide weather-tight construction. Comply with requirements of Section 07 92 00 for caulking and sealant.
- C. Refer Section 08 80 00 - Glazing for installation of glass to be glazed into windows.

3.02 CLEANING

- A. Clean completed system, inside and out, promptly after installation of glass and sealants. Remove excess glazing and sealant compounds, dirt, and other substances from aluminum surfaces. Remove protective coating when completion of construction activities no longer requires its retention.
- B. Institute protective measures and other precautions required to ensure that aluminum window units will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Hardware as shown on the Drawings and in Schedules. Door hardware is hereby defined to include all items known commercially as builders hardware, as required for swing doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame. The required types of hardware include (but are not limited to) the following:
1. Butts and hinges
 2. Lock cylinders and keys
 3. Lock and latch sets
 4. Bolts
 5. Push/pull units
 6. Closers
 7. Door trim units
 8. Stripping and seals
 9. Thresholds
- B. Items of hardware not definitely specified, but required for the completion and proper operation of the doors, shall be suitable in type, comparable to the type specified for similar openings. Labeled doors shall be fitted with labeled hardware.
- C. All modifications of hardware required by reason of construction characteristics shall be such as to provide the proper operation or functional features. Contractor shall be fully responsible for checking all details, such as wall trim clearance, bevels, backsets, proper type strike plates, length of spindles, hands of locks, etc., in order that all items of hardware shall fit properly. Hardware for application to metal shall be made to standard templates. Template information shall be furnished to door and frame fabricators and all other trades requiring same, in order that they may cut, reinforce or otherwise prepare in the shop, materials for reception of hardware.
- D. Hardware shall be free from defects affecting appearance and serviceability. Working parts shall be well fitted and smooth working without unnecessary play. All items of hardware shall be delivered to the building site in sufficient time in advance of its requirement for use for inspection prior to installation.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and Installation instructions for each type of hardware. Include operating instructions, maintenance information and spare part sources.
- B. Contractor's Hardware Schedule: After all samples have been approved but prior to delivery of hardware, Contractor shall prepare and submit to the Project Engineer / MDOT Architect a complete schedule of all finish hardware required. Schedule shall follow requirements of Specifications and shall indicate type, manufacturer's name and number, location and finish of each item required. Approval of schedule will not relieve Contractor of responsibility for furnishing all necessary hardware.
- C. Submit such samples as required by the Project Engineer / MDOT Architect for approval. Do not deliver hardware until approval is obtained.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with the following requirements:
 - 1. ANSI A117.1 – Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
 - 2. NFPA 101.
- B. Hardware Supplier: Company specializing in supplying commercial door hardware with five years documented experience and approved by manufacturer.
- C. Hardware supplier shall have in his employment, an Architectural Hardware Consultant (AHC) in good standing as certified by the Society of Hardware Consultants Council. The Architectural Hardware Consultant shall assist the Contractor in installation and verify that hardware has been furnished and installed in accordance with manufacturer's instructions and as specified herein.
- D. Templates: The hardware supplier shall provide templates and / or physical hardware to trades as required and in sufficient time to prevent delay in the execution of the Work.

1.04 PACKING AND MARKING

- A. Package each item of hardware and lockset separately in individual containers, complete with screws, keys, instructions and installation template for spotting mortising tools. Mark each container with item number corresponding to number shown on Contractor's hardware schedule.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equivalent products by the following manufacturers are acceptable:
 - 1. Architectural Builders Hardware Mfg., Inc., Itasca, IL. Tel. (630) 875-9900.
 - 2. Baldwin Hardware Corporation, Reading, PA. Tel (800) 566-1986.
 - 3. Best Access Sys. Indianapolis, IN. Tel: (800) 311-1705.
 - 4. Corbin Russwin Arch't. Hardware. Berlin, CT. Tel: (800) 543-3658.
 - 5. Dorma Door Controls, Inc. Reamstown, PA. Tel: (800) 523-8483.
 - 6. Hager Companies. Saint Louis, MO. Tel: (800) 325-9995.
 - 7. LCN. Princeton, IL. Tel: (800) 526-2400.
 - 8. Markar Architectural Products, Inc., Lancaster, NY. Tel. (800) 866-1688.
 - 9. McKinney Hinge. Scranton, PA. Tel: (800) 346-7707.
 - 10. National Guard Products, Memphis, TN. Tel. (800) 647-7874.
 - 11. Pemko. Ventura, CA. Tel: (800) 283-9988.
 - 12. Rockwood Manufacturing Co. Rockwood, PA. Tel: (800) 458-2424.
- B. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 KEYING / CYLINDERS

- A. Furnish all cylinders & locksets with removable type cores. The removable core system shall be one that uses either temporary construction cores or construction keyed cores operated by a construction key until such time the construction key is rendered inactive by the change key or retractor key.

- B. All cylinders shall be keyed in sets as directed by the Project Engineer / MDOT Architect. Furnish 3 change keys per lock and 6 masterkeys per set.

2.03 MATERIALS

- A. See Hardware Schedule at end of this Section. Products listed set standard.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Mount hardware units at heights recommended in "Recommended Locations for Builders' Hardware" NBHA, except as other wise specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by the Project 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, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. 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. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- D. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hairline joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.
- E. Screw thresholds to substrate with No. 10 or larger screws, of the proper type for permanent anchorage and of bronze or stainless steel that will not corrode in contact with the threshold metal.
 - 1. At exterior doors, and elsewhere as indicated, set thresholds in a bed of either butyl rubber sealant or polyisobutylene mastic sealant to completely fill concealed voids and exclude moisture from every source.
 - 2. Do not plug drainage holes or block weeps. Remove excess sealant.

3.02 ADJUSTING AND CLEANING

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite-type if no other recommended). Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.

3.03 HARDWARE SCHEDULE:

HW1 (For AMP Doors to Toilet Rooms)
Each Opening Shall Have:

1 – Each Cont. Hinge	Markar	FM 100 X MPPC2 “Custom”
1 – Deadlock	Baldwin	8555 X 003
1 – Push Plate	Rockwood	#76 (4X30) X 3 PF X CFC
1 – Pull Plate	Rockwood	#76 (4X30) X 148 X 3 PF X CFC
1 – Closer	LCN	PA4040 CUSH X Metal Cove X 605
1 – Kickplate	Rockwood	8 X 2 LDW 0.050 X 3PF (Mounted push side)
1 – W/Strip	N. Guard	160VB (MTD. HD & Jamb)
1 – Threshold	N. Guard	896BR X Baldwin Lifetime Finish

HW2 (For AMP Doors to Mechanical & Janitor Rooms)
Each Opening Shall Have:

1 – Cont. Hinge	Markar	FM100 MPPC2 “Custom”
1 – Deadlock	Baldwin	8555 X 003
1 – Cyl. Ring Pull	Rockwood	90 X 3PF
1 – Kickplate	Rockwood	8 x 2 LDW 0.050 X 3PF (Mounted push side)
1 – Threshold	N. Guard	896BR X Baldwin Lifetime Finish
1 – Set W/Strip	Pemko	303 DV (Head & Jambs)
1 – O.H. Holder / Stop	ABH	7000 Series X US3

HW3 (for AMP Door to Concession Building Storage Room)
Each Opening Shall Have:

1 – Cont. Hinge	Markar	FM100 MPPC2 “Custom”
1 – Deadlock	Baldwin	8555 X 003
1 – Cyl. Ring Pull	Rockwood	90 X 3PF
1 – Kickplate	Rockwood	8 x 2 LDW 0.050 X 3PF (Mounted push side)
1 – Threshold	N. Guard	896BR X Baldwin Lifetime Finish
1 – Set W/Strip	Pemko	303 DV (Head & Jambs)
1 – O.H. Holder / Stop	ABH	7000 Series X US3

END OF SECTION

SECTION 08 80 00 GLAZING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Glass and glazing for doors, windows and other glazed openings, interior and exterior locations.

1.02 RELATED SECTIONS

- A. Section 08 51 13 - Aluminum Windows.

1.03 QUALITY ASSURANCE

- A. Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Prime Glass Standard: FS DD-G-45I.
- C. Heat-Treated Glass Standard: FS DD-G-I403.
- D. Safety Glass Standard: CPSC I6 CFR I20I.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect glass during transit, storage and handling to prevent scratching or breakage of glass. Replace all broken glass.

1.05 PROJECT CONDITIONS

- A. Meet with Glazier and other trades affected by glass installation, prior to beginning of installation. Do not perform work under adverse weather or job conditions. Install liquid sealant when temperatures are within lower or middle third of temperature range recommended by manufacturer.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equivalent products by the following prime glass manufacturers are acceptable:
 - 1. AFGD Glass, Inc., Atlanta, GA. Tel. (800) 766-2343.
 - 2. American Glassmith, Inc., Columbus, OH. Tel No. (800) 870-2519
 - 3. Cardinal Glass Industries, Eden Prairie, MN. Tel. (952) 229-2600.
 - 4. Pilkington North America, Toledo, OH. Tel. (419) 247-3731.
 - 5. PPG Industries, Inc., Pittsburgh, PA. Tel. (800) 377-5267.
 - 6. Zeledyne, Tulsa, OK. Tel. (800) 331-2607.
- B. Substitutions shall fully comply with specified requirements and Section 01 62 14 - Product Options and Substitution Procedures

2.02 INSULATING GLASS

- A. Material: Shall consist of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E 774 for performance classification indicated. Unless shown otherwise on Drawings, use this type glass for all exterior applications.
- B. Characteristics: Other requirements specified for glass characteristics, air space, sealing system, sealant spacer material, corner design and desiccant are as follows:
 - 1. Thickness of Each Pane: 1/4 - inch.
 - 2. Airspace Thickness: 1/2 - inch.
 - 3. Sealing System: Manufacturer's standard 1 inch sealing system.
 - 4. Spacer Material: Manufacturer's standard metal-white.
 - 5. Desiccant: Manufacturer's standard, either molecular sieve or silica gel.
 - 6. Corner Construction: Manufacturer's standard.
 - 7. Exterior Pane: Frosted; equal to Sumiglass Model FR240 Heavy Frost by American Glassmith, Inc.
 - 8. Interior Pane: Clear with MSVD (Sputter) Low-E on 3rd (air space) surface.
 - 9. Warranty: Manufacturer's Ten year.

2.03 LAMINATED CLEAR SAFETY GLASS

- A. Two layers of 1/8 inch glass Type 1 (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select) with a 0.030 polyvinyl butyryl interlayer. Total thickness, 1/4 inch (plus). Unless shown otherwise on Drawings, use this type glass for all interior applications.

2.04 SETTING MATERIALS

- A. Provide all necessary primers, sealants, channels, setting blocks, etc. with items to be glazed. Conform to requirements set forth in FGJA Glazing Manual.

PART 3 - EXECUTION

3.01 GLAZING INSTALLATION

- A. Do not commence glazing Work until the required primers have been applied and have dried. Clean all surfaces to which setting materials are to be applied to assure that the materials properly adhere and seal.
- B. Experienced glaziers having highest quality workmanship shall perform all glazing. Glass shall be set without springing or forcing. Putty, glazing compound, stops and the like shall not project above the sight line. Exposed surfaces of putty and glazing compound shall be left straight, flat and clean. Corners shall be well formed.
- C. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- D. Apply clear glazing compound around perimeter and at all glass-to-glass connections of butt-glazing system. Compound shall be the type recommended by the glass manufacturer for this particular installation.

3.02 STANDARDS AND PERFORMANCE

- A. Watertight and airtight installation of each glass product is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors), without failure including loss or breakage of glass, failure of sealant 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. Glazing channel dimensions where shown are intended to provide for necessary bite on glass, minimum edge clearance, and adequate sealant thickness, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- D. Comply with combined recommendations and technical reports by manufacturers of glass and glazing products as used in each glazing channel, and with recommendations of Flat Glass Marketing Association "Glazing Manual," except where more stringent requirements are indicated.

3.03 PREPARATION FOR GLAZING

- A. Clean glazing channel and other framing members to receive glass, immediately before glazing. Remove coatings that are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.
- B. Apply primer or sealant to joint surfaces where recommended by sealant manufacturer.

3.04 GLAZING

- A. Install setting blocks of proper size in sill rabbet, located 1/4 of glass width from each corner. Set blocks in thin course of heel-bead compound, if any.
- B. Provide spacers inside and out, of proper size and spacing, for glass sizes larger than 50 united inches, except where gaskets or pre-shimmed tapes are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- D. Force sealant into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- E. Tool exposed surfaces of glazing liquids and compounds to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- F. Clean and trim excess glazing materials from glass and stops or frames promptly after installation, and eliminate stains and discoloration.

- G. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement. Anchor gasket to stop with matching ribs, or by proven adhesives, including embedment of gasket tail in cured heel-bead.

3.05 CURE AND PROTECTION

- A. Protect 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 nonpermanent labels and clean surfaces. Cure sealant 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.

3.06 CLEANING

- A. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish Date of Completion in each area of Project. Comply with glass product manufacturer's recommendations for final cleaning.
- B. The General Contractor shall be responsible for removal of protective materials and cleaning with plain water, or water with soap or household detergent as approved by the glass manufacturer. The General Contractor shall be held responsible for damages resulting from the use of other cleaning material.

END OF SECTION

SECTION 09 05 15 COLOR DESIGN

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. A coordinated comprehensive Color System in which requirements for materials specified in other Sections of this Specification and / or shown on the Drawings are identified for quality, color, finish, texture and pattern.

1.02 MANUFACTURER'S TRADE NAMES

- A. Manufacture's trade names and number designations used herein identify colors, finishes, textures and patterns for materials and products specified in the technical sections of the Specifications. Wherever such products are referred for selection or approval in other sections, such products shall be understood to be referenced to this Section. If no selection is listed herein for products, the Project Engineer / MDOT Architect shall be contacted for a color selection. Subject to approval of the Project Engineer / MDOT Architect, products of other manufacturers will be considered, provided they are equivalent to the quality, colors, finishes, textures and patterns listed and meet the requirements of the Specifications and Drawings.

1.03 RELATED SECTIONS

- A. Section 01 33 00 - Submittal Procedures.

1.04 SAMPLES

- A. Samples shall be submitted for approval prior to applying or installing any finishes or items that are not included in this Section. See appropriate technical Sections for submittal requirements. Upon receipt of samples, the Project Engineer / MDOT Architect may make revisions to the Color schedule.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials are specified in other Sections of the Specifications. Any reference by trade name or manufacturer shall be considered as establishing a standard of quality and shall in no way limit competition.

2.02 MANUFACTURERS

- A. The following manufacturers were used in preparing the Color Schedule:

SECTION / MATERIAL	MANUFACTURER / NUMBER & COLOR NAME	COLOR DESCRIPTION
• 03 30 00 – Concrete Floors	H&C HC#157 Sandstone	(tan)
• 04 01 25 - Brick (damaged)	Match Existing	
• 04 01 25 - Mortar (repoint)	Match Existing	
• 04 01 25 - Conc. Block Walls (Int.)	SW #6106-Kilim Beige (P3)	(tan)

- 04 01 25 - Conc. Block Walls (Ext.) SW #6106-Kilim Beige (P3) (tan)
- 05 50 00 - Miscellaneous Steel S/W #6468-Hunt Club (P1) (dark green)
- 05 50 00 - Misc. Stl. (Ornamental) S/W #6468-Hunt Club (P1) (dark green)
- 06 40 00 - Bead-Board Ceiling SW #6105-Devine White (P2) (light beige)
- 06 40 00 - Crown Molding SW #6109-Hopsack (P4) (dark tan)
- 06 40 00 - Wood Shutters (Ext.) S/W #6468-Hunt Club (P1) (dark green)
- 06 40 00 - Picnic Shelter Ceiling SW #6105-Devine White (P2) (light beige)
- 06 40 00 - P S Fascia & Beams SW #6109-Hopsack (P4) (dark tan)
- 06 40 00 - Picnic Shelter Siding SW #6106-Kilim Beige (P3) (light beige)
- 06 40 00 - Concession Bldg. Ceiling SW #6105-Devine White (P2) (light beige)
- 06 40 00 - Concession Bldg. Siding SW #6106 Kilim Beige (P3) (tan)
- 06 40 00 - C B Fascia & Beams SW #6109-Hopsack (P4) (dark tan)
- 06 40 00 - Wood door Frames SW #6109-Hopsack (P4) (dark tan)
- 07 46 34 - Vinyl Siding Wolverine- #833 Sand (light tan)
- 07 61 00 - Metal Roofing & Trim Firestone- Classic Copper (bright copper)
- 07 62 00 - Copper Gutters & DS Match Existing Copper (real copper)
- 07 62 00 - Met. Fascia & Trim Firestone- Classic Copper (bright copper)
- 07 92 00 - Joint Sealants Pecora (Match adjacent lighter color)
- 08 11 13 - Met. Dr. Frames SW #6468-Hunt Club (P1) (dark green)
- 08 11 13 - Met. Doors SW #6468-Hunt Club (P1) (dark green)
- 08 16 16 - AMP Doors (Int. & Ext.) Match S/W #6468-Hunt Club (P1) (dark green)
- 08 51 13 - Alum. Windows Peerless-#395F515 Sarapi Green (dark green)
- 08 71 00 - Door Hardware Brass & Bronze (dark brown)
- 09 29 00 - Gypsum (Ceilings) SW #6105 Divine White (P2) (light beige)
- 09 31 13 - Ceramic Tile Floor #1 Daltile #DC07 Sage Green (8"x8") (light green)
- 09 31 13 - Ceramic Tile Floor #2 Daltile #DC09 Hunter (8"x8") (dark green)
- (Ceramic Tile floor in Rest Rooms to be checkered pattern)
- 09 31 13 - Ceramic Tile Wall #4 Daltile #K165 Almond (4-1/4"x4-1/4") (off white)
- 09 31 13 - Cer Tile Cove & Wall #5 Daltile #K112 Timberline (4 1/4"x4 1/4") (dark green)
- 09 31 13 - "Mississippi" wall mosaic Daltile #DK09 Camouflage (1"x1") (green/rust/white)
- (There will be 24 other single color 1"x1" tiles 'scattered' in this green mosaic)
- 09 31 13 - Grout (Floors) Laticrete #33-Boston Fern (green)
- 09 31 13 - Grout (Walls) Laticrete #85-Almond (light tan)
- 10 11 00 - Visual Display Surfaces Claridge- Medium Bronze (bronze)
- 10 14 00 - Specialty Signs (Backgrd) Mohawk #118 Green (dark green)
- 10 14 00 - Specialty Signs (Letters) Mohawk #226 Beige (off white)
- 10 21 15 - Toilet Partitions Bobrick- SC04 Forest Green (dark green)
- 22 42 00 - 3-Station Lavatory Bradley- Riverstone (brown w/ specs)
- 22 42 00 - Lavatory Front Panel Bradley- Mystic Moss (lt green w/ specs)
- 32 30 00 - Conc. Picnic Tables & Benches S/W #6468-Hunt Club (P1) (dark green)
- 32 30 00 - Wood Picnic Tables & Benches S/W #6468-Hunt Club (P1) (dark green)

PART 3 - EXECUTION

3.01 EXECUTION REQUIREMENTS

- A. Refer to execution requirements specified in other Sections of this Specification for the specific products listed. All remaining colors, finishes, textures or patterns not included in this Color Design will be selected by the MDOT Architect upon written notification and subsequent submittals by the Contractor.

END OF SECTION

SECTION 09 21 18

SUSPENDED GYPSUM BOARD SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The extent of the suspended gypsum board drywall system is shown on the Drawings and in schedules. The types of work required include the following:
 - 1. Ceiling suspension systems.
 - 2. Drywall system face-type gypsum board work.
 - 3. Trim and accessories that are installed prior to or concurrent with gypsum board.

1.02 SUBMITTALS

- A. Submit product data and installations instructions for each gypsum board drywall system required, including other data as may be required to show compliance with these specifications. Distribute a copy of each installation instructions to the installer.

1.03 QUALITY ASSURANCE

- A. Industry Standard: Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more detailed or more stringent requirements are indicated including the recommendations of the manufacturer.
- B. Allowable Tolerances: 1/8 inch offsets between planes of board faces, and 1/4 inch in 8 ft. for plumb, level, warp and bow.
- C. Manufacturer: Obtain gypsum board, framing and fasteners, trim accessories, adhesives and joint treatment products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum board, by one of the following:
 - 1. BPB America Inc. Tampa, FL Tel: (866) 427-2872.
 - 2. Georgia-Pacific Corp, Atlanta, GA, Tel. (800) 327-2344.
 - 3. National Gypsum Company, Charlotte, NC, Tel. (800) 343-4893.
 - 4. United States Gypsum Company, Chicago, IL, Tel. (800) 874-4968.

1.04 PRODUCT HANDLING

- A. Deliver gypsum drywall materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type and grade; store in a dry, well ventilated space, protected from the weather, under cover and off the ground.

1.05 PROJECT CONDITIONS

- A. Installer must examine the substrates and the spaces to receive gypsum drywall, and the conditions under which gypsum drywall is to be installed; and shall notify the Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

- B. Maintain ambient temperatures at not less than 55 degrees F., for the period of 24 hours before drywall finishing, during installation and until compounds are dry.

PART 2 - PRODUCTS

2.01 CEILING SUPPORT MATERIALS

- A. Main Runners: 1-1/2 inch steel channels, either cold-rolled at 0.475 pounds per foot or hot-rolled at 1.12 pounds per foot, rust-inhibitive paint finish.
- B. Furring Members: Screw-type hat-shaped furring channels of 25 gage zinc-coated steel; comply with ASTM C 645.
- C. Furring Members: Screw-type "Cee" shaped studs of depth indicated, of 25 gage zinc-coated steel; comply with ASTM C 645.
- D. Hanger Wire: Galvanized, soft-temper steel wire complying with ASTM A 641, Class 1 coating, prestretched; sized in accordance with ANSI A42.4 unless otherwise indicated.
- E. Hanger Anchorage: Comply with ANSI A42.4 for concrete inserts, clips, bolts, screws and other devices applicable to the indicated method of structural anchorage for ceiling hangers. Size devices for 3 by calculated load supported, except size direct-pull concrete inserts for 5 by calculated load.
- F. Furring Anchorage: Galvanized, 16-gage wire ties, manufacturer's standard wire-type clips. Bolts, nails or screws as recommended by furring manufacturer and complying with ANSI A42.4.

2.02 GYPSUM BOARD PRODUCTS

- A. Specified in Section 09 29 00 – Gypsum Board.

2.03 TRIM ACCESSORIES

- A. Provide Manufacturer's standard galvanized steel beaded units with flanges for concealment in joint compound including corner beads, edge trim and control joints; except provide semi-finishing type (flange not concealed) where indicated.
- B. Semi-Finishing Type: Manufacturer's standard trim units that are not to be finished with joint compound (non-beaded).
- C. Plastic Edge Trim: Manufacturer's standard rigid or semi-rigid PVC moldings of the semi-finishing type, shaped to provide resilient contact of gypsum board edges with other work; friction-fit, or pressure-sensitive adhesive mounting.

2.04 JOINT TREATMENT MATERIALS

- A. ASTM C 475; type recommended by the manufacturer for the application indicated, except as otherwise indicated.
- B. Joint Tape: Perforated type.
- C. Joint Compound: Provide chemical hardening type for bedding and filling, ready-mixed vinyl type or non-case in-type for topping.

2.05 MISCELLANEOUS MATERIALS

- A. Laminating Adhesive: The type and grade of adhesive or compound recommended by the gypsum board manufacturer, for laminating gypsum board together in applications as indicated.
- B. Fastening Adhesive: The type and grade of adhesive recommended by the gypsum board manufacturer for fastening board to structural supports or substrates as indicated.
- C. Gypsum Board Fasteners: Comply with GA-216, and with gypsum board manufacturer's recommendations.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Meet at the project site with the installers of related work and review the coordination and sequencing of work to ensure that everything to be concealed by gypsum drywall has been accomplished, and that chases, access panels, openings, supplementary framing and blocking and similar provisions have been completed.

3.02 INSTALLATION REQUIREMENTS

- A. Comply with ANSI A42.4 as applicable to the type of substrate and drywall support system indicated; and comply with the Gypsum Association GA-203 for installation of furring members.
- B. Coordinate and integrate where possible, the installation of trim accessories with the installation of gypsum board. Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges by nailing or stapling in accordance with manufacturer's instructions and recommendations.
- C. Secure hanger wires to structural supports by wire-typing directly to structure where possible, otherwise tie to inserts, clips and other anchorage devices or fasteners as indicated. Wire-tie hanger wires to main runners.
- D. Space main runners 4 feet on center and space hangers at 4 feet on center along runners, except as otherwise indicated.
- E. Level main runners to a tolerance of 1/4 inch in 12 feet, measured both lengthwise in each runner and transversely between parallel runners.
- F. Space furring members at 24 inches on center except as otherwise indicated.

3.03 PROTECTION OF WORK

- A. Installer shall advise Contractor of required procedures for protection of the gypsum drywall Work from damage and deterioration during the remainder of the construction period.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Gypsum board work with a tape-and-compound joint treatment system known as "drywall finishing" work.
- B. The types of Work required include the following:
 - 1. Gypsum board applied to wood framing and furring.
 - 2. Gypsum backing boards for application of other finishes.
 - 3. Drywall finishing (joint tape-and-compound treatment).

1.02 SUBMITTALS

- A. Submit manufacturer's technical product data, installation instructions and recommendations for products specified.

1.03 QUALITY ASSURANCE

- A. Where work is indicated for fire resistance ratings, including those required to comply with governing regulations, provide materials and installations identical with applicable assemblies which have been tested and listed by recognized authorities, including UL and A.I.A.
- B. Industry Standard: Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more detailed or more stringent requirements are indicated including the recommendations of the manufacturer.
- C. Allowable Tolerances: 1/8 inch offsets between planes of board faces, and 1/4 inch in 8 ft. for plumb, level, warp and bow.
- D. Manufacturer: Obtain gypsum boards, framing and fasteners, trim accessories, adhesives and joint treatment products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

1.04 PRODUCT HANDLING

- A. Deliver gypsum drywall materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type and grade; store in a dry, well ventilated space, protected from the weather, under cover and off the ground.

1.05 PROJECT CONDITIONS

- A. Installer must examine the substrates and the spaces to receive gypsum drywall, and the conditions under which gypsum drywall is to be installed; and shall notify the Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

- B. Maintain ambient temperatures at not less than 55 degrees F., for the period of 24 hours before drywall finishing, during installation and until compounds are dry.

PART 2 - PRODUCTS

2.01 GYPSUM BOARD PRODUCTS

- A. Furnish Gypsum board products in maximum lengths available to minimize end-to-end butt joints. To the extent not otherwise indicated, comply with GA-216, as specified and recommended.
- B. Exposed gypsum board shall be Type X, fire rated type with tapered long edges and as follows:
 - 1. Edge Profile: Special rounded or beveled edge.
 - 2. Sheet Size: Maximum length available that will minimize end joints.
 - 3. Thickness: 5/8 inch, except where otherwise indicated.
 - 4. Water-resistant Type (WR-1): Provide at exterior walls and where indicated; equal to 5/8 inch thick DensArmor Plus Fireguard by G-P Gypsum.
 - 5. Cement Board: Provide water-resistant cement based backer board as a base for ceramic tile, equal to 5/8 inch thick Durock by USG.

2.02 TRIM ACCESSORIES

- A. Manufacturer's standard galvanized steel beaded units with flanges for concealment in joint compound including corner beads, edge trim and control joints; except provide semi-finishing type (flange not concealed) where indicated.
- B. Where metal moldings are specifically called out on the Drawings, provide the appropriate item from below:
 - 1. Edge Trim - USG No. 200-A.
 - 2. Control Joint - USG No. 093.

2.03 JOINT TREATMENT MATERIALS

- A. General: ASTM C 475; type recommended by the manufacturer for the application indicated, except as otherwise indicated.
- B. Joint Tape: Perforated type.
- C. Joint Compound: On interior work provide chemical hardening type for bedding and filling, ready-mixed vinyl-type or non-case in-type for topping. On exterior work provide water-resistant type.

2.04 MISCELLANEOUS MATERIALS

- A. Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board. Gypsum board fasteners shall comply with GA-216. Provide anti-corrosive type at exterior applications.

PART 3 - EXECUTION

3.01 Install supplementary framing, runners, furring, blocking and bracing at opening and terminations in the Work, and at locations required to support fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported directly on gypsum board alone.

3.02 GENERAL GYPSUM BOARD INSTALLATION REQUIREMENTS

- A. Meet at the project site with the installers of related work and review the coordination and sequencing of work to ensure that everything to be concealed by gypsum drywall has been accomplished, and that chases, access panels, openings, supplementary framing and blocking and similar provisions have been completed. In addition to compliance with GA-216 and ASTM C 840, comply with manufacturer's instructions and requirements for fire resistance ratings (if any), whichever is most stringent.
- B. Install wall / partition boards vertically to avoid end- butt joints wherever possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.
- C. Install sound attenuation blankets and insulation as indicated, prior to gypsum board unless readily installed after board has been installed.
- D. Floating construction: Where feasible, including where recommended by manufacturer, install gypsum board with "floating" internal corner construction, unless isolation of the intersecting boards is indicated or unless control or expansion joints are indicated.
- E. Space fasteners in gypsum boards in accordance with manufacturer's recommendations.

3.03 SPECIAL GYPSUM BOARD APPLICATIONS

- A. Where drywall is base for thin set ceramic tile and similar rigid applied wall finishes, install cement based backing board.
- B. At toilets, showers, labs, janitor closets, drinking fountains and similar "wet" areas, install water-resistant gypsum board.
- C. Apply with uncut long edge at bottom of work, and space 1/4 inch above fixture lips. Seal ends, cut-edges and penetrations of each piece with water-resistant sealant before installation.

3.04 INSTALLATION OF DRYWALL TRIM ACCESSORIES

- A. Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges by nailing or stapling in accordance with manufacturer's instructions and recommendations.
- B. Install metal corner beads at external corners of drywall work.

- C. 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 except where semi-finishing type is indicated. Install L-type trim where work is tightly abutted to other work, and install special kerf-type where other work is kerfed to receive long leg of L-type trim. Install U- type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints.) Install metal control joint (beaded type) where indicated or required for proper installation.

3.05 INSTALLATION OF DRYWALL FINISHING

- A. Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fastener heads, surface defects and elsewhere as required to prepare Work for decoration. Pre-fill open joints and rounded or beveled edges, using type of compound specified herein and recommended by manufacturer.
- B. Apply joint tape at joints between gypsum boards, except where a trim accessory is indicated.
- C. Apply joint compound in 3 coats (not including pre-fill of openings in base), and sand between last 2 coats and after last coat.
- D. Base for Ceramic Tile: Do not install drywall finishing where ceramic tile and similar rigid applied finishes are indicated.
- E. Unless otherwise indicated, install drywall finishing at all gypsum board exposed to view and to receive finishes as specified. Where not exposed to view and above ceilings, sanding is not required.
- F. Finishing Gypsum Board Assemblies: Level 4 finish, unless otherwise indicated; Level 1 finish for concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies and Level 2 finish where panels form substrates for tile, Level 5 finish is required in areas with a gloss or epoxy finished coating

3.06 PROTECTION OF WORK

- A. Installer shall advise Contractor of required procedures for protection of the gypsum drywall Work from damage and deterioration during the remainder of the construction period.

END OF SECTION

SECTION 09 31 13

THIN-SET CERAMIC TILING

PART 1- GENERAL

1.01 SECTION INCLUDES

- A. Thin set ceramic floor tile, glazed cove base, glazed wall tile, mosaic wall tile and accessories.

1.02 RELATED SECTIONS

- A. Section 07 26 00 – Vapor Retarders (Floor protection paper).
- B. Section 09 05 15 – Color Design.

1.03 SUBMITTALS

- A. Submit manufacturer's product data and written instructions for recommended installation and maintenance practices for each product specified.
- B. Submit 2 samples of types and colors of tile and grout required in similar pattern of tile shown on Drawings, mounted on not less than 12 inches square plywood or hardboard and grouted as required.
- C. Submit one full size sample of each tile accessory and marble threshold. Submit samples of trim and other units if requested by the Project Engineer / MDOT Architect. Review will be for color, pattern and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

1.04 QUALITY ASSURANCE

- A. Furnish tile conforming to the Standard Grade Requirements of ANSI A137.1.
- B. When using setting and grouting materials manufactured under TCA license, include identification, and formula number on each container. Provide materials obtained from only one source for each type of tile, grout and color to minimize variations in appearance and quality.
- C. Install ceramic tile in accordance with manufacturers instructions and applicable installation specifications of the Tile Council of America's "Handbook for Ceramic Tile Installation", latest edition.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver packaged materials and store in original containers with seals unbroken and labels intact until time of use, in accordance with manufacturer's directions.

1.06 PROJECT CONDITIONS

- A. Continuously heat areas to receive tile to 50 degrees F. for at least 48 hours prior to installation, when project conditions are such that heating is required. Maintain 50 degrees F. temperature continuously during and after installation as recommended by tile manufacturer but not less than 7 days. Maintain a minimum lighting level of 50 fc during installation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equivalent products by the following manufacturers are acceptable:
1. American Olean Tile Company, Lansdale, Pennsylvania
 2. Dal-Tile Corporation, Dallas, Texas
 3. Floor Gres Ceramiche, Italy
 4. Florida Tile Industries, Lakeland, Florida.
 5. Lone Star Porcelain Mosaic Tile, Dallas, Texas
 6. United States Ceramic Tile Co., East Spatra, Ohio
- B. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 MATERIALS

- A. Ceramic Floor Tile: 8 inches by 8 inches by 5/16 inch, cushioned edge, unglazed, color to be selected from standard colors available.
- B. Ceramic Base Tile: 4-1/4 inches by 4-1/4 inches by 5/16 inch, cushioned edge, bright glaze, cove base round top, color to be selected from standard colors available.
- C. Glazed Wall Tile: Size 4-1/4 inches by 4-1/4 inches by 5/16 inch, cushioned edge, bright glaze, colors to be selected from standard colors available.
- D. Mosaic Wall Tile: Provide "Mississippi" mosaic glazed wall tile in 1" square tile in one dominant color and up to six other colors from standard colors available to be selected prior to installation.
- E. Trim and Special Shapes: Provide necessary units with rounded internal and external corners, and rounded internal and external corner units of same material and finish as field tile, and as follows:
1. Base: Sanitary cove units.
 2. External Corners: Bullnose shapes, with a radius of not less than 3/4 inch, unless otherwise shown.
 3. Internal Corners: Field-butted square, except use square corner, combination angle and stretcher type cap.
- F. Marble Thresholds: Provide sound Group "A" marble with an abrasive hardness of not less than 10.0, when tested in accordance with ASTM C 241. Marble threshold color to be selected by the Project Engineer / MDOT Architect from manufacturer's full range of standard colors.
- G. Adhesive: ANSI A136.1 and ANSI A118.4 when mixed with additive, with Tile Contractor's Association or Adhesive and Sealant Council certification of conformance, for base and wall tile set on each type of substrate. Provide primer-sealer as recommended by adhesive manufacturer. Equal to Laticrete Type 272 Premium or 317 Floor 'N Wall Thin-Set with 333 Super Flex Additive. Equivalent products by Mapei and Bostik are acceptable.

- H. Grout: ANSI A 118.3, with Tile Contractor's Association certification of conformance. Equal to Laticrete Type, SpectraLOCK Pro Grout.
 - 1. Equivalent products by Mapei and Bostik are acceptable. Color of grout to be selected by the MDOT Architect from manufacturer's full range of standard colors.

2.03 MOSAIC MURAL FABRICATION

- A. Tile for 'Mississippi' mosaic mural and adjacent wall tile shall be laser cut as shown on Drawings.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Installer must examine the substrate and the conditions under which ceramic tile is to be installed and notify the contractor in writing of any conditions detrimental to the proper and timely completion of the Work.
- B. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION

- A. Comply with the applicable parts of ANSI 108 Series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile", and the tile and grout manufacturer's printed instructions, and applicable installation specifications of the Tile Council of America's "Handbook for Ceramic Tile Installation", latest edition.
- B. Handle, store, mix and apply proprietary setting and grouting materials in compliance with the manufacturer's instructions.
- C. Extend tile Work into recesses and under equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate Work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight, aligned joints. Fit tile closely to electrical outlets, piping, and fixtures so that plates, collars, or covers overlap tile.

3.03 JOINTING PATTERN

- A. Unless otherwise shown, lay tile in grid pattern. Align joints where adjoining tiles on floor, base, walls and trim are the same size. Layout tile Work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.

3.04 COLOR PATTERN

- A. A simple color pattern shall be provided with approved color chart and sample submittal to Contractor using 3 or less colors on walls and floors.

3.05 CLEANING AND PROTECTION

- A. Cleaning: Clean grout and setting materials from face of tile while materials are workable. Leave tiles face clean and free of all foreign matter. Unglazed tile may be cleaned with acid solutions only when permitted by the tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush the surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile Work.
- C. Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile Work by covering with floor protection paper during the construction period to prevent damage and wear. Prohibit all foot and wheel traffic from using tiled floors for 7 days after installation. Before final inspection, remove protective covering and rinse neutral cleaner from all tile surfaces.

END OF SECTION

SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Resilient Wall Base and Accessories.

1.02 RELATED SECTIONS

- A. Section 09 05 15 – Color Design.

1.03 SUBMITTALS

- A. Submit manufacturer's product data and written instructions for recommended installation and maintenance practices for each type of product indicated.
- B. Submit complete line of color samples for selection.

1.04 QUALITY ASSURANCE

- A. Wherever possible, provide resilient base, adhesives, cleaners, polishes and accessories produced by a single manufacturer.
- B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.05 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive resilient products.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS – RESILIENT WALL BASE

- A. Drawings and specifications are based on Resilient Wall Base manufactured by Johnsonite, 16910 Munn Road, Chagrin Falls, OH 44024. Tel. No. (800) 899-8916.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Armstrong Commercial Flooring, Lancaster, PA. Tel. No. (800) 292-6308.
 - 2. Azrock Commercial Flooring, Florence, AL. Tel. No. (800) 558-2240.
 - 3. Flexco, Inc. Tuscumbia, AL. Tel. (800) 633-3151.
 - 4. Mannington Commercial, Salem, NJ. Tel. No. (800) 241-2262.

- C. Alternate manufacturers: Products produced by other manufacturers that fully meet or exceed the specified requirements may be considered under provisions of Section 01 62 14-Product Options and Substitution Procedures.

2.02 RESILIENT BASE

- A. Provide rubber base complying with ASTM F-1861, Type TP, Group 1 (solid) Standard Specification for Resilient Wall Base, with matching end stops and preformed or molded corner units as available. Color selected by Architect from full range of colors.
 - 1. Resilient Wall Base shall be 4 inches high, 0.125-inch gage, length 120 feet, standard top-set cove.

2.03 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Installer shall examine the areas and conditions under which resilient flooring, wall base and accessories are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work.
- B. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 PREPARATION

- A. Acclimate base and accessories to job site conditions for at least 48 hours prior to installation.
- B. Clean substrates to be covered by resilient products immediately before installation.

3.03 INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- D. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- E. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

- F. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
 - G. Do not stretch resilient base during installation.
- 3.04 CLEANING AND PROTECTION
- A. Remove excess adhesive or other surface blemishes, using neutral type cleaners as recommended by manufacturer. Cover resilient products until Substantial Completion.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Painting and finishing of exterior and interior exposed items and surfaces throughout the project, except as otherwise indicated. Surface preparation, priming and finish coats specified in this Section are in addition to shop priming and surface treatment specified under other Sections of the Work.
- B. The Work includes field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the mechanical and electrical Work, except as otherwise indicated.
- C. "Paint" 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.
- D. Paint all exposed surfaces whether or not colors are designated in "schedules", except where the natural finish of the material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the Architect will select these from standard colors available for the materials system specified.
- E. Extra Materials: Deliver to Owner a 1-gal. Container, properly labeled and sealed, of each color and type of finish coat paint used on Project and with readable labels.

1.02 PAINTING NOT INCLUDED

- A. The following categories of Work are not included as parts of the field-applied finish Work, or are included in other Sections of these Specifications.
- B. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various Sections for structural steel, miscellaneous metal, hollow metal work, and similar items. Also, for fabricated or factory-built mechanical and electrical equipment or accessories.
- C. 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) plastic toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, finished mechanical and electrical equipment including light fixture, switch-gear and distribution cabinets, elevator entrance frames, door and equipment.
- D. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundations spaced, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.
- E. 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.

- F. 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. Do not paint over any code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.03 RELATED SECTIONS

- A. Section 09 05 15 – Color Design.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information including basic materials analysis and application instructions for each coating material specified.
- B. Paint Systems: Comply with Article 2.04 indicating each type of primer and top coat required for each substrate by product name and number.
- C. Samples: Submit color samples for selection by Architect from manufacturer's full range of colors. Indicate submitted manufacturer's CLOSEST STANDARD COLORS that match colors specified.
- D. Bidders desiring to use coatings other than those specified shall submit their proposal in writing to the Architect at least ten (10) days prior to the bid opening. Substitutions which decrease the film thickness, the number of coats applied, change the generic type of coating or fail to meet the performance criteria of the specified materials will not be approved. All primers and topcoats plus the seam sealer and pit filler shall be furnished by the same manufacturer to ensure compatibility.

1.05 QUALITY ASSURANCE

- A. On actual wall surfaces and other exterior and interior building components, duplicate painted finishes as specified. On at least 100 square feet 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.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label, and the following information:
 - 1. Name or title of material.
 - 2. Fed. Spec. Number, if applicable.
 - 3. Manufacturer's stock number and date of manufacturer.
 - 4. Manufacturer's name.
 - 5. Contents by volume, for major pigment and vehicle constituents.
 - 6. Thinning instructions.
 - 7. Application instructions.
 - 8. Color name and number.
- B. Store materials under cover, protected from inclement weather and adverse temperature extremes, in original containers or unopened packages, in accordance with manufacturer's instructions.

1.07 PROJECT CONDITIONS

- A. Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 90 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F. and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instruction. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on products manufactured by the Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115. Tel. (800) 321-8194.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Benjamin Moore & Company, Montvale, NJ. Tel. (800) 344-0400.
 - 2. Farrell-Calhoun Paint, Memphis, TN. Tel. (901) 526-2211.
 - 3. Tnemec Company Inc., Kansas City, Missouri. Tel. (800) 863-6321.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures

2.02 COLORS AND FINISHES

- A. Paint colors, surface treatments, and finishes will be selected from color chips submitted by contractor. Prior to beginning Work, the Architect will select color chips for surfaces to be painted. Use representative colors when preparing samples for review. Final acceptance of colors will be from samples.
- B. Color Pigments: Pure, non-fading, applicable types to suit the substrates and service indicated. Lead content in the pigment, if any, is limited to contain not more than 0.5 percent lead, as lead metal based on the total non-volatile (dry-film) of the paint by weight.
- C. 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 coats system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials provided for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primer or remove and reprime as required. Notify the Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

2.03 MATERIAL QUALITY

- A. Provide the best quality grade of the various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best grade product WILL NOT BE ACCEPTED. Proprietary names used to designate colors or materials are not intended to imply that products of the named manufacturers are required to the exclusion of equivalent products of other manufacturers.
- B. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only within recommended limits.

2.04 PAINT SYSTEMS

- A. Provide the following paint systems for the various substrates, as indicated.
- B. Exterior Paint Systems are as follows:
 - 1. Ferrous and Zinc Coated Metal
 - 1st Coat: S-W ProCryl® Universal Primer, B66-310 Series
(2-4 mils dry)
 - 2nd Coat: S-W Duration® Exterior Latex Acrylic Gloss Coating, K34 Series
 - 3rd Coat: S-W Duration® Exterior Latex Acrylic Gloss Coating, K34 Series
(7 mils wet, 2.8 mils dry per coat)
 - 2. Painted Woodwork
 - 1st Coat: S-W A-100® Exterior Latex Wood Primer, B42W41
(4 mils wet, 1.4 mils dry)
 - 2nd Coat: S-W Duration® Exterior Latex Acrylic Gloss Coating, K34 Series
 - 3rd Coat: S-W Duration® Exterior Latex Acrylic Gloss Coating, K34 Series
(7 mils wet, 2.8 mils dry per coat)
 - 3. Concrete Picnic Tables and Benches
 - 1st Coat: S-W Loxon Acrylic Masonry Conditioner, Guide Coat White, A24-100
(6 mils wet, 3 mils dry)
 - 2nd Coat: S-W Metalatex® Semi-Gloss Coating, B42 Series
 - 3rd Coat: S-W Metalatex® Semi-Gloss Coating, B42 Series
(3-5 mils dry per coat)
Not less than 9.0 mils dry film total thickness.
- C. Interior Paint Systems are as follows:
 - 1. Gypsum Drywall (Semi-Gloss)
 - 1st Coat: S-W Harmony Low Odor Interior Latex Primer, B11W900
(4 mils wet, 1.3 mils dry per coat)
 - 2nd Coat: S-W Harmony Low Odor Interior Latex Semi-Gloss, B10 Series
 - 3rd Coat: S-W Harmony Low Odor Interior Latex Semi-Gloss, B10 Series
(4 mils wet, 1.6 mils dry per coat)
 - 2. Gypsum Drywall (Eggshell)
 - 1st Coat: S-W Harmony Low Odor Interior Latex Primer, B11W900
(4 mils wet, 1.3 mils dry per coat)
 - 2nd Coat: S-W Harmony Low Odor Interior Latex Eg-Shel, B9 Series
 - 3rd Coat: S-W Harmony Low Odor Interior Latex Eg-Shel, B9 Series
(4 mils wet, 1.6 mils dry per coat)

3. Gypsum Drywall (in wet areas)
 - 1st Coat: S-W Harmony Low Odor Interior Latex Primer, B11W900
(4 mils wet, 1.3 mils dry per coat)
 - 2nd Coat: S-W Waterbased Catalyzed Epoxy, B70W211/ B60V25
 - 3rd Coat: S-W Waterbased Catalyzed Epoxy, B70W211/ B60V25
(2.5 - 3 mils dry per coat)
4. Concrete Masonry Units (Waterborne Acrylic)
 - 1st Coat: S-W PrepRite Block Filler, B25W25
(16 mils wet, 8 mils dry)
 - 2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss, B31 Series
 - 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss, B31 Series
(4 mils wet, 1.4 mils dry per coat)
5. Concrete Masonry Units (Epoxy)
 - 1st Coat: S-W PrepRite Block Filler, B25W25
(16 mils wet, 8 mils dry)
 - 2nd Coat: S-W Waterbased Catalyzed Epoxy, B70W211/ B60V25
 - 3rd Coat: S-W Waterbased Catalyzed Epoxy, B70W211/ B60V25
(2.5 - 3 mils dry per coat)
6. Ferrous and Zinc Coated Metal
 - 1st Coat: S-W ProCryl Universal Primer, B66-310 Series
 - 2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss, B31 Series
 - 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss, B31 Series
(4 mils wet, 1.4 mils dry per coat)
7. Painted Woodwork
 - 1st Coat: S-W Harmony Low Odor Interior Latex Primer, B11W900
(4 mils wet, 1.3 mils dry per coat)
 - 2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss, B31 Series
 - 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss, B31 Series
(4 mils wet, 1.4 mils dry per coat)
8. Concrete Floor Stain & Sealer (Opaque Color)
 - 1st Coat H&C Concrete Sealer Solid Color Solvent Based
 - 2nd Coat H&C Concrete Sealer Solid Color Solvent Based
Include Optional - H&C SharkGrip Slip Resistant Additive to the 2nd coat. Note - New concrete must be etched prior to application, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Applicator must examine the areas and conditions under which painting Work is to be applied and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Applicator. Starting of painting Work will be construed as the Applicator's acceptance of the surfaces and conditions within any particular area.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.

3.02 SURFACE PREPARATION

- A. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition. Remove all 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 the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, re-install the removed items by workmen skilled in the trades involved. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Schedule the cleaning and painting so that contaminants from the cleaning process with not fall onto wet, newly painted surfaces.
- B. Ferrous Metals:
 - 1. 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.
 - 2. Touch-up shop-applied prime coats wherever damaged or bare. Where required by other Sections of these Specifications, clean and touch-up with the same type shop primer.
- C. Galvanized Surfaces: Clean free of oil and surface contaminants with acceptable non-petroleum based solvent.
- D. Wood: Clean wood surfaces to be painted of all dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, 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 the priming coat.
 - 1. Prime, stain, or seal wood required being job-painted, as soon as practicable upon delivery to job. Prime edges, ends, faces, under sides, and backsides of such wood, including cabinets, counters, cases, paneling, etc. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dry.
 - 2. When transparent finish is required, use sealer as recommended by manufacturer. Seal tops, bottoms, and cutouts of unprimed wood doors with sealer immediately upon delivery to project.

3.03 MATERIALS PREPARATION

- A. Mix and prepare painting materials in accordance with manufacturer's directions. 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. Stir materials before application to produce a mixture of uniform density, and stir as required during the application of the materials. Do not stir surface film into the material. Remove the film and if necessary, strain the material before using.

3.04 APPLICATION

- A. Apply paint in accordance with the manufacturer's directions. Use applicators and techniques best suited for the substrate and type of material being applied. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
- B. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint. Paint the back- sides of access panels, and removable or hinged covers to match the exposed surfaces.
- C. Finish exterior doors on tops, bottoms and side edges the same as the exterior faces, unless otherwise indicated.
- D. Sand lightly between each succeeding enamel or varnish coat.
- E. Omit the first coat (primer) on metal surfaces that have been shop-primed and touch-up painted, unless otherwise indicated or barrier coat is required for compatibility.
- F. Scheduling Painting: Apply the 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. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- G. Minimum Coating Thickness: Apply each material at not less than the manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.
- H. Mechanical and Electrical Work: Painting of mechanical and electrical Work include items exposed to view in mechanical equipment rooms, in occupied spaces and where indicated on Drawings or specified in other Sections. Coordinate with Division 15 and Division 16 Sections.
 - 1. Mechanical items to be painted include, but are not limited to, the following:
 - a. Piping, pipe hangers, and supports.
 - b. Heat exchangers.
 - c. Tanks.
 - d. Ductwork.
 - e. Motor, mechanical equipment and supports.
 - f. Accessory items.
 - 2. Electrical items to be painted include, but are not limited to, the following;
 - a. Conduit and fittings.
 - b. Switchgear.
- I. Prime Coats: Apply a prime coat of material which is required to be painted or finished, and which has not been prime coated by others. Re-coat 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.

- J. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, or other surface imperfections will not be acceptable.
 - K. Transparent (Clear) 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. Provide satin finish for final coats, unless otherwise indicated.
 - L. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint Work not in compliance with specified requirements.
- 3.05 CLEANING AND PROTECTION
- A. Cleaning: During the progress of the Work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each workday. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
 - B. Protection: Protect Work of other trades, whether to be painted or not, against damage by painting and finishing Work. Correct any damage by others for protection of their Work, after completion of painting operations. At the completion of Work of other trades, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION

SECTION 10 11 00 VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Visual display boards as described in this section. Types specified in this section include Visual Aid Board.

1.02 RELATED SECTIONS

- A. Section 09 05 15 – Color Design.

1.03 SUBMITTALS

- A. Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating materials comply with requirements.
- B. Samples: Submit full range of color samples for visual Aid board, surface, trim and accessories required. Provide 12-inch square samples of sheet materials and 12-inch lengths of trim members for color verification after selections have been made.
- C. Shop Drawings: Submit sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, and installation details.
- D. Certification: Submit manufacturer's certification that all materials furnished for Project complies with requirements specified herein.

1.04 QUALITY ASSURANCE

- A. Fire Hazard Classification: Provide tackboard surfaces which have been tested in accordance with ASTM E-84 and have been certified as complying with the following fire hazard classifications: Flame spread not more than 25. Fuel contributed not more than 25. Smoke developed not more than 25.
- B. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication where possible, to ensure proper fitting of Work.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Claridge Products and Equipment, Inc., P.O. Box 910, Harrison, AR 72602. Tel. (870) 743-2200.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Draper, Inc., P.O. Box 425, Spiceland, IN 47385. Tel. (765) 987-7999.
 - 2. March Industries, Inc., P.O. Box 509, Dover, OH 44622. Tel. (330) 343-8825.
 - 3. NACO, 180 N. Sherman Ave., Corona, CA 91720. Tel. (909) 340-2800.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures

2.02 MATERIALS

- A. Visual Aid Board shall be equal to Claridge No. 2040 Bulletin Board Cabinet with the following attributes:
 - 1. Double door cabinet with dark bronze anodized finish.
 - 2. Cork tack surface shall be finished with "designer fabric surface" in colors and textures as selected by Project Engineer / MDOT Architect from manufacturer's standards.
 - 3. Tempered glass doors shall be fitted with flat key tumbler locks and hung on piano hinges.
 - 4. Size shall be 4 feet by 4 feet.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Installer shall examine area and conditions under which unit is to be installed 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 manner acceptable to Installer.

3.02 INSTALLATION

- A. Deliver factory-built unit completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to Project Engineer / MDOT Architect. When overall dimensions require delivery in separate units, pre-fit at factory, disassemble for delivery, and make final joints at site. Use splines at joints to maintain surface alignment.
- B. Install unit in location and mounting height as shown on Drawings and in accordance with manufacturer's instructions, keeping perimeter lines straight, plumb, and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories for complete installation. If unit is not shown on Drawings, install unit in location as directed by Project Engineer.
- C. Coordinate job-assembled units with grounds, trim, and accessories. Join all parts with neat, precision fit.

3.03 ADJUSTING AND CLEANING

- A. Verify accessories required are properly installed, adjusted and properly functioning.
- B. Clean unit in accordance with manufacturer's instructions, breaking in only as recommended.

END OF SECTION

SECTION 10 14 00 SIGNAGE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Signage for room identification system, informational and directional signage.

1.02 RELATED SECTIONS

- A. Section 09 05 15 – Color Design.

1.03 SUBMITTALS

- A. Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each color and finish of exposed materials and accessories required for specialty signs. Project Engineer / MDOT Architect's review of samples will be for color and texture only. When requested, furnish full-size samples of specialty sign materials.
- C. Shop Drawings: Submit Shop Drawings for fabrication and erection of specialty signs. Include plans, elevations, and large-scale details of sign wording and lettering layout. Show anchorage and accessory items.

1.04 QUALITY ASSURANCE

- A. Provide each type of sign as a complete unit produced by a single manufacturer including necessary mounting accessories, fittings and fastenings.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components correctly packed to prevent damage. Store in secure area out of weather. Handle per manufacturer's instructions.

1.06 WARRANTY

- A. Provide manufacturer's standard one-year warranty covering manufacturing defects.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by Mohawk Sign Systems, Inc., P.O. Box 966, Schenectady, NY 12301. Tel. (518) 370-3433.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. ASI Sign Systems, Inc., Dallas, TX. Tel. (800) 274-7732.
 - 2. Best Sign Systems, Montrose, CO. Tel. (970) 249-2378.
 - 3. Scott Sign Systems, Inc., Sarasota, FL. Tel. (800) 237-9447.

- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures

2.02 SIGN SYSTEM

- A. Restroom Signage: Wall mounted Series 200A Sand carved, Helvetica letter style.
- B. Informational Signage: Wall mounted Series 200A Sand carved, Helvetica letter style.
- C. Directional Signage: Wall mounted Series 200A Sand carved, Helvetica letter style.

2.03 COMPONENTS

- A. Material: Approximately 1/8-inch thick melamine plastic laminate with contrasting core color. Melamine shall be non-staining, fire-retardant, self-extinguishing, and impervious to alkalis, alcohol, solvents, abrasives, boiling water and most acids.
- B. Fasteners: 0.030-inch thick, double face tape shall be used on wall signs. Aluminum or stainless steel attachment shall be used on suspended double face directional signs.
- C. Sizes are as indicated on sign schedule at the end of this Section.

2.04 BRAILLE AND TACTILE COPY

- A. Comply with requirements of the Americans with Disabilities Act. Tactile copy to be raised 1/32-inch minimum from sign face. Glue-on or etched letters are not acceptable. Translation of copy into Braille shall be the responsibility of the manufacturer.

2.05 FINISHES – INTERIOR SIGNAGE

- A. Colors: Selected from manufacturer's standard.
- B. Surface Texture: Matte.

2.06 FONT

- A. Shall be Helvetica Medium, unless noted otherwise. Font and required symbol size shall be as indicated and meet ADA requirements.

2.07 BORDERS

- A. Borders and corner keystones shall be provided on all signs as required. Borders shall be raised and finished to match raised letter finish.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Installer shall examine the substrates and conditions under which the specialty signs are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION

- A. Install sign units and components at the locations shown or scheduled, securely mounted with concealed theft-resistant fasteners, unless otherwise indicated. Attach signs to substrates in accordance with the manufacturer's instructions, unless otherwise shown.
- B. Install level, plumb, and at the proper height. Cooperate with other trades for installation of sign units to finish surfaces. Repair or replace damaged units as directed by the Project Engineer.
- C. Position sign on wall surface 2 inches from strike side of doorframe and 60 inches high to center of sign from finish floor, typical unless indicated otherwise.

3.03 SCHEDULES

- A. Sign Type 1: 7 inches wide by 9 inches high wall mounted restroom sign, with appropriate gender, wheelchair symbol and Braille. (MEN – 1 required; WOMEN – 1 required).
- B. Sign Type 2: 36 inches wide by 6 inches high wall mounted restroom sign, with appropriate gender, both men & women, wheelchair symbol and no smoking symbol with "NO SMOKING" letters under the symbol. (RESTROOMS – 2 required).
- C. Sign Type 3: 8 inches wide by 8 inches high wall mounted informational sign, with round hole cutout for button. (PRESS BUTTON FOR SECURITY OFFICER – 1 required; PRESS BUTTON FOR WEATHER INFORMATION – 1 required).
- D. Sign Type 4: 24 inches wide by 6 inches high wall mounted informational sign, with appropriate symbol as required. (NO SMOKING – 2 required with symbol; NO PETS – 2 required with symbol; SECURITY – 3 required).
- E. Sign Type 5: 12 inches wide by 6 inches high wall mounted informational sign. (EMPLOYEES ONLY – 2 required).

END OF SECTION

SECTION 10 21 14

REINFORCED COMPOSITE TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Solid color reinforced composite, floor-to-ceiling-mounted, toilet compartments and wall-hung urinal screens.

1.02 RELATED SECTIONS

- A. Section 09 05 15 – Color Design.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's sample warranty, color charts and detailed technical data for materials, fabrication, and installation, including catalog cuts of anchors, hardware, fastenings, and accessories.
- B. Shop Drawings: Submit job-specific shop drawings for fabrication and erection of toilet compartment assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other Work.

1.04 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication where possible, to ensure proper fitting of Work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.
- B. Coordination: Furnish inserts and anchorage, which must be built into other work for installation of toilet partitions and related work; coordinate delivery with other work to avoid delay.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Upon receipt of toilet partitions and other materials, installer shall examine the shipment for damage and completeness. Materials shall be stored in a clean, dry place. Stack all materials to prevent damage.

1.06 WARRANTY

- A. Manufacturer to supply a written warranty covering all plastic components against breakage, warping, corrosion and delamination for a period of 10 years.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and Specifications are based on product model 1096.67 SierraSeries as manufactured by Bobrick Washroom Equipment, Inc., 100 Bobrick Drive, Jackson, TN. 38301-5635. Tel. (731) 424-7000.

- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Privacy Plus™ Toilet Compartments by Gerali Custom Design, Inc.
 - 2. Ultimate Corian® System by Shower Shapes.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 COMPONENTS/MATERIALS

- A. Stiles, Panels, Doors, and Screens shall be all be manufactured from Solid Color Reinforced Composite material.
- B. Characteristics: Toilet partition materials shall be constructed of Solid Color Reinforced Composite material, which is composed of dyes, organic fibrous material, and polycarbonate/phenolic resins. Material shall have a non-ghosting, graffiti resistant surface integrally bonded to core through a series of manufacturing steps requiring thermal and mechanical pressure. Edges of material shall be the same color as the surface.
 - 1. Stiles, doors, and urinal screens shall be a minimum of 3/4 inch thick, panels shall be a minimum of 1/2 inch thick and all exposed surfaces to be free of saw marks.
 - 2. Doors and dividing panels shall be 58 inches high and mounted 14 inches above the finish floor.
 - 3. Pilasters shall be full height and fastened into a 4-inch high stainless steel pilaster shoe with a stainless steel, torx head sex bolt.
 - 4. Urinal screens shall be 24 inches wide by 42 inches high with 41 inch continuous Stainless steel wall brackets. 1095 SierraSeries.
 - 5. Finish shall be similar and equal to standard color chart selections from Bobrick. Color of doors and pilasters to be selected by the Project Engineer / MDOT Architect from Manufacturer's full color range.

2.03 HARDWARE

- A. Door hardware: Vandal-Resistance door hardware shall be as follows:
 - 1. All hardware shall be 18-8, type-304 stainless steel with satin finish.
 - 2. Hinges shall be manufacturer's 16-gage self-closing piano hinge continuous for door height.
 - 3. Each door shall be supplied with one coat bumper / hook.
 - 4. Each handicapped door to include one door pull and one wall stop.
 - 5. Door stops shall be fabricated from stainless steel and shall be vandal-resistance.
 - 6. Door latch shall be fabricated from heavy-duty 14-gage, type 304 stainless steel and include through-bolted keeper.
- B. Wall Brackets: Wall brackets shall be full-length continuous stainless steel. Brackets shall be used for all pilasters to pilaster and pilasters to wall connections. Attach brackets to adjacent wall construction with No. 14 by 1-1/2 inch stainless steel Phillips head screws. Anchor screws directly behind the vertical edge of pilasters at 12-inch intervals along the full length of bracket and at each 12-inch interval alternately spaced between anchor connections.

- C. Accessories: Furnish units with stainless steel finish, unless otherwise indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Installer shall examine the areas and conditions under which toilet partitions and related items are to be installed, including supporting anchors and supports installed by others, and must notify Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in manner acceptable to the Installer.

3.02 INSTALLATION

- A. Comply with manufacturer's recommended procedure and installation sequence. Install partitions rigid, straight, plumb, and level. Secure partitions in position with manufacturer's recommended anchoring devices. Provide clearances of not more than 1/2 inch between pilasters and panels, and not more than one inch between panels and walls. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 1/4 inch.

3.03 ADJUSTING AND CLEANING

- A. Adjusting: Adjust and lubricate hardware for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors (and entrance swing doors) to return to fully closed position.
- B. Cleaning: Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

END OF SECTION

SECTION 10 28 13

TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The extent of each type of toilet accessory is shown on the Drawings and Schedules, unless otherwise indicated. The types of toilet accessories required include the following:

1. Mirrors
2. Toilet Paper Dispenser
3. Grab Bars
4. Soap Dispensers
5. Clothes Hook
6. Mop Holder
7. Waste Receptacle
8. Diaper Changing Station
9. Hand Dryer
10. Toilet Seat Cover Dispenser
11. Napkin Disposal Unit

1.02 SUBMITTALS

- A. Submit manufacturer's product and technical data indicating compliance with these Specifications and Shop Drawings for the fabrication and installation of all toilet accessories. Show all anchorage and other necessary items including mounting heights.

1.03 QUALITY ASSURANCE

- A. Provide products of the same manufacturer for each type of accessory unit and for units exposed in the same areas, unless otherwise acceptable to the MDOT Architect. Stamped names or labels on exposed faces of units will not be permitted, except where otherwise indicated.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Upon receipt of toilet accessories and other materials, installer shall examine the shipment for damage and completeness. Materials shall be stored in a clean, dry place. Stack all materials to prevent damage.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equivalent products by the following manufacturers are acceptable:
1. A & J Washroom Accessories, New Windsor, NY. Tel. (845) 562-3332.
 2. American Specialties, Inc., Yonkers, NY. Tel. (914) 476-9000.
 3. Bobrick Washroom Equipment, Inc., Jackson, TN. Tel. (901) 424-7000.
 4. Bradley Washroom Accessories Division, Menomonee Falls, WI. Tel. (414) 354-0100.
 5. Koala Corp., Denver, CO. Tel. (800) 985-6252.
 6. World Dryer, Berkeley, IL. Tel. (800) 323-0701.

- B. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 ACCESSORIES

- A. Mirrors: Provide 1/4 inch polished plate glass, electrolytically plated mirrors with 1/2 inch stainless steel channel frame. Mirrors shall be 24 inches by 36 inches equal to Bradley model 780-2436. Locate at each toilet lavatory mounted in locations shown.
- B. Toilet Paper Dispenser: Provide surface mounted stainless steel jumbo-roll toilet tissue dispenser with key lock, hinged front cover, product view lens and tear-off bars on sides equal to Bradley model 5424. Locate at each toilet in public toilet rooms.
- C. Grab Bars: Provide 1-1/2 inches diameter horizontal 2 wall stainless steel grab bars with safety-grip non-slip finish and concealed mounting equal to Bradley model 8122-059, 36 inches by 52 inches standard dimensions. Locate at toilets where indicated at heights shown. Contractor has option to use one 36-inch grab bar and one 42-inch grab bar, but installation must meet all ADA requirements.
- D. Soap Dispensers: Provide surface mounted liquid type stainless steel soap dispenser units equal to Bradley model 6542 or 6562 as indicated on the Drawings. Locate at each lavatory where shown and at heights shown.
- E. Clothes Hook: Provide surface mounted stainless steel hook equal to Bradley model 9135 at each Toilet Room, unless coat hooks are provided with toilet partition doors.
- F. Mop Holder: Provide surfaced mounted stainless steel mop and broom holder equal to Bradley model 9933. One piece construction with welded gusset and hooks. Holder consist of spring activated rubber cams on plated steel retainers. Unit measures 14 inches high by 34 inches long, with 4 hooks and 3 holders. Shelf projects 8 inches. Locate at each service sink where shown and at height shown or if not shown then per Project Engineer's instructions.
- G. Waste Receptacle: Provide surfaced mounted stainless steel waste receptacle with hinged cover equal to Bradley model 356-35. Include removable heavy-duty polyvinyl liner model P11-006. Locate in Public Toilet Rooms where shown and at height shown.
- H. Diaper Changing Station: Provide surfaced mounted, folding, high density polyethylene units with full length steel hinge mechanism and molded-in liner dispensers and bag hooks equal to Bradley model 961. Locate in Public Toilet Rooms where shown and at height shown.
- I. Hand Dryer: Provide surface mounted hand dryer equal to Bradley model 2870-28. Hand dryer shall be fabricated from porcelain enameled grey cast iron fitted with fixed nozzle and infrared electronic control. Universal type motor, 1/10 HP at 7500 RPM with resilient ring mounts and sealed, lubricated ball bearings. Protected by 2-amp fuse. 115volt, 20 amp, 60 Hz. Entire unit shall be UL listed and guaranteed against defects in material and/or workmanship for 10 years. Locate in Public Toilet Rooms where shown and at heights shown.
- J. Toilet Seat Cover Dispenser: Provide surface mounted stainless steel toilet seat cover dispenser with full length piano hinge, tumbler lock and 500 capacity standard single-fold or half-fold toilet seat covers equal to Bradley model 583. Locate at each toilet in Public Toilet Rooms.

- K. Napkin Disposal Unit: Provide surface mounted stainless steel napkin disposal unit with hinged cover and bottom with lock, equal to Bradley model 4781-15. Include disposable wet strength paper liner. Locate at each toilet in Women's Toilet Room.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Installer shall examine the areas and conditions under which toilet accessories are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION

- A. Use concealed fastenings wherever possible. Provide anchors, bolts and other necessary anchorage, and attach accessories securely to walls and partitions in locations as shown or directed. Install concealed mounting devices and fasteners fabricated of the same material as the accessories, or of galvanized steel, as recommended by manufacturer.
- B. Install exposed mounting devices and fasteners finished to match the accessories. Provide theft-resistant fasteners for all accessory mountings. Secure toilet room accessories in accordance with the manufacturer's instructions for each item and each type of substrate construction.
- C. Installation shall meet all ADA requirements including proper mounting heights.

END OF SECTION

SECTION 10 44 16

FIRE EXTINGUISHERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Portable, multi-purpose, and dry-chemical fire extinguishers including accessories and mounting brackets.

1.02 SUBMITTALS

- A. Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required.

1.03 QUALITY ASSURANCE

- A. Provide new portable fire extinguishers which are UL listed and bear UL "Listing Mark" for each type, rating, and classification of extinguisher indicated.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Drawings and specifications are based on products manufactured by J.L. Industries, Inc., 4450 W. 78th Street Circle, Bloomington, MN 55435. Tel. (612) 835-6850.
- B. Equivalent products by the following manufacturers are acceptable:
 - 1. Amerex Corp., Trussville, AL. Tel.(205) 655-3271.
 - 2. Larsen's Mfg. Co., Minneapolis, MN. Tel. (612) 571-1181
 - 3. Potter-Roemer, Santa Ana, CA. Tel. (800) 366-3473.
- C. Substitutions shall fully comply with specified requirements and Section 01 62 14-Product Options and Substitution Procedures.

2.02 FIRE EXTINGUISHERS

- A. Provide fire extinguishers for each location indicated, in colors and finishes that comply with requirements of governing authorities.
- B. Multi-Purpose Dry Chemical for Wall Mounting: Equal to J.L. Industries Cosmic 10E, UL rated 4A-60BC, 10 lb. nominal capacity.

MOUNTING BRACKETS

- A. Provide manufacturer's bracket designed to prevent accidental dislodgment of extinguisher, of proper size for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights and locations to comply with applicable regulations of governing authorities.
- B. Securely fasten mounting brackets to structure, square and plumb, to comply with manufacturer's instructions.
- C. Fire Extinguisher units shall be mounted in exposed locations indicated, or if not indicated, in a manner such that no point in the building will be further than 75 feet from an extinguisher. Two units are required, unless additional units are indicated otherwise on Drawings.

END OF SECTION

SECTION 22 05 10

PLUMBING GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. This division and the accompanying drawings cover furnishing of all labor, equipment, appliances, and materials and performing all operations in connection with the installation of complete plumbing systems as specified herein and as shown on the drawings.
- B. The general provisions of the contract including the Conditions of the Contract (General, Supplementary and other conditions) and other divisions as appropriately apply to work specified in this division.

1.02 CODES, ORDINANCES, AND PERMITS:

- A. All plumbing materials and workmanship shall comply with the following codes and standards as applicable:
 - 1. The National Electric Code (2005 Edition)
 - 2. The International Building Code (2006 Edition)
 - 3. The International Plumbing Code (2006 Edition)
 - 4. The International Fuel Gas Code (2006 Edition)
- B. Applicable Publications: The publications listed below form a part of this specification to the extent referenced and are referred to in the text by the basic designation only.
 - 1. Air Conditioning and Refrigeration Institute Standards (ARI)
 - 2. American National Standards Institute, Inc. Standards (ANSI)
 - 3. American Society for Testing and Materials Publications (ASTM)
 - 4. American Gas Association Inc. Laboratories (AGA)
 - 5. American Society of Mechanical Engineers Code (ASME)
 - 6. Factory Mutual Underwriters (FM)
 - 7. National Fire Protection Association Standard (2006)
 - 8. Underwriters Laboratories Inc. (UL)
- C. All work done under this Contract shall comply with all state and local code authorities having jurisdiction and with the requirements of the Utility Companies whose services may be used. All modifications required by these codes and entities shall be used made by the Contractor without additional charges. Any conflict between these documents and the governing codes shall be immediately brought to the attention of the Engineer of Record. Where code requirements are less than those shown on the Plans or in the Specifications, the Plans and Specifications shall be followed. Where applicable, N.F.P.A. requirements shall be met.
- D. The Contractor shall obtain all permits, inspections, and approvals as required by all authorities having jurisdiction, and deliver certificates of approval to the Architect. All fees and costs of any nature whatsoever incidental to these permits, inspections and approvals shall be assumed and paid by the Contractor.
- E. The Contractor shall comply with all applicable provisions of the William-Steiger Occupational Safety and Health Act (O.S.H.A.).

1.03 APPLICABILITY

- A. The work specified herein shall include all labor, materials, equipment, tools, supplies and supervision required to install and place in operation the plumbing systems and appurtenances specified herein and/or indicated on the drawings or reasonably implied as necessary for completion of the various systems.

1.04 COORDINATION OF PLUMBING DOCUMENTS:

- A. The plumbing work listed in these documents shall be coordinated with the work indicated on all other drawings, schedules, schematics, and specifications that are part of these construction documents. Should a conflict occur, the contractor shall submit a request for clarification to the engineer prior to bid opening. NO ALLOWANCES shall be made for any assumptions made by the contractor or any sub-contractors that are in direct conflict with the intent of the construction documents; in the event a conflict is discovered after construction has commenced, the resolution of the conflict shall be decided by the Engineer of Record, whose interpretation of the documents shall be final.

1.05 WELDERS QUALITY ASSURANCE

- A. All welders shall be certified by ANSI B31.1.0-1967 "Standard Qualification Welding Procedures, Welders and Welding Operators" or "Qualification Tests" in Section IX, ASME Boiler and Pressure Vessel Code. Welder performance qualification tests shall be made in strict accordance with the above codes. Welders shall be certified for the type of pipe material specified herein. All costs incident to procedures and welder's qualification tests shall be assumed by the Contractor. Two copies of the qualification test report and certification with the welder's identification number, recommendation letter, etc. shall be delivered to the Architect before any welding commences.

PART 2 - PRODUCTS

2.01 COORDINATION OF PRODUCTS

- A. The products of particular manufacturers have been used as the basis of design in preparation of these documents. Any modifications to the plumbing systems and their components, the electrical systems, the building structure and architecture, or any other portion of the building that result from the use of any other than the basis of design equipment shall be coordinated with all other trades. Such coordination shall occur before shop drawing submittals and shall be clearly indicated on the shop drawings. Any related modifications shall be the responsibility of the contractor and shall be performed without any additional cost to the Contract.

2.02 DESCRIPTION

- A. All components of the plumbing systems shall be new. All equipment and products for which independent laboratory testing and labeling is applicable and/or required shall bear the Underwriter's Laboratories, Inc. (UL) label.

PART 3 - EXECUTION

3.01 GENERAL

- B. The Contractor shall provide and prepare all openings for plumbing work as required in walls, roof, ceilings, etc.; he shall also do all painting as may be required. He shall coordinate the installation of all plumbing equipment in the exterior wall and roof.
- B. The plumbing plans do not give exact elevations or locations of lines, nor do they show all the offsets, control lines, or other installation details. The Contractor shall carefully lay out his work at the site to conform to the structural conditions, to provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and to thereby provide an integrated, coordinated and satisfactorily operating installation.
- C. If the Contractor proposes to install equipment and piping requiring space conditions other than those shown, or to rearrange the equipment, he shall assume full responsibility for the rearrangement of the space and shall have the Architect review the change before proceeding with the work. The request for such changes shall be accomplished by Shop Drawings of the space in question, including plans, sections, elevations, etc., sufficient to indicate that the revised layout will fit and allow for required access to clearance.
- D. The Contractor is responsible for the proper location and size of all slots, holes or openings, in the building structure pertaining to his work, and for the correct location of sleeves, inserts, cores, etc.
- E. The Contractor shall so coordinate the work of the several various trades that it may be installed in the most direct and workmanlike manner without hindering or handicapping the other trades. Piping interference shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. For example sewer lines and condensate piping shall take precedence over water lines in determination of elevations. Where there is interference between sewer lines and condensate lines, the sewer lines shall have precedence and provisions shall be made in the condensate lines for looping them around the sewer lines. In all cases, lines requiring a stated grade for their proper operation shall have precedence over electrical conduit and ductwork.
- F. Except where otherwise noted, all piping in finished areas shall be installed in chases, furred spaces, above ceilings, etc. In all cases, pipes shall be installed as high as possible. Runs of piping shall be grouped whenever it is feasible to do so.
- G. The Electrical Contractor shall bring adequate power to and make final connections to all equipment furnished under this contract. All control wiring shall be by the Controls Contractor.
- H. Piping and equipment shall not be installed in electrical equipment rooms except as serving only those rooms. Outside of electrical equipment rooms, do not run piping or ductwork, or locate equipment, with respect to switchboards, panel-boards, power panels, motor control centers, or dry type transformers:
 - 1. Within 42 inches in front (and rear if free standing) of equipment; or
 - 2. Within 36 inches of sides of equipment,
 - 3. Clearances apply vertically from floor to structure.
 - 4. Provide access to equipment and apparatus requiring operation, service or maintenance within the life of the system. Including, but not limited to, motors, valves, filters, dampers, shock absorbers, etc. Equipment located above lay-in type ceilings is considered accessible.

3.02 ELECTRICAL WORK

- A. All electrical equipment provided under this Division shall comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 26.

3.03 PROTECTION OF EQUIPMENT

- A. Store equipment, including pipe and valves, off the ground and under cover. For storage outdoors, minimum 4-mil thick plastic shall be fitted to withstand splattering, ground water, precipitation and wind.
- B. Plug ends of pipe when work is stopped and close ends of ducts with plastic taped in place until work resumes.
- C. Damaged equipment shall be repaired or replaced at the option of the Engineer of Record.

3.04 PAINTING

- A. Factory painted equipment that has been scratched or marred shall be repainted to match original factory color.
- B. All un-insulated black ferrous metal items exposed to sight inside the building, such as piping, equipment hangers and supports not provided with factory prime coat, shall be cleaned and painted with one coat of rust inhibitor primer. In addition, such items in finished spaces shall also be painted with two coats of finish paint in a color to match adjacent surfaces or as otherwise selected by the Architect.
- C. Black ferrous metal items exposed outside the building, such as equipment support beams, un-insulated pipe and pipe supports not provided with factory prime coat, shall be cleaned and painted with one coat of rust inhibiting primer and two coats of an asphalt base aluminum paint. Insulated pipes outside the building shall be cleaned and painted with one coat of rust inhibiting primer before installing insulation.
- D. In lieu of painting hanger rods, cadmium plated or galvanized rods may be furnished.
- E. No nameplates or equipment shall be painted, and suitable protection shall be afforded to the plates to prevent their being rendered illegible during the painting operation. Labels shall also be protected from becoming illegible due to weathering.
- F. Galvanizing broken during construction shall be re-coated with cold galvanizing compound.

3.05 PROTECTION OF EXISTING UTILITIES

- A. The Contractor shall use extreme caution during excavation operations not to damage or otherwise interrupt the operations of existing utilities. The Contractor shall be responsible for the continuous operation of these lines and shall provide bypasses or install such shoring, bracing, or underpinning as may be required for proper protection.

3.06 CUTTING AND PATCHING

- A. The Contractor shall assume all cost of, and be responsible for, arranging for all cutting and patching required to complete the installation of his portion of the Work. All cutting shall be carefully and neatly done so as not to damage or cut away more than is necessary of any existing portions of the structure.

- B. All surfaces shall be patched to the condition of the adjacent surfaces.
- B. The Contractor shall make suitable provisions for adequately water-proofing at his floor penetrations of water proof membrane floors. This shall include but not be limited to floor drains, open sight drains, hub drains, clean-outs, and sleeves for the various piping. This also applies to membrane roofing systems.

3.07 SLEEVES, FLOOR AND CEILING PLATES

- A. The Contractor shall install, as required, in concrete, carpentry or masonry construction, all necessary hangers, sleeves, expansion bolts, inserts and other fixtures and appurtenances necessary for the support of all pipe, duct, equipment and devices furnished under each section of the Specification.
- B. Cutting of openings and installation of sleeves or frames through walls and surfaces shall be done in a neat workmanlike manner. Openings shall be cut only as large as required for the installation; sleeves, except as otherwise indicated, and/or frames shall be installed flush with finished surfaces and grouted in place. Surfaces around opening shall be left smooth and finished to match surrounding surface.
- C. Where pipes pass through floor slabs, sleeves shall be standard weight black steel pipe with top of sleeve 3 inches above finished floor. Where pipes pass through walls, sleeves shall be standard weight black steel pipe or 20-gage galvanized sheet metal with ends flush with wall surfaces.
- D. Each pipe passing through walls, floors, ceilings or partitions shall be provided with sleeves having internal diameter one inch larger than the outside dimensions of insulated pipes.
- E. All pipe sleeves through floors, roofs and masonry walls shall be built in place as the affected walls, floors, and roofs are built.
- F. All penetrations through rated walls and floors shall be packed, sealed and encapsulated per the applicable U.L. details(s).
- G. Sleeves through exterior wall shall be steel or cast iron pipe, flush with the exterior surfaces, and with the space between the pipe and the sleeves caulked watertight in an approved manner.
- H. Inserts shall be cast iron or galvanized steel individual type, with accommodations for removable nuts and threaded rods up to 3/4 inch diameter, and permitting lateral adjustment.

3.08 ESCUTCHEONS

- A. Escutcheons shall be installed on all pipes where they pass through floors, ceilings, walls, or partitions in finished areas.
- B. The interior of closets, adjacent to finished areas, shall be considered as finished for the intent of these Specifications.
- C. Escutcheons shall be split, hinged, stamped brass type designed to fit the pipe, and to cover the terminating pipe sleeve, in chrome plated finish unless otherwise specified, with securing device to hold the escutcheon tight to the pipe.

3.09 CLEANING

- A. Flush new water piping systems until water runs clean. Mild chemical cleaning may be required. If so, flush all cleaning chemicals out of the piping system before recharging with water.
- B. Before installing thermostatic members of the steam traps, and connecting return mains to the return pumps, pipe the return mains outside the building and blow down the new steam piping system until thoroughly clean. Open automatic steam valves while blowing down.
- C. Remove all stickers, rust, stains, labels, and temporary covers before final acceptance.
- D. The exterior surfaces of all mechanical equipment, piping, etc., shall be cleaned of all grease, oil, paint, dust and other construction debris.
- E. Bearings that require lubrication shall be lubricated in accordance with the manufacturer's recommendations. Provide written certification of lubrication.
- F. Equipment rooms shall be left broom clean.
- G. End of open pipes shall be covered during construction except when working directly on such one prohibits covering.
- H. Clean and polish identification plates.

3.10 EQUIPMENT, MATERIALS AND BID BASIS

- A. It is the intention of these Specifications to indicate a standard of quality for all material incorporated in this work. Manufacturer's names are used to designate the item of equipment or material as a means of establishing grade and quality. Where several manufacturers are named, only these manufacturers' products will be considered and the Contractor's bid shall be based on their products. Other named manufacturers, although acceptable as manufacturers, must prove their product will perform satisfactorily and will meet space requirements, etc., and shall obtain pre-approval of their equipment, before submitting shop drawings, when their equipment achieves the required results in a manner different than that of the first named manufacturer. Where only one manufacturer is named, unless the Specifications state otherwise, manufacturers of similar quality products will be considered. Such unnamed manufacturer's products will, however, be considered as substitutions and shall not be used as a basis for bidding. In the event the Contractor wishes to submit substitutions to the Architect for review prior to bid, he shall furnish descriptive catalog material, text data, samples, etc., as well as any other pertinent data necessary to demonstrate that the proposed substitutions are acceptable equals to the specified product. No substitutions shall be made without the written consent of the Architect.
- B. The use of one named manufacturer in the schedules on the Drawings is for guide purposes. The provisions of the above paragraph will govern in the selection of products to be used.

3.11 GUARANTEE

- A. All systems and components shall be provided with a one year guarantee from the time of final acceptance or beneficial occupancy (Coordinate with the Architect). The guarantee shall cover all materials and workmanship. During this guarantee period, all defects in materials and workmanship shall be corrected by repair or replacement without incurring additions to the Contract.

3.12 FOUNDATIONS

- A. All concrete foundations required by equipment furnished under the Plumbing Division shall be constructed in conformance with the recommendations of the manufacturer of the respective equipment actually applied, and with the approval of the Architect. All corners of the foundations shall be neatly chamfered. Foundation bolts shall be placed in the forms when the concrete is poured. Allow one inch (1") below the equipment bases for alignment, leveling and grouting with non-shrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary. After removal of the forms, the surface of the foundation shall be rubbed. Unless otherwise noted, foundations shall be four inches 4 inches – 6 inches high. All concrete work performed shall conform entirely to the requirements of the General Specifications that describe this class of work.

3.13 RECORDS AND INSTRUCTIONS FOR OWNER

- A. The Contractor shall accumulate during the job's progress the following data in triplicate prepared in neat brochures or packet folders and turned over to the Architect/Engineer for check and subsequent delivery to the Owner:
 - 1. Provide all warranties and guarantees, manufacturer's directions and material covered by the Contractor.
 - 2. Provide approved fixture brochures, wiring diagrams, and control diagrams.
 - 3. Provide copies of approved shop drawings.
 - 4. Three sets of operating instructions for plumbing equipment and systems. Operating instructions shall also include recommended periodic maintenance and suggested procedures in operation of all systems in this particular building to promote energy conservation. These instructions must be written expressly for this project and shall refer to equipment, valves, etc., by mark number from project schedules. Operating instructions and procedures shall be submitted in draft form, for approval prior to final issue of complete brochures. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.
 - 5. Any and all other data and/or drawings required during construction.
 - 6. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.
- B. All of the above data shall be submitted to the Architect/ Engineer for approval at such time as the Contractor asks for his last estimate prior to his final estimate, but in no case, less than two weeks before final inspection.
- C. The Contractor shall also give not less than 1 day of operating instructions, during the adjustment and testing period, to the Owner's operating personnel in order to familiarize them with the proper care and operation of the equipment. The written operating instructions referred to in paragraph above shall be used as a basis for this on-the-job instruction.

3.14 RECORD DRAWINGS

- A. The Contractor shall maintain on a daily basis at the project site a complete set of "Record Drawings" reflecting an accurate dimensional record of all buried or concealed work. In addition, the "Record Drawings" shall be marked to show the precise location of concealed work and equipment, including concealed or embedded piping and valves and all changes and deviations in the Mechanical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect. The "Record Drawings" shall consist of a set of mylar sepia prints of the Contract Drawings for this Division with the Engineer's seal and Engineer's firm name removed or blacked out. Prior to commencing work the Contractor shall purchase from the Architect a set of mylar sepia prints to be used for the "Record Drawings".
- B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two (2) dimensions to permanent structures.
- C. The Contractor shall mark all "Record Drawings" on the front lower right hand corner with a rubber stamp impression that states the following:

"RECORD DRAWINGS – "3/8" inch high letters to be used for recording field deviations, and "5/16" inch high letters to be used for dimensional data only.

3.15 INSTALLATION

- A. All equipment shall be installed in strict conformance with manufacturer's recommendations, as specified herein. If any conflict arises between these instructions, notify the Engineer immediately for clarification.

3.16 ACCESS DOORS

- A. Furnish and install access doors at each point required to provide access to concealed valves, cleanouts, and other devices requiring operation, adjustment, or maintenance. Access doors shall be 16 gauge steel, prime coat finish, with mounting straps, concealed hinge and screwdriver locks, designed for the doors to open 180 degrees.
- B. Access doors installed in firewalls or partitions shall be UL Labeled to maintain the fire rating of the wall or partition.
- C. Access doors shall be provided under this section of the specifications and furnished to the General Contractor to be installed.
- D. Access doors shall be MILCOR or approved equal in accordance with the following:
 - 1. Style AT Door for Acoustical Tile Ceilings
 - 2. Style AP Door for Acoustical Plaster Ceilings
 - 3. Style K Door for Plastered Wall and Ceiling Surfaces
 - 4. Style DW Door for Drywall
 - 5. Style ATR for Suspended Drywall Ceilings
 - 6. Style M Door for Masonry, Ceramic Tile, Etc.
 - 7. Fire-Rated 1-1/2 hr. (B-label) Door where required.
 - 8. Security access doors for all security walls and ceilings shall have minimum 3/16 inch by 2 inches by 2 inches welded steel frame with 10 gauge door panel and heavy duty stainless steel hinge welded to door and frame. Door shall have detention type deadbolt lock.

- E. Size and type shall be as required for proper service and/or as may be directed by the Architect.
- F. Access door finish shall be chemically bonded to steel with a prime coat of baked on electrostatic powder. Color shall be as selected by Architect.

3.17 FLAME SPREAD AND SMOKE DEVELOPED PROPERTIES OF MATERIALS

- A. Materials and adhesives used throughout the mechanical and electrical systems for insulation, and jackets or coverings of any kind, or for piping or conduit system components, shall have a flame-spread rating not over 25 without evidence of continued combustion and with a smoke developed rating not higher than 50. If such materials are to be applied with adhesives, they shall be tested as applied with such adhesives, or the adhesives used shall have a flame-spread rating not over 25 and a smoke developed rating not higher than 50. (Note: Materials need not meet these requirements where they are entirely located outside of a building and do not penetrate a wall or roof, and do not create an exposure hazard.)
- B. "Flame-Spread Rating" and "Smoke Developed Rating" shall be as determined by the "Method of Test of Surface Burning Characteristics of Building Materials," NFPA No. 255, ASTM E84, Underwriter's Laboratories, Inc., Standard". Such materials are listed in the Underwriters' Laboratories, Inc., "Building Materials List" under the heading "Hazard Classification (Fire)".

3.18 EQUIPMENT FURNISHED BY OWNER

- A. The contractor shall unload, uncrate, assemble, and connect any and all equipment shown on the drawings or called out in the specifications to be furnished by the owner for installation by the contractor.
- B. The contractor shall take full charge of such equipment from the time the items are delivered to the job, set in place, connected, tested, adjusted, and placed into operation.

3.19 HAZARDOUS MATERIALS

- A. No products shall be used that contain any known hazardous or carcinogenic materials. Products with asbestos or radioactive content shall not be used.
- B. Handling of any hazardous material is not covered in specification Division 22. Any requirements for such are beyond the scope of this contract and shall be done only by those persons contracted to do so.

3.20 PROTECTION OF EXPOSED PIPING

- A. All piping exposed to freezing shall be heat traced as per manufacturer's recommendations per Section 22 05 33 "Heat Tracing for Plumbing Piping" and insulated per Section 22 07 00 "Plumbing Insulation".

END OF SECTION

SECTION 22 05 11 PLUMBING SUBMITTAL DATA

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, and Section 22 05 10 Plumbing General Requirements, apply to all work herein.

1.02 QUALITY ASSURANCE:

- A. Shop drawings or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this contract. The Contractor shall submit to the Architect a sufficient number of copies of all such Shop Drawings or catalog data to provide him with as many reviewed copies as he may need, plus two (2) copies for retention; one by the Architect and one by the Engineer.
- B. Before submitting Shop Drawings to the Architect for review, the Contractor shall examine them and satisfy himself that they are correctly representative of the material or equipment to which they pertain. The Contractor shall so note these Drawings before submitting them. The Contractor's review of the Shop Drawings is not intended to take the place of the official review by the Architect. Any Shop Drawings which have not been reviewed by the Architect shall not be used in fabricating or installing any work.
- C. The review of Shop Drawings or catalog data by the Architect shall not relieve the Contractor from responsibility for deviations from the Plans and Specification unless he has, in writing, specifically called attention to such deviations at the time of submission and has obtained the permission of the Architect. Also, it shall not relieve him from responsibility for error of any kind in Shop Drawings. When the contractor does call such deviations to the attention of the Architect, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.
- D. Verification and assignment of dimensions, quantities, and construction means, methods, sequences or procedures, the correctness of which is set forth in the Contract Documents or submittal, shall be the sole responsibility of the Contractor.
- E. Reproduction of design documents in any portion for use in a submittal is not acceptable.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All products shall be new and bear all labels which are identified by the applicable specification section and Contract Documents.

PART 3 - EXECUTION

3.01 SUBMITTAL DATA

A. General

1. The submittal data to be furnished for this project shall comply with the Specifications and Contract Documents in their entirety. Any submittals herein scheduled are as a minimum only and shall not be construed to limit the submittal data required within the individual Sections of these Specifications.
2. Shop Drawings will be returned unchecked unless the following information is included: Reference to all pertinent data in the Specifications or on the Drawings, such as sound power levels of motor driven equipment where called for in the specifications, electrical characteristics and horse power, capacities, construction material of equipment, UL labels where required, accessories specified, manufacturer, make and model number, weights where specified, starters where required by Division 22 and Division 23, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings. All submitted equipment must be identified on Shop Drawings with the same "Mark Numbers" as identified on Drawings or in Specifications. All pertinent data such as accessories shall also be marked. Any deviation from any part of the Contract Documents shall be clearly and completely highlighted.
3. Plumbing submittal data shall be bound into separate 3-ring binders, Each plumbing volume shall contain one copy of all specified equipment/shop drawing submittals. Each binder shall be provided with an index of materials and an identification tab for each Specification Section that requires submittals. Each item in each tabbed section shall be identified with the paragraph number relating to the item submitted. **FAILURE to provide BOUND AND IDENTIFIED SUBMITTALS will result in the AUTOMATIC REJECTION of the submittal data with NO EXCEPTION.**

B. The bound submittals are to be submitted for review within 30 days after the Contract is awarded. No submittal will be checked until ALL required submittals have been received by the Engineer.

C. The Contractor shall submit with the bound and identified submittal data a letter signed by the Contractor's Project Manager (or higher level officer of the firm) stating that all electrical characteristics of the mechanical equipment to be supplied has been fully coordinated with the electrical contractor. No submittal data will be checked until this letter is submitted. Any changes to the electrical requirements from the Contract Documents resulting from alternate equipment being submitted shall be performed without any additions to the Contract Sum. Submit attachment and fastening methods for piping and equipment to the Structural Engineer for approval. Shop Drawings shall be submitted for each of the following:

1. Air Release & Vacuum Valves
2. Backflow Preventers
3. Cleanouts
4. Disconnect Switches
5. Drainage & Vent Piping (Gravity Sewer & Forced Sewer)
6. Insulation
7. Heat Cable
8. Hydrants
9. Manholes
10. Pipe Hangers and Supports

11. Plumbing Drains
12. Plumbing Fixtures, Carriers and Fittings
13. Pressure Booster System
14. Thermometers, Gauges, etc.
15. Valves
16. Vacuum Breakers
17. Water Heaters
18. Water Piping
19. Water Supplies and Stops
20. Water Hammer Arrestors

3.02 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Description

1. Complete operating and maintenance instructions shall be provided to the Owner. Four (4) separate copies (three for the owner, one for the Architect) shall be provided, and each copy shall be bound in a separate 3-ring, loose leaf notebook. Operating instructions shall be provided for each system, and shall include a brief system description, a simple schematic and a sequence of operation. Operating and maintenance instruction shall be included for each piece of equipment. Manufacturers' Standard literature is acceptable for each piece of equipment. However, the contractor shall prepare a SYSTEM O&M manual including overall system descriptions, operating and energy conservation techniques.
2. A system wiring and control diagram shall be included in the operating and maintenance instruction.
3. Prior to final acceptance or beneficial occupancy, provide the services of a competent representative to instruct the Owner in the operation of all systems for a period of not less than one (1) day. This instruction shall include a complete walk-through of all equipment and systems. The Architect reserves the right to attend any such meeting and shall be duly notified.

3.03 OTHER SUBMITTALS – CLOSEOUT FORMS

- #### A. Submit two copies of the following prior to occupancy of the project by the Owner. See Contract Closeout Forms – Section 00 65 00.
1. As built drawings for plumbing systems.
 2. Request for final payment.
 3. Letter or "Release of Liens".
 4. Letter of "Guarantee".
 5. Submit two (2) copies of welder's certificate.
 6. Consent of Surety Company to final payment.
 7. Certify disinfection of domestic water service.
 8. Power of Attorney.
 9. Contractor's Affidavit of Payment of Debts and Claims.

END OF SECTION

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING
PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplemental Conditions, and General Provisions Division 01 apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Furnish hangers to support the required loads. Where necessary, supports shall be designed to permit movement due to expansion and contraction. Where drawings show details of supports and anchors, conform to details shown. Where details are not shown, conform to general requirements specified herein.
- B. "C" CLAMPS may be used as point of attachment to building structure for pipe hangers and/or all-thread rods; however, piping shall not be supported directly by "C" clamps.
- C. Do not pierce waterproofing with support bolts.
- D. All ferrous metal hangers and supports, not otherwise coated, shall be provided with a field-applied coat of zinc chromate primer prior to any installation. In lieu of field painting, the contractor may furnish cadmium plated, or galvanized hangers and supports.

1.03 QUALITY ASSURANCE:

- A. All hangers, support, anchors, and guides shall be in accordance with the American National Standard Code for Pressure Piping, ANSI B31.1 with addenda 31.1 OA-69.
- B. Provide an adequate suspension system in accordance with recognized engineering practices, using where possible, standard commercially accepted pipe hangers and accessories. Submit fastening methods to the Structural Engineer for approval and as approved copy to the engineer.
- C. Horizontal suspended pipe shall be hung using adjustable pipe hangers with bolted hinged loops or turnbuckles. Chains, wire, perforated strap iron or flat steel straps are not acceptable.
- D. For the purpose of this specification, Grinnell product figure numbers are given. Equal products by B-Line and Michigan Hanger Co. (M-Co) are acceptable.

1.04 DESIGN

- A. Supporting steel not shown for the equipment will be designed, supplied and erected by the Contractor; the supporting steel is that steel which is connected to the building structure shown on the drawings and carries the weight of the plumbing items. This supporting steel design must carry the dead weight and dynamic load imposed by the equipment, piping and other mechanical components.

- B. The supporting steel shall be connected to the building structure in such a manner as not to overload the structure. It is the responsibility of the General Contractor and the steel fabricator to verify that this purpose is accomplished. It is the responsibility of the General Contractor to call to the attention of the Architect-Engineer any deficiency prior to bidding.
- C. Where thermal movement in the pipe line will occur, the pipe hanger assembly must be capable of supporting the line in all operating conditions. Accurate weight balance calculations shall be made to determine the supporting force at each hanger in order to prevent excessive stress in either pipe or connected equipment.

PART 2 - PRODUCTS

2.01 UPPER ATTACHMENTS

- A. Support piping in wood construction with Side Beam Bracket, Grinnell Fig. 202 or Hanger Flange, Grinnell Fig 128R, using lag screws.

2.02 WALL SUPPORTS

- A. Where piping is run adjacent to walls or steel columns welded steel brackets Grinnell Fig. 195 and 199 may be used. The bracket shall be bolted to the wall and a back plate of such size and thickness as to properly distribute the weight.

2.03 FLOOR SUPPORTS

- A. Where pipe lines are located next to the floor and no provision for expansion are required support piping with Grinnell Fig. 258, pipe rest with nipple and floor flange.
- B. Where provisions for expansion are required support piping with Grinnell adjustable pipe stand Fig. 274, or pipe roll stand Fig. 271.
- C. Vertical piping shall be supported at every other floor using riser clamps Grinnell Fig. 261, for steel and cast iron pipe, and copper clad riser clamp Grinnell Fig. CT-121 for all copper piping.

2.04 SUPPORTS FOR PIPING OUTSIDE THE STRUCTURE

- A. Support piping outside the structure on adjustable pipe supports Grinnell Fig. 264.

2.05 INTERMEDIATE ATTACHMENTS

- A. Supports for horizontal piping shall be all-thread galvanized steel rods, ASTM A-107, Grinnell Fig. 146, of the following sizes:

Pipe Size	Hanger Rod Diameter
2" and smaller	3/8"
2-1/2" and 3"	1/2"
4" and 5"	5/8"
6"	3/4"
8" to 12"	7/8"
14" and 16"	1"

2.06 PIPE ATTACHMENTS

- A. Hangers for insulated pipe shall be sized to bear on the outside of the insulation.
- B. Hangers for steel and cast-iron horizontal piping where provision for expansion are not required shall be Grinnell Fig. 260, clevis type with vertical adjustment.
- C. Hangers for uninsulated copper pipe 4" and smaller shall be copper plated adjustable band hangers Grinnell Fig. CT. 99C, for pipe sizes over 4" provide Grinnell copper clad clevis type hanger with a copper clad saddle at each hanger location.
- D. Hanger for PVC pipe shall be Grinnell Fig. CT. 99, adjustable band hanger.
- E. Hangers for steel and copper piping where provisions for expansion are required shall be Grinnell Fig. 171 or Fig. 181, adjustable roller hanger with Grinnell Fig. 160, pipe covering protection saddles.
- F. Support hot and cold water piping in spaces behind plumbing fixtures with plastic coated brackets and plastic coated U-bolts.
- G. Pipe guide shall be Grinnell Fig. 256.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Support horizontal equipment such as strainers, water heaters, independently of the piping system.
- B. Hang pipe from substantial building structure. Pipe shall not be hung from other piping.
- C. Support each horizontal length of NO-HUB cast iron pipe within 2-1/2 feet of each joint and a maximum of 5'-0" on centers.
- D. Provide a hanger within one foot of each elbow.
- E. Provide a hanger within one foot of each riser in addition to the riser clamp support at every other floor.
- F. Unless specified otherwise, provide the following support spacing.

1.	Pipe Size	Support Spacing
	1" and smaller	5'-0"
	1-1/4" and larger	10'-0"

END OF SECTION

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 APPLICABILITY

- A. All work specified in this Section shall comply with the provision of General Provisions Division 01.
- B. All above ground piping inside the building shall be identified with color bands at each shut-off valve, each piece of equipment, branch take-off, and 40'-0" maximum spacing on exposed straight pipe runs.
- C. All underground plastic gravity sanitary sewer and water piping outside the building shall have #14-copper (TW) tracer wire attached to pipe with exception of water main piping being direct bored from connection to existing city water main to water meter. Install directly above pipe a continuous 6-inch wide vinyl plastic tape with printing identifying buried service, 12 inches below finished grade, during backfilling operation.
- D. All underground plastic HDPE forced sanitary sewer and water piping shall have #8-copper (TW) tracer wire attached to pipe. Pipe shall be factory marked with identification of buried service, i.e. "Forced Sanitary Sewer" or "Domestic Water Main".

PART 2 - PRODUCTS

2.01 PIPE MARKINGS

- A. All aboveground piping shall be identified with pipe markers. Pipe markings shall be manufactured preprinted markings in accordance with the following:
 - 1. No tape or self-adhering markers will be allowed.
 - 2. Snap on pipe markers, W. H. Brady Co. or approved equal are acceptable.
 - 3. Markers shall be strapped on with nylon fasteners.
 - 4. Markers will be non-corrosive, non-conductive, mildew resistant and impervious to moisture.

2.02 BAND AND LETTER SIZE: Band and letter sizes shall conform to the following table:

O.D. of Pipe	Width of Color Band	Size of Letter/Numbers
1-1/4" and smaller	8"	1/2"
1-1/2" to 2"	8"	3/4"
2-1/2" to 6"	12"	1-1/4"
6" to 10"	24"	2-1/2"
Over 10"	32"	3-1/2"

2.03 IDENTIFICATION:

A. Band legend and color and letter color shall conform to the following table:

Piping Band	Legend	Letters	Band Color
Cold Water (Domestic)	CW (Dom)	White	Green
Hot Water (Domestic)	HW (Dom)	Black	Yellow
Drain	D	Black	Green

B. All equipment, such as water heaters, pumps, etc., furnished by this Contractor, shall be permanently labeled, in an approved manner, corresponding to the mark or name shown on the drawings and/or specifications, or Owners' sequences.

C. For applications where existing color schemes may already be in place, all new work requiring identification and color coding shall match the existing color schemes.

PART 3 - EXECUTION

3.01 EXECUTION:

A. Locate pipe identification in the following areas:

1. Each riser and each valve,
2. One on each side where piping pass thru walls and floors,
3. Locate at or near each change in direction,
4. Every 40 feet along continuous runs,
5. Located within 4 feet of exit or entrance to a vessel or tank.

B. Indicate pipe content flow direction with arrows of matching style and placed so the arrow points away from the legend.

END OF SECTION

SECTION 22 07 00

PLUMBING INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawing and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.02 DESCRIPTION

- A. All insulation products used outside of mechanical rooms shall meet NFPA requirements for Flame Spread Rating 25, Smoke Developed Rating 50, and Fuel Contributed 50.
- B. **Staples shall not be used for securing insulation.** All insulation shall be installed in accordance with the insulation manufacturer's recommendations. Insulation shall be continuous through wall, ceiling, floor and roof openings and sleeves, except at fire/smoke dampers.
- C. Supports for insulated piping shall be outside the insulation. Inserts shall be provided at hangers. Inserts shall be Foamglass Insulation, Calcium Silicate or Perlite and shall be 2" longer than the pipe shields. Pipe shoes welded to the pipe shall be used for roll type hangers.
- D. All required tests of the relevant section of pipe or equipment shall be completed before insulation is applied.
- E. Do not store materials in building until it is enclosed and dry. Wet insulation shall not be installed.
- F. Insulation products with self-sealing type jacket shall not be applied at temperatures below 40 degrees F.
- G. Items not to be insulated:
 - 1. Underground domestic cold water piping.
 - 2. Vents from pressure relief valves.
 - 3. Chrome plated piping at plumbing fixtures.
- H. Clean and dry all surfaces to be insulated from loose scale, dirt, oil, moisture and other foreign matter.
- I. Insulate completely all metal surfaces of piping and equipment other than hangers.
- J. Surface finishes shall present a tight smooth appearance.
- K. Permit expansion and contraction without causing damage to insulation or surface finish.
- L. Surface finish shall be extended to protect all surfaces, ends, and raw edges of insulation.
- M. Vapor barriers must be continuous and uninterrupted throughout the system where specified except where insulation is interrupted for fire dampers. See details for special conditions.

1.03 PIPING

- A. Insulate all valves, strainers and fittings. For the purposes of this Specification, fittings include unions and flanges. Use premolded material where available. Insulate valves up to and including bonnets.
- B. Pipe Hangers that are installed in direct contact with the surface of the pipe, such as a pipe clamp shall have the insulation applied over the hanger as well as the pipe. Provide a rain shield on piping supported on hangers outdoors to prevent bulk water from entry.

1.04 QUALITY ASSURANCE

- A. Codes and regulations referred to are minimum standards. Where the requirements of these specifications or drawings exceed those of the codes and regulations, the drawings and specifications shall govern.
- B. Any methods of application of insulation materials or finishes not specified in detail herein shall be in accordance with the particular manufacturer's published recommendations. Insulation shall be applied by experienced workers regularly employed for this type of work. Material shall be furnished to the job bearing the manufacturer's label.
- C. Insulation products shall be as manufactured by Pittsburgh Corning Corporation, Knauf, Owens-Corning, Certainteed or Armstrong.

PART 2 - PRODUCTS

2.01 PRE-MOLDED FIBERGLASS PIPE INSULATION

- A. Insulation shall be heavy density, one- piece insulation made from inorganic glass fibers bonded with a thermosetting resin and accurately molded to conform to the outside diameter of the pipe. Insulation shall be one piece snap-on or self-sealing type with white all service jacket. Insulation shall be suitable for use on either hot or cold water pipes with temperature range of plus 20 degrees to 400 degrees F. Thermal conductivity shall not exceed 0.23 at 75 degrees F. mean temperature.
- B. Safe burning characteristics shall be UL Classified and shall not exceed 25 flame spread, 50 smoke developed when tested in accordance with ASTM E84, NFPA 255 and UL723.
- C. Insulation jacket shall have a water vapor transmission of 0.02 perms or less as tested by ASTM E96, Procedure A.
- D. All pipe fittings and accessories insulated with fiberglass shall be fitted with heavy gauge PVC covers and jackets as manufactured by Johns Manville Zeston 300 Series. Fitting covers shall be two-piece PVC made for short and long radius elbows in shapes for 45 degrees and 90 degrees bends. Covers and jackets to have a white glossy finish and UV resistant. Material thickness shall be a minimum 30 mil and carry a flame spread of 25 or less with a smoke development of 50 or less.
- E. Pre-molded fiberglass insulation shall be used on the following pipe systems. Pipe insulation shall be equal to Manville Fiberglass Micro-Lok AP-T Plus.

**INSULATION THICKNESS IN INCHES
FOR PIPE SIZES**

	Temperature Up to	Up to 1"	1-1/4" to 2"	2- 1/2" to 3- 1/2 "	4" & Over
Cold Water	50°-65°F	1/2"	1"	1"	1"
Hot Water	200°F	1/2"	1"	1"	1-1/2"
Drains Connecting A/C Equipment	40°-55°F	1/2"	1"	1"	1-1/2"

2.02 FOAMED PLASTIC SHEET AND TUBING:

- A. Sheet Insulation shall be equal to Armstrong Armaflex. Minimum of 4.5 lbs. per cu. ft. Thermal conductivity shall not exceed 0.28 at 75 degrees F mean temperature.
- B. Insulate the following piping system as indicated:
 - 1. Water cooler waste and trap with 1/2 inch thick foamed plastic tubing
 - 2. Domestic hot water piping below ground with 1/2 inch thick foamed plastic tubing.
- C. Piping outside the building shall be insulated with 1 inch thick flexible foamed plastic insulation with weatherproof aluminum as hereinafter specified.

2.03 ADHESIVES, MASTIC, COATINGS:

- A. Benjamin Foster, Childers, Insul-Coustic, EPOLUX, Minnesota Mining and Manufacturing Co.
- B. Treatment of pipe jackets to impart flame and smoke safety shall be permanent. The use of water-soluble treatments is prohibited.
- C. Vapor barriers shall have a perm rating of not more than .05 perms. Adhesives, coatings and mastics shall have a perm rating of not more than .25 perms.

2.04 TAPE: Wherever tape is used for sealing purposes, it shall be of the type and shall be applied as recommended by the non-conductive covering manufacturer. Where recommendation is lacking, the tape used shall be sealed with Minnesota Mining Adhesive EC-1329.

2.05 WEATHERPROOFING:

- A. Protect exposed water piping from freezing down to 0°F in unheated areas with self-regulating heater cable with built-in thermostat. Cable shall be installed in contact with pipe and beneath pipe insulation. Protect piping insulation with Pabco insulating division aluminum sheets of .016 thickness and aluminum formed elbows with leak-proof beads and epoxy coated interior.
- B. Heater cable shall be in accordance with specification section 22 05 33 "Heat Tracing for Plumbing Piping".

PART 3 - EXECUTION

3.01 GENERAL:

- A. Surfaces to be insulated shall be clean, dry, and free of foreign material, such as rust, scale and dirt when insulation is applied. Perform pressure tests required by other Sections before applying insulation.
- B. Where existing insulation is damaged due to the new work, repair damage to match existing work or replace damaged portion with insulation specified for new work.

3.02 INSULATION FOR ALL PIPING SYSTEMS:

- A. Insulate pipe, fittings, flanges, unions and valves.
- B. Install insulation materials with smooth and even surfaces, jackets drawn tight and cemented down smoothly at longitudinal seams and end laps. Do not use scrap pieces of insulation where a full length section will fit.
- C. Install insulation, jackets and coatings continuous through wall and floor openings and sleeves.
- D. Fittings, valves and flanges shall be insulated with field fabricated multiple mitered segments of molded fiberglass insulation of the same thickness as adjoining pipe insulation. Secure fitting insulation segments with 20 gauge galvanized steel wire and apply a smoothing coat of insulating cement. White fabric and mastic shall be used on exposed fittings.
- E. Application of all materials shall be in accordance with the manufacturer's instructions.
- F. Butt all joints of pipe insulation together and secure all jacket laps with lap adhesive. Seal all butt joints with joint straps furnished with insulation.
- G. Care shall be taken so as not to place insulation over vent and drain inlets and outlets.
- H. Staples are not permitted on pipe insulation.

END OF SECTION

SECTION 22 11 13

FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. This Section of the Specifications and related drawings describe requirements pertaining to the plumbing piping and equipment.
- B. Refer to the following sections for related work:
 - 1. 22 05 11 Plumbing Submittals Data
 - 2. 22 05 29 Hangers and Supports for Plumbing Piping and Equipment
 - 3. 22 05 53 Identification for Plumbing Piping and Equipment
 - 4. 22 33 00 Electric Domestic Water Heaters
 - 5. 22 42 00 Commercial Plumbing Fixtures

1.02 RECORD DOCUMENTS

- A. Provide corrected Record Documents in accordance with the Project Record Documents Sections and the Mechanical General Section.

1.03 GENERAL PROVISIONS AND BASIC MATERIALS

- A. The requirements of Plumbing General Requirements Section 22 05 10 apply to this work.

1.04 CODE

- A. The work shall comply with the International Plumbing Code; acceptability under the codes shall not authorize any substitution, smaller size, lighter weight or less durable materials for the items specified.
- B. The Contractor shall obtain and pay for all required permits and inspections and shall deliver one copy of each inspection certificate to the Architect before the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 WATER PIPING

- A. Aboveground piping 3 inches and smaller: Type "L" copper tubing with tin-antimony soldered joints and wrought copper socket fittings.
- B. Underground piping 3 inches and smaller beneath building slab to 5'-0" outside building: Type "K" hard drawn copper tubing, with 95-5 silver soldered joints and wrought copper socket fittings.

- C. Underground piping outside building (with exception of direct buried pipe where noted on drawings) all sizes: Polyvinyl chloride (PVC) plastic piping Schedule 40, ASTM D-1785 with 150 PSI minimum pressure rating. Fittings shall conform to ASTM D-2466 with solvent weld joints conforming to ASTM D-2564.
- D. Direct buried underground piping outside building 3" and smaller: PE 4710 High density polyethylene (HDPE) plastic pressure piping ASTM D-3350 conforming to AWWA C901, NSF listed for potable water service with 160 PSI minimum pressure rating. Joints shall be butt fusion type in accordance with manufacturer's recommendations. Piping shall be "PressureFlex" water pipe as manufactured by Lawson Pipe Company or approved equal.
- E. Underground piping 1 inch and smaller below building slab: Below slab Type "L" soft drawn copper tubing, with no joints.

2.02 BASIC PIPING SPECIALTIES

A. Unions:

- 1. Unions shall be the same material and working pressure as the fittings specified for the piping system. Unions on piping 2-1/2 inches in size and larger shall be bolted flanged joint and on smaller than 2-1/2 inches shall be screwed connection.
- 2. Unions and flanges provided between copper and ferrous pipe connections shall be insulating (dielectric) type to electrically separate dissimilar metal connections in piping system.

B. Dielectric Adapters:

- 1. Dielectric adapters shall be the union type for pipes 2 inches in size and larger. Adapters shall have working pressure of 250 psi for union type and 165 psi for flanged type. The insulating gaskets shall have an operating range of 40 degrees F. to 240 degrees F. and shall limit the galvanic corrosion to a maximum of 1 percent of the short circuit current. Dielectric adapters shall be Ebco, Crane or Capitol.
- 2. Provide a dielectric adapter between any ferrous and copper connection including piping and equipment.

C. Pipe Sleeves:

- 1. The Contractor shall install, as required, in concrete, carpentry or masonry construction, all necessary hangers, sleeves, expansion bolts, inserts and other fixtures and appurtenances necessary for the support of all pipe, equipment and devices furnished under each section of the Specification.
- 2. Cutting of openings and installation of sleeves or frames through walls and surfaces shall be done in a neat workmanlike manner. Openings shall be cut only as large as required for the installation; sleeves, except as otherwise indicated, and/or frames shall be installed flush with finished surfaces and grouted in place. Surfaces around opening shall be left smooth and finished to match surrounding surface.
- 3. Where pipes pass through floor slabs, sleeve shall be standard weight black steel pipe with top of sleeve 3" above finished floor. Where pipes pass through walls, sleeves shall be standard weight black steel pipe or 20-gage galvanized sheet metal with ends flush with wall surfaces.
- 4. Each pipe passing through walls, floors, ceilings or partitions shall be provided with sleeves having internal diameter one inch larger than the outside dimensions of insulated pipes.

5. All pipe sleeves through floors, roofs and masonry walls shall be built in place as the affected walls, floors, and roofs are built.
6. All penetrations through rated floors shall be packed with mineral wool and capped off with a silicon caulk. As an alternate, an approved, fire rated sealant as manufactured by 3M or Hilti may be used.
7. Sleeves through exterior wall shall be steel or cast iron pipe, flush with the exterior surfaces, and with the space between the pipe and the sleeves caulked watertight in an approved manner.
8. Inserts shall be cast iron or galvanized steel individual type, with accommodations for removable nuts and threaded rods up to 3/4 inch diameter, and permitting lateral adjustment.

F. Floor, Wall and Ceiling Plates:

1. Escutcheons shall be installed on all pipes where they pass through floors, ceilings, walls, or partitions in finished areas.
2. The interior of closets, adjacent to finished areas, shall be considered as finished for the intent of these Specifications.
3. Escutcheons shall be split, hinged, stamped brass type designed to fit the pipe, and to cover the terminating pipe sleeve, in chrome plated finish unless otherwise specified, with securing device to hold the escutcheon tight to the pipe.

2.03 WATER HAMMER ARRESTORS

- A. Water hammer arrestors shall be piston operated, type "K" copper, pressure rated for 250 psi, tested and certified in accordance with PDI standard WH-201; Precision Plumbing Products, Inc., or approved equal.

2.04 VALVES

- A. All shutoff valves shall be gate or ball valves unless otherwise noted. All drain valves shall be globe or angle valves unless otherwise noted.
- B. Gate valves 2 inches and smaller shall be of Class 125, body and bonnet shall be of ASTM B-62 cast bronze composition, solid disc, copper-silicon alloy stem, brass packing gland, solder ends, Teflon-impregnated packaging, and malleable handwheel; NIBCO S-11 or approved equal.
- C. Class 150 valves meeting the above specifications shall be used where pressure requires; NIBCO S-134 or approved equal.
- D. Ball valves 2 inches and smaller shall be 600 psi CWP, have cast brass bodies, replaceable reinforced Teflon seats, conventional port, blowout proof stems, chrome-plated brass ball, solder ends with extended solder cups; NIBCO S-580-BR-R-70 or approved equal.
- E. Gate valves 2-1/2 inches and larger shall be Class 125 iron body, bronze mounted, with body and bonnet conforming to ASTM A-126 Class B cast iron, flanged ends, with Teflon-impregnated packing and two-piece packing gland assembly; NIBCO F-617-0 or approved equal.
- F. Globe valves 2 inches and smaller shall be of Class 125, body and bonnet of ASTM B-62 cast bronze composition, solder ends, copper silicon alloy stem, brass packing gland, Teflon-impregnated packing and malleable handwheel; NIBCO S-235-Y or approved equal.

- G. Globe valves 2-1/2 inches and larger shall be of Class 125 iron body, bronze mounted with body and bonnet conforming to ASTM A-126 Class B cast iron, flanged end, with Teflon-impregnated packing and two-piece packing gland assembly; NIBCO F-178-B or approved equal.
- H. Check valves 2 inches and smaller shall be of Class 125, solder ends, with bodies and caps conforming to ASTM B-62 cast bronze composition, swing type disc; NIBCO S-413-BYW or approved equal.
- I. Check valves 2-1/2 inches and larger shall be iron body, bronze mounted, with body and cap conforming to ASTM A-126 Class B cast iron, flanged ends, swing type disc; NIBCO F-918-B or approved equal.

2.05 PLUMBING SYSTEM INSULATIONS

- A. All water piping shall be insulated in accordance with specification section 22 07 00 "Plumbing Insulation".

2.06 PIPE HANGERS AND SUPPORTS

- A. Provide pipe hangers and supports in accordance with Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment".

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install piping and make all joints in accordance with the pipe manufacturer's recommendations. Make provisions for thermal expansion and contraction.
- B. Rough-in for fixtures in accordance with the fixture manufacturer's roughing-in drawings to provide the heights and locations indicated on the Architectural drawings or as specified.
- C. Install piping and pipe supports as specified. Keep pipe ends closed except for vent and drain openings; protect vent and drains from the entrance of materials that could cause stoppage.
- D. Install shut-off valves where indicated on the drawings and required by the code including valves at all fixture groups, and equipment.
- E. Install drain valves at low points of all new water piping except buried piping.

3.02 EXCAVATION, TRENCHING AND BACKFILLING

- A. Perform all excavation, trenching and backfilling for work under Division 22. During excavation, material for backfilling shall be piled back from the banks of the trench to avoid overloading and to prevent slides and cave-ins. All excavated materials not to be used for backfilling shall be re moved and disposed of. Grading shall be done to prevent surface water from flowing into trenches and other excavation and any water accumulating therein shall be removed by pumping. All excavations shall be made by open cut. No tunneling shall be done.
- B. Bottom of trench shall be uniformly graded to provide firm support and even bearing surface for pipe.

- C. Pipe shall be laid on firm soil, laid in straight lines and on uniform grades. Provide bell holes so that barrels of pipe rest evenly on bottom of trench along entire length of pipe.
- D. Pipe shall be inspected and tested prior to backfilling. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. Trench shall be hand filled to a minimum of 12" above the top of the pipe with clean earth and tamped to 95 percent compaction after first layer using the modified Proctor test method of compaction.

3.03 TESTS OF PIPING

- A. Install temporary connections and plugs or valves at all points necessary for venting air from the piping, filling, holding test pressure, draining and flushing the piping.
- B. Test all new pressure piping roughing hydrostatically to show zero leakage in eight (8) hours at the following pressures measured at the low points: Domestic water (C.W. and H.W.), 125 psi.

3.04 FLUSHING AND STERILIZING:

- A. Flush all new water piping after pressure tests and repairs are completed by draining from the low points; refill with clean water.
- B. Sterilize the above ground water piping after fixtures and equipment are installed with 50 ppm chlorine solution distributed throughout all C.W. and H.W. piping; let stand for 24 hours, then flush enough water at drinking fountains and lavatories to reduce the residual chlorine content to less than one (1) ppm. Domestic water heater shall have the heat source shut off while sterilization is in progress.
- C. Furnish three copies of a Certificate of Performance of Complete Sterilization to the Architect before final inspection of the work, all certified by a registered chemical engineer.

3.05 WATER TESTS

- A. The Contractor shall have representative water samples from the fixtures tested by the local Health Department or a laboratory approved by the Health Department. If the tests do not indicate potable water, the sterilizing procedure and the test shall be repeated. Submit test report to the Architect.

3.06 START-UP, ADJUSTMENT, INSTRUCTION

- A. Start-up, lubricate, adjust and test equipment installed under this Section and furnish instructions to the Owner as specified in the General Requirements Section.

3.07 OPERATIONAL TESTS

- A. When installation and adjustment of all fixtures and equipment is complete, perform operational tests of all plumbing system components at normal operating pressures as specified under the General Requirements Section and include the following tests:
 - 1. Operate all manual and automatic valves at least one full open-closed cycle; examine for stem leakage, failure to close or other malfunction.

END OF SECTION

SECTION 22 13 00 FACILITY SANITARY SEWERAGE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section of the Specifications and related drawings describe requirements pertaining to the sanitary sewerage piping and drainage accessories.
- B. Refer to the following sections for related work:
 - 1. 22 05 29 Hangers and Supports for Plumbing Piping and Equipment
 - 2. 22 05 53 Identification for Plumbing Piping and Equipment

1.02 RECORD DOCUMENTS

- A. Provide corrected Record Documents in accordance with the Project Record Documents Sections and the Mechanical General Section.

1.03 GENERAL PROVISIONS AND BASIC MATERIALS

- A. The requirements of the General Requirements Division 01 00 00 apply to this work.

1.04 QUALITY ASSURANCE

- A. Manufacturing firms shall be regularly engaged in the manufacture of plumbing products of type and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.
- B. Subject to compliance with requirements, provide drains, cleanouts & drainage accessories of one of the following manufacturers:
 - 1. Josam Mfg. Co.
 - 2. Smith (Jay R.) Mfg. Co.
 - 3. Wade Div., Tyler Pipe
 - 4. Zurn Industries, Hydromechanics Div.

1.05 CODE

- A. The work shall comply with the International Plumbing Code; acceptability under the codes shall not authorize any substitution, smaller size, lighter weight or less durable materials for the items specified.
- B. The Contractor shall obtain and pay for all required permits and inspections and shall deliver one copy of each inspection certificate to the Architect before the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS FOR DRAINAGE SYSTEMS

- A. Aboveground piping all within building: Service weight (SV) No-hub cast iron soil pipe and fittings CISPI301 with "husky" heavy duty stainless steel clamps, CISPI301 and neoprene gaskets, ASTM C-564.
- B. Underground building drain piping beneath slab to 5'-0" outside building: Service weight (SV) cast iron hub and spigot soil pipe and fittings, ASTM A-74 with neoprene compression gasket, joints, ASTM C-564.
- C. Gravity drainage piping all sizes outside building: Polyvinyl chloride pipe (PVC) ASTM D-2665, PVC Type DWV fittings with solvent weld joints.
- D. Forced sanitary sewer piping all sizes: PE 4710 High density polyethylene (HDPE) plastic pressure piping ASTM D-3350 conforming to AWWA C901, for sanitary sewer service with 160 PSI minimum pressure rating. Joints shall be butt fusion type in accordance with manufacturer's recommendations. Piping shall be "PressureFlex" sewer pipe as manufactured by Lawson Pipe Company or approved equal.
- E. Condensate Drain Piping: Type DWV copper pipe with tin-antimony soldered joints and drainage fittings.
- F. All traps shall have brass cleanout plug except where buried.

2.02 ROOF FLASHING

- A. Vent pipes passing through roof shall be flashed with a one piece pipe flashing unit constructed of E.P.D.M. rubber with an aluminum reinforcing ring suitable for a temperature range of minus 25 degrees F. to 250 degrees F. as manufactured by Butler Manufacturing Company or approved equal. Flashing to be installed in accordance with metal building manufacturer recommendations. Vents shall offset in roof joist area or ceiling cavity if necessary so that no vent shall be closer than 4'-0" from outside wall line.

2.03 DRAINAGE ACCESSORIES

- A. Provide factory fabricated drainage piping products of the size and type as indicated on drawings, including features as specified herein. Where not indicated, provide proper selection as determined by installer to comply with installation requirements and governing regulations.
- B. Floor drains shall be provided with trap primer connections where indicated on drawings.
- C. All floor drains without trap primers shall be provided with deep seal "P" traps.
- D. All floor drains and floor sinks located on elevated floors shall be provided with seepage holes and flashing collar or clamping rings to provide for leak proof installation.

2.04 CLEANOUTS

- A. Vertical and horizontal lines exposed - Test Tee – Smith 4510.
- B. Vertical lines concealed – Smith 4472 with stainless steel access cover.
- C. Horizontal lines under unfinished floors – Smith 4405.

- D. Finished floors – Smith 4023 cast iron adjustable floor level cleanout assembly with round polished bronze top.
- E. Finished Floors - Linoleum, Terrazzo or Tile – Smith 4143 cast iron adjustable floor level cleanout assembly with round polished bronze top. Top depression to be covered with surrounding floor pattern bonded with waterproof adhesive.
- F. All lines outside of building - Smith 4400.

2.05 BASIC PIPING SPECIALTIES

A. Pipe Sleeves:

1. The Contractor shall install, as required, in concrete, carpentry or masonry construction, all necessary hangers, sleeves, expansion bolts, inserts and other fixtures and appurtenances necessary for the support of all pipe, equipment and devices furnished under each section of the Specification.
2. Cutting of openings and installation of sleeves or frames through walls and surfaces shall be done in a neat workmanlike manner. Openings shall be cut only as large as required for the installation; sleeves, except as otherwise indicated, and/or frames shall be installed flush with finished surfaces and grouted in place. Surfaces around opening shall be left smooth and finished to match surrounding surface.
3. Where pipes pass through floor slabs, sleeve shall be standard weight black steel pipe with top of sleeve 3" above finished floor. Where pipes pass through walls, sleeves shall be standard weight black steel pipe or 20-gage galvanized sheet metal with ends flush with wall surfaces.
4. Each pipe passing through walls, floors, ceilings or partitions shall be provided with sleeves having internal diameter one inch larger than the outside dimensions of insulated pipes.
5. All pipe sleeves through floors, roofs and masonry walls shall be built in place as the affected walls, floors, and roofs are built.
6. All penetrations through rated floors shall be sealed with an approved fire rated sealant as manufactured by 3M or Hilti.
7. Sleeves through exterior wall shall be steel or cast iron pipe, flush with the exterior surfaces, and with the space between the pipe and the sleeves caulked watertight in an approved manner.
8. Inserts shall be cast iron or galvanized steel individual type, with accommodations for removable nuts and threaded rods up to ¾ inch diameter, and permitting lateral adjustment.

B. Floor, Wall and Ceiling Plates:

1. Escutcheons shall be installed on all pipes where they pass through floors, ceilings, walls, or partitions in finished areas.
2. The interior of closets, adjacent to finished areas, shall be considered as finished for the intent of these Specifications.
3. Escutcheons shall be split, hinged, stamped brass type designed to fit the pipe, and to cover the terminating pipe sleeve, in chrome plated finish unless otherwise specified, with securing device to hold the escutcheon tight to the pipe.

2.06 PIPE HANGERS AND SUPPORTS

- A. Provide pipe hangers and supports in accordance with Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment".

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install soil and vent piping pitched to drain at minimum slope of 1/4 inch per foot (2 percent) for piping 3 inches and smaller, and 1/8 inch per foot (1 percent) for piping 4 inches and larger.
- B. Install piping and make all joints in accordance with the pipe manufacturer's recommendations. Make provisions for thermal expansion and contraction.
- C. Install cleanouts on gravity drainage piping where indicated on the drawings and as required by the code, and at every change in direction of more than 45 degrees in horizontal piping. Locate wall cleanouts as low as possible but high enough for the cover plate to clear the base. Locate test tees where necessary to separate sections of piping for testing.
- D. Rough-in for fixtures in accordance with the fixture manufacturer's roughing-in drawings to provide the heights and locations indicated on the Architectural drawings or as specified.
- E. Set floor cleanouts so that the top rims are level and flush with the finished floor surface and so that square and rectangular tops are parallel to the walls, unless otherwise noted.
- F. Install piping and pipe supports as specified. Keep pipe ends closed except for vent and drain openings; protect vent and drains from the entrance of materials that could cause stoppage.
- G. Plumbing vents shall terminate at 1'-0" above roof.

3.02 EXCAVATION, TRENCHING AND BACKFILLING

- A. During excavation, material for backfilling shall be piled back from the banks of the trench to avoid overloading and to prevent slides and cave-ins. All excavated materials not to be used for backfilling shall be removed and disposed of. Grading shall be done to prevent surface water from flowing into trenches and other excavation and any water accumulating therein shall be removed by pumping. All excavations shall be made by open cut. No tunneling shall be done.
- B. Bottom of trench shall be uniformly graded to provide firm support and even bearing surface for pipe.
- C. Pipe shall be laid on firm soil, laid in straight lines and on uniform grades. Provide bell holes so that barrels of pipe rest evenly on bottom of trench along entire length of pipe.
- D. Pipe shall be inspected and tested prior to backfilling. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. Trench shall be hand filled to a minimum of 12 inches above the top of the pipe with clean earth and tamped to 95 percent compaction after first layer using the modified Proctor test method of compaction.

3.03 TESTS OF PIPING

- A. Install temporary connections and plugs or valves at all points necessary for venting air from the piping, filling, holding test pressure, draining and flushing the piping.

- B. Test all new gravity waste and sewer piping under 10 feet head of water (except for the uppermost 10 feet) as required by the Plumbing Code, with zero leakage allowed. The test pressure shall be maintained for at least 30 minutes before inspection starts and maintained for the time necessary to inspect all joints but not less than 15 minutes.
- C. Test all new forced sanitary sewer piping hydrostatically to show zero leakage in eight (8) hours at 40 psi.

3.04 OPERATIONAL TESTS

- A. When installation and adjustment of all fixtures and equipment is complete, perform operational tests of all plumbing system components at normal operating pressures include the following tests:
 - 1. Pour at least five (5) gallons of water into every floor drain to test for pipe stoppage.
- B. All floor drain strainers shall be securely fastened to drain body.
- C. During construction drains shall be kept covered so that traps, sediment buckets and dome type strainers are kept free from debris and trash.

END OF SECTION

SECTION 22 13 43

FACILITY PACKAGED SEWAGE PUMPING STATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. All work specified in this Section is subject to the provisions of Plumbing General Requirements Section 22 05 10.
- B. Refer to section 22 13 00 Facility Sanitary Sewerage for related work in connection with the sewage pumping system:

1.02 DESCRIPTION OF WORK

- A. Firms regularly engaged in manufacture of sewage pumping systems with characteristics, sizes, and capacities required, whose products have been in satisfactory use in similar service for not less than five (5) years.
- B. UL and NEMA Compliances - Provide electric motors, control panels, and electrical components required as part of booster pump equipment, which have been listed and labeled by Underwriters Laboratories and comply with NEMA standards.
- C. NEC Compliance - Comply with National Electrical Code (ANSI/NFPA 70) as applicable to installation and electrical connections of ancillary electrical components of plumbing equipment.

PART 2 - PRODUCTS

2.01 SANITARY LIFT STATION NO: 1

- A. Sewage Pumps: The Contractor shall furnish and install as shown on the drawings EBARA Model EBHG-51-2A duplex sealed submersible grinder pumps. Each pump shall have a capacity of 55 GPM at 105 ft. total head. Each pump shall be furnished with a 3" flanged discharge. The pump casing shall be of high tensile strength cast iron. The brass impeller shall be of the recessed vortex type, non-overloading design. The impeller shall be dynamically balanced before it is secured to a 416 stainless steel pump shaft. The grinder shall be capable of grinding all materials found in normal domestic sewage, including plastics, rubber, sanitary napkins, disposable diapers, and wooden articles into a finely ground slurry. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance. An automatic alternator shall be furnished on duplex pumps to allow the pumps to alternate on each successive cycle of operation. The pumps are to be driven by a standard 5 horsepower, 240 volt, 1 phase, 60 hertz, 3450 RPM sealed submersible motor. Equipment to be as manufactured by EBARA or approved equal.
- B. Duplex Lifting Guide Rail System: Provide a lift-out system for each pump with ball check valve and EBARA Model RS3-H quick disconnect assembly, EBARA Model UGB-SS and IGB-SS guide brackets and 1 ¼" stainless steel guide rails, gate valves and gate valve extensions. The pumps are to be provided with cables to allow removing the pumps for service. Contractor shall provide piping from the quick disconnect fitting, located at the bottom of the pit, to the point where the piping exits the pit, as well as all required check valves and shutoff valves. See detail on drawings.
- C. Sump basin: Reinforced concrete 60" diameter x 180" deep with steel gas type cover plate; complete with vent, and 24x36" stainless steel access door equal to Halliday Products Series

H1R. Access door shall have auto-lock T-316 stainless steel hold open arm with release handle, T-316 SS hinges, attaching hardware, T-316 SS slam lock w/ removable key, SS compression spring assist, single leaf construction with H20 load rating, extruded aluminum frame and recessed handle.

2.02 SANITARY LIFT STATION NO: 2

- A. Sewage Pumps: The Contractor shall furnish and install as shown on the drawings EBARA Model EBHG-71 triplex sealed submersible grinder pumps. Each pump shall have a capacity of 30 GPM at 155 ft. total head. Each pump shall be furnished with a 3" flanged discharge. The pump casing shall be of high tensile strength cast iron. The brass impeller shall be of the recessed vortex type, non-overloading design. The impeller shall be dynamically balanced before it is secured to a 416 stainless steel pump shaft. The grinder shall be capable of grinding all materials found in normal domestic sewage, including plastics, rubber, sanitary napkins, disposable diapers, and wooden articles into a finely ground slurry. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance. An automatic alternator shall be furnished on triplex pumps to allow the pumps to alternate on each successive cycle of operation. The pumps are to be driven by a standard 7 1/2 horsepower, 240 volt, 1 phase, 60 hertz, 3450 RPM sealed submersible motor. Equipment shall be as manufactured by EBARA or approved equal.
- B. Triplex Lifting Guide Rail System: Provide a lift-out system for each pump with ball check valve and EBARA Model RS3-H quick disconnect assembly, EBARA Model UGB-SS and IGB-SS guide brackets and 1 1/4" stainless steel guide rails, gate valves and gate valve extensions. The pumps are to be provided with cables to allow removing the pumps for service. Contractor shall provide piping from the quick disconnect fitting, located at the bottom of the pit, to the point where the piping exits the pit, as well as all required check valves and shutoff valves. See detail on drawings.
- C. Sump basin: Reinforced concrete 60 inches diameter x 192 inches deep with steel gas type cover plate; complete with vent, and 24 by 42 inches stainless steel access door equal to Halliday Products Series H1R. Access door shall have auto-lock T-316 stainless steel hold open arm with release handle, T-316 SS hinges, attaching hardware, T-316 SS slam lock w/ removable key, SS compression spring assist, single leaf construction with H20 load rating, extruded aluminum frame and recessed handle.

2.03 DUPLEX AND TRIPLEX SANITARY LIFT STATION CONTROL PANELS:

- A. Each lift station shall be provided with a NEMA 3R control panel complete with all floats and components necessary for proper operation of lift station. The panel shall be designed for 240 volt, single-phase, 60 Hertz power.
- B. Provide properly sized Main Lugs, mounted near the top of the enclosure, for incoming power. In addition, provide a service entrance Lightning Arrestor (LA) and Power Monitor (PM), both per Component Specifications. During power monitor failure, no three phase motors shall be allowed to operate.

- C. Provide a properly sized circuit breaker combination motor starter with NEMA Class 10, ambient compensated overload protection for each pump. The pumps shall be controlled

by a Duplex or Triplex Pump Controller as described below. The pump supplier shall provide all information required for the proper selection of start capacitors, run capacitors and start relays for each motor. In addition, provide the following additional equipment and controls.

- D. The Pump Controller shall receive stop and start commands based upon the level in the station wet well as sensed by the float switches. Provide an Elapsed Time Meter for each pump to indicate pump total run time. Controller sequencing is detailed below.
- E. Float switches shall be a direct acting switch and contain a single pole mercury switch, which activates when the longitudinal axis of the float is horizontal and deactivates when the liquid level falls 1 inch below the actuation elevation. The float shall have a chemical resistant polypropylene casing with a firmly bonded electrical cable protruding. One end of the cable shall be permanently connected to the enclosed mercury switch and the entire assembly shall be capsulated to form a completely watertight and impact resistance unit. Float shall include a bracket for support pipe mounting. Provide the following float switches and control points:
 - 1. High Level Alarm
 - 2. Lag 2 Start
 - 3. Lag 1 Start
 - 4. Lead Start
 - 5. All Stop
- F. Provide 120 volt, 20 Amp circuit breaker for Control Power and Alarm Light.
- G. Provide a weatherproof exterior common Alarm Light with red Lexan lens mounted on side of enclosure. The alarm light shall burn dim during normal conditions to indicate "Power On" and "Light Bulb Good" and shall flash brightly during any alarm condition.
- H. Panels shall be provided with Lightening Arrestors. Arrestor shall be Silicon Oxide Varistor type, having current rating of 100,000 Amperes and 3,000 Joules maximum energy per pole. Response time to clamp 100 amps shall be 10 nanoseconds; response time to clamp 50,000 amps shall be 25 nanoseconds.
- I. Pump Controller: Provide a duplex or triplex NEMA 3R pump controller, including the following features for each pump
 - 1. Operators and Indicators:
 - a. Manual-Off-Automatic selector switch
 - b. Green "Running" pilot light
 - c. Red "Failure" pilot light
 - d. Red "Seal Failure" pilot light
 - e. Green pump "Start" pilot lights for pumps.
 - f. Amber pump "Stop" pilot lights for pumps.
 - 2. Level Inputs:
 - a. Individual "Start" and "Stop" level control points shall be provided for each pump or field adjustable controls shall be provided to allow the first "Stop" level control point to stop all of the pumps.
 - b. Provide a High liquid level alarm input sensing point, as required for the application.

- c. Provide pilot light indicators for each level input sensing point.
 - d. Provide manual override inputs for each pump, which can be used to override the triplex controller's pump call-for outputs when the controls are in the Automatic mode. Inputs shall be provided to start or stop each pump from a remote location.
 - e. All pump control inputs shall be optically isolated and their power limited to 24 Vdc with a maximum current of 16 mAdc for intrinsic safety.
3. Pump Sequencing:
- a. Automatic pump alternation on lead pump cycle. Pump alternation shall be field selectable to alternate on a first pump "ON", first pump "OFF" basis or on a last pump "ON", first pump "OFF" basis.
 - b. The pumps shall also alternate as lead pump, when the lead pump reaches a field adjustable running period, which shall have a time range from 10 minutes to 21 hours.
 - c. Provide a field adjustable failure time delay for each pump. If a pump fails to run, or if that pump's selector switch is placed in the off position, provide controls to start the next pump in the sequence at the failed or disabled pump's operating call-for input setting.
 - d. If a pump fails to run, that pump shall automatically become the last called for pump in the operating sequence. Normal pump alternation shall resume when the failure condition is corrected and the failed pump has been reset.
 - e. Provide individual field adjustable time controls to delay starting each pump in the automatic mode after power failure or during initial start.
 - f. Provide stagger stop feature to require the pumps to stop a minimum of two (2) seconds apart during the condition that two or more pumps are running when signaled to stop. Provide stagger start feature to start the pumps a minimum of three (3) seconds apart during conditions that two or more pumps are called for simultaneously.
 - g. Provide controls to remove any pump(s) from the alternating sequence, making the removed pump(s) the last pump(s) to be called for if the input conditions require it.
 - h. Pump failure, Seal failure, High-level alarm, and Improper Sequence alarm red pilot lights shall flash when activated.
 - i. Provide automatic controls to alternate pumps on Pump Failure, Seal Failure, or when a pump is running in Automatic and is manually turned off.
 - j. When pump seal failures are not needed, the seal failure circuitry for each pump shall be able to indicate an auxiliary condition by flashing or steady operation without interfering with the controller operation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Pumps shall be installed as per manufacturer's written instructions.
- B. All tests shall be conducted in the presence of, and to the satisfaction of the authority having jurisdiction and the Engineer, each of whom shall be notified seven (7) days in advance of any such tests.

3.02 ADJUSTING AND CLEANING

- A. Check alignment, and where necessary, realign shafts of motors and pumps within recommended tolerances by manufacturer, and in presence of manufacturer's service representative.
- B. Lubricate pumps before startup. Startup shall be in accordance with manufacturer's instructions.
- C. Clean factory finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch up paint.

3.03 STARTUP

- A. Provide the services of a factory engineer, for a minimum of one day per sewage pump system to train Owner's personnel in the operation and maintenance of each system and to assist in startup of each system.
- B. System shall be operated under loads similar to anticipated demands of the system.

3.04 WARRANTY: Sewage pump systems shall be warranted against defects in material or workmanship for minimum of one (1) year from date of installation.

END OF SECTION

SECTION 22 33 00

ELECTRIC DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. All work specified in this section is subject to the provisions of General Provisions Division 01.
- B. Refer to the following sections for related work in connection with electric water heaters:
 - 1. 22 05 29 Hangers and Supports for Plumbing Piping and Equipment
 - 2. 22 05 53 Identification for Plumbing Piping and Equipment
 - 3. 22 11 13 Facility Water Distribution Piping

1.02 DESCRIPTION OF WORK

- A. The number and size of the electric water heaters are indicated on the drawings and schedules.

1.03 QUALITY ASSURANCE

- A. Manufacturing firms shall be regularly engaged in the manufacture of electric water heaters of type and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.
- B. Provide water heaters which comply with ASHRAE 90.1b-1992 for energy efficiency.
- C. U.L. and NEMA Compliances - Provide electrical components required as part of electric water heaters, which have been listed and labeled by Underwriters Laboratories and comply with NEMA Standards.
- D. NEC Compliance - Comply with the National Electric Code as applicable to installation and electrical connections of ancillary electrical components of electric water heaters.

1.04 SUBMITTALS

- A. Product Data - Submit manufacturer's plumbing equipment specifications, installation and start-up instructions.
- B. Shop Drawings - Submit assembly type shop drawings indicating dimensions, weights, required clearances, and methods of assembly of all components.
- C. Wiring Diagrams - Submit ladder type wiring/diagrams for all components, clearly indicating all required field electrical connections.
- D. Maintenance Data - Submit maintenance data and parts lists for each item of accessory equipment. Include "trouble-shooting" maintenance guides. Include this data in maintenance manual.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Electric water heaters shall be of same manufacturer. Refer to schedule for heater sizes, capacities, electrical characteristics and element operation.

2.02 ELECTRIC INSTANTANEOUS HEATER

- A. Electric instantaneous point of use water heater shall have cast aluminum alloy housing, with heating coils to be flow switch operated. Contractor shall coordinate heater housing size with available space within multi-lav. units being furnished on project and provide compatible heater.
- B. Provide flow control fitting at inlet of heater. Provide ball valve at inlet and outlet of heater.
- C. Instantaneous heater shall be equal to Eemax, Inc.

PART 3 - EXECUTION

3.01 INSTALLATION OF WATER HEATERS

- A. Install water heaters as indicated, in accordance with manufacturer's installation instructions, and in compliance with applicable codes.
- B. Connections - Make connections between water heaters and domestic water piping shutoff valves with unions or flanges as indicated. Provide dielectric isolation at all tank connections.
- C. Identification - Provide sign securely attached to water heater identifying equipment number, service and capacity. Provide valve tags on all valves and provide identification on all piping connections to water heaters.
- D. Testing - Upon completion of installation, pressure test water heaters hydrostatically to assure structural integrity and freedom from leaks.
- E. Disinfection and Flushing - Disinfect in accordance with potable water piping requirements and flush water heaters upon completion of installation in accordance with manufacturer's instructions, and comply with applicable health codes.

END OF SECTION

SECTION 22 42 00

COMMERCIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.01 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.
- B. All work specified in this Section is subject to the provisions of General Provisions Division 01.

1.02 DESCRIPTION OF WORK

- A. Extent of plumbing fixtures and trim work is indicated by drawings and schedules, and by requirements of this section.
- B. Refer to Division-26 sections for electrical connections to water coolers and other plumbing fixtures; not work of this section.

1.03 QUALITY ASSURANCE

- A. Manufacturing: Firms shall be regularly engaged in the manufacturing of plumbing fixtures of the type, style and configuration required, whose products have been in satisfactory use in similar service for not less than five (5) years.
- B. Comply with applicable portions of the Plumbing Code, latest edition, pertaining to materials and installation of plumbing fixtures.
- C. Comply with applicable ANSI standards pertaining to plumbing fixtures and systems, and bathtub units.
- D. Comply with ANSI A117.1 standard and the Americans with Disabilities Act (ADA) pertaining to plumbing fixtures for handicapped.
- E. Comply with standards established by Plumbing and Drainage Institute pertaining to plumbing fixture supports.
- F. Comply with applicable FS WW-P-541/-Series sections pertaining to plumbing fixtures.
- G. Provide water coolers which are rated and certified in accordance with applicable Air Conditioning and Refrigeration Institute standards and are listed by Underwriter's Laboratories.

1.04 SUBMITTALS

- A. Submit manufacturer's specifications for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished, roughing-in dimensioned drawings, templates for cutting substrates, fixture carriers, and installation instructions.
- B. Submit maintenance data and parts lists for each fixture type and trim item, including instructions for care of finishes. Include this data in maintenance manual.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver plumbing fixtures individually wrapped in factory-fabricated containers.
- B. Handle plumbing fixtures carefully to prevent breakage, chipping and scoring the fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.
- C. Fixtures shall be protected after installation to prevent scratches, dents, surface mar or any other damage during the course of construction.

PART 2 - PRODUCTS

2.01 PLUMBING FIXTURES

- A. Provide factory-fabricated fixtures of type, style and material scheduled on drawings. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete installation. Where more than one type is indicated, selection is Installer's option; but, all fixtures of same type must be furnished by single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.
- B. Fixture color shall be white unless noted otherwise.

2.02 MATERIALS

- A. Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface imperfections on finished units are not acceptable.
- B. Where fittings, trim and accessories are exposed or semi-exposed, provide bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.

2.03 PLUMBING FITTINGS, TRIM AND ACCESSORIES

- A. At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves, or dispensing devices, of type and size indicated, and as required to operate as indicated. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shut-down of water supply piping systems.
- B. Include removable P-traps where drains are indicated for direct connection to drainage system.
- C. Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.
- D. Where fixture supplies and drains penetrate walls in exposed locations, provide chrome plated cast-brass escutcheons with set screw.
- E. Provide aerators on all faucet sets of types approved by Health Departments having jurisdiction.
- F. Comply with additional fixture requirements contained in fixture schedule.

2.04 MANUFACTURERS

A. Subject to compliance with requirements, provide plumbing fixtures and trim of one of the following:

1. Plumbing Fixtures
 - American Standard, U.S. Plumbing Products
 - Eljer Plumbing-ware Division, Wallace-Murray Corporation
 - Kohler Company
 - Bradley Corp.
 - Acorn Engineering Co.

2. Plumbing Trim
 - American Standard, U.S. Plumbing Products
 - Eljer Plumbing-ware Division, Wallace-Murray Corporation
 - Kohler Company
 - T & S Brass and Bronze Works, Inc.
 - Eastman Brasscraft
 - McGuire Manufacturing Co.

3. Flush Valves
 - Toto
 - Sloan Valve Company
 - Zurn Industries, Inc., Hydromechanics Div.

4. Fixture Seats
 - Bemis Mfg. Co.
 - Beneke Corp., Div. of Beatrice Foods
 - Church
 - Olsonite Corp., Olsonite Seats

5. Water Coolers
 - Oasis
 - Elkay Mfg. Co.
 - Halsey Taylor Div.
 - Haws Drinking Faucet Co.

6. Service Sinks/Mop Sinks
 - Fiat Products, Unit of Mark Control Corp.
 - Stern-Williams Co., Inc.

7. Fixture Carriers
 - Josam Mfg. Co.
 - J.R. Smith
 - Wade
 - Zurn Industries, Inc., Hydromechanics Div.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION

- A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the Plumbing Code pertaining to installation of plumbing fixtures.
- C. Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid, and not subject to pull or push movement.
- D. Where fixtures are mounted against or abut walls, caulk along fixture.

3.02 CLEAN AND PROTECT

- A. Clean plumbing fixtures of dirt and debris upon completion of installation.
- B. Protect installed fixtures from damage during the remainder of the construction period.

3.03 FIELD QUALITY CONTROL

- A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.
- B. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match shall be judged by Architect. Remove cracked or dented units and replace with new units.

3.04 EXTRA STOCK

- A. Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt. Furnish one (1) device for every ten (10) units.

END OF SECTION

SECTION 23 05 10

HVAC GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This division and the accompanying drawings cover furnishing of all labor, equipment, appliances, and materials and performing all operations in connection with the installation of complete air conditioning, ventilating, and heating systems as specified herein and as shown on the drawings.
- B. The general provisions of the contract including the Conditions of the Contract (General, Supplementary and other conditions) and other divisions as appropriately apply to work specified in this division.

1.02 CODES, ORDINANCES, AND PERMITS

- A. All heating, ventilating and air conditioning materials and workmanship shall comply with the following codes and standards as applicable:
 - 1. The National Electric Code (2005 Edition)
 - 2. The International Fuel Gas Code (2006 Edition)
 - 3. The International Building Code (2006 Edition)
 - 4. The International Mechanical Code (2006 Edition)
- B. Applicable Publications: The publications listed below form a part of this specification to the extent referenced and are referred to in the text by the basic designation only.
 - 1. Air Conditioning and Refrigeration Institute Standards (ARI)
 - 2. American National Standards Institute, Inc. Standards (ANSI)
 - 3. American Society for Testing and Materials Publications (ASTM)
 - 4. American Gas Association Inc. Laboratories (AGA)
 - 5. American Society of Mechanical Engineers Code (ASME)
 - 6. Factory Mutual Underwriters (FM)
 - 7. National Fire Protection Association Standard (2003)
 - 8. Sheet Metal and Air Conditioning Contractor's National Association Inc. (SMACNA)
 - 9. Underwriters Laboratories Inc. (UL)
- B. All work done under this Contract shall comply with all state and local code authorities having jurisdiction and with the requirements of the Utility Companies whose services may be used. All modifications required by these codes and entities shall be used made by the Contractor without additional charges. Any conflict between these documents and the governing codes shall be immediately brought to the attention of the Engineer of Record. Where code requirements are less than those shown on the Plans or in the Specifications, the Plans and Specifications shall be followed. Where applicable, N.F.P.A. requirements shall be met.
- C. The Contractor shall obtain all permits, inspections, and approvals as required by all authorities having jurisdiction, and deliver certificates of approval to the Architect. All fees and costs of any nature whatsoever incidental to these permits, inspections and approvals shall be assumed and paid by the Contractor.
- D. The Contractor shall comply with all applicable provisions of the William-Steiger Occupational Safety and Health Act (O.S.H.A.).

1.03 APPLICABILITY

- A. The work specified herein shall include all labor, materials, equipment, tools, supplies and supervision required to install and place in operation the mechanical systems and appurtenances specified herein and/or indicated on the drawings or reasonably implied as necessary for completion of the various systems.

1.04 TEMPORARY HVAC

- A. New HVAC equipment, i.e. air handling units, fans, thru wall heat pumps, condensing units, etc. shall not be placed into service until the facility has been turned over to the Owner. All HVAC equipment warranties shall start on the day of the Owner's acceptance of the facility.

NOTE: The temporary use of the building HVAC systems during the construction period SHALL NOT be permitted with the following exceptions:

1. HVAC systems may be placed in operation only when temperature and humidity control is critical for the installation of final finishes, i.e. interior painting, ceilings, hardwood floors, paneling, etc. All air systems must be equipped with heavy duty, high efficiency air filters. Each air system shall be checked on a daily basis to determine the filter status. Refer to Section 23 41 00 "Particulate Air Filtration" and air handling equipment schedules in these documents for filter types, sizes and capacities.
2. HVAC systems must be operational during the time required for the TAB Sub-contractor to do the final testing, adjusting and balancing.

The above exceptions shall be permitted only at a point in time when the building has been cleared of all debris and swept clean and all air systems are fitted with high quality, construction grade air filters. The Architect and/or Engineer shall also be notified of any and all temporary use of the HVAC systems and shall be documented by the General Contractor. NO EXCEPTIONS.

NOTE: HVAC systems SHALL NOT be in operation when sheet rock sanding is being performed.

- B. If space conditioning is required before the above conditions are satisfied, such space conditioning shall be the responsibility of the Contractor. If the Contractor elects to utilize the permanently installed building HVAC systems to provide the space conditioning, it shall be the responsibility of the General Contractor to ensure that the required warranty periods for all equipment provided are effective from the date of acceptance of the project.

1.05 COORDINATION OF HVAC DOCUMENTS

- A. The HVAC work listed in these documents shall be coordinated with the work indicated on all other drawings, schedules, schematics, and specifications that are part of these construction documents. Should a conflict occur, the contractor shall submit a request for clarification to the engineer prior to bid opening. NO ALLOWANCES shall be made for any assumptions made by the contractor or any sub-contractors that are in direct conflict with the intent of the construction documents; in the event a conflict is discovered after construction has commenced, the resolution of the conflict shall be decided by the Engineer of Record, whose interpretation of the documents shall be final.

1.06 WELDERS QUALITY ASSURANCE

- A. All welders shall be certified by ANSI B31.1.0-1967 "Standard Qualification Welding Procedures, Welders and Welding Operators" or Qualification Tests" in Section IX, ASME Boiler and Pressure Vessel Code. Welder performance qualification tests shall be made in strict accordance with the above codes. Welders shall be certified for the type of pipe material specified herein. All costs incident to procedures and welder's qualification tests shall be assumed by the Contractor. Two copies of the qualification test report and certification with the welder's identification number, recommendation letter, etc. shall be delivered to the Architect before any welding commences.

PART 2 - PRODUCTS

2.01 COORDINATION OF PRODUCTS

- A. The products of particular manufacturers have been used as the basis of design in preparation of these documents. Any modifications to the mechanical systems and their components, the electrical systems, the building structure and architecture, or any other portion of the building that result from the use of any other than the basis of design equipment shall be coordinated with all other trades. Such coordination shall occur before shop drawing submittals and shall be clearly indicated on the shop drawings. Any related modifications shall be the responsibility of the contractor and shall be performed without any additional cost to the Contract.

2.02 DESCRIPTION

- A. All components of the mechanical systems shall be new. All equipment and products for which independent laboratory testing and labeling is applicable and/or required shall bear the Underwriter's Laboratories, Inc. (UL) label.

PART 3 - EXECUTION

3.01 GENERAL

- D. The Contractor shall provide and prepare all openings for ducts and other HVAC work as required in walls, roof, ceilings, etc.; he shall also do all painting as may be required. He shall coordinate the installation of all mechanical equipment in the exterior wall and roof.
- B. The HVAC plans do not give exact elevations or locations of lines, nor do they show all the offsets, control lines, or other installation details. The Contractor shall carefully lay out his work at the site to conform to the structural conditions, to provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and to thereby provide an integrated, coordinated and satisfactorily operating installation.
- C. If the Contractor proposes to install equipment, including piping and ductwork, requiring space conditions other than those shown, or to rearrange the equipment, he shall assume full responsibility for the rearrangement of the space and shall have the Architect review the change before proceeding with the work. The request for such changes shall be accomplished by Shop Drawings of the space in question, including plans, sections, elevations, etc., sufficient to indicate that the revised layout will fit and allow for required access to clearance.

- D. The Contractor is responsible for the proper location and size of all slots, holes or openings, in the building structure pertaining to his work, and for the correct location of sleeves, inserts, cores, etc.
- E. The Contractor shall so coordinate the work of the several various trades that it may be installed in the most direct and workmanlike manner without hindering or handicapping the other trades. Piping interference shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. For example sewer lines and condensate piping shall take precedence over water lines in determination of elevations. Where there is interference between sewer lines and condensate lines, the sewer lines shall have precedence and provisions shall be made in the condensate lines for looping them around the sewer lines. In all cases, lines requiring a stated grade for their proper operation shall have precedence over electrical conduit and ductwork.
- F. Except where otherwise noted, all piping and ductwork in finished areas shall be installed in chases, furred spaces, above ceilings, etc. In all cases, pipes and ducts shall be installed as high as possible. Runs of piping shall be grouped whenever it is feasible to do so.
- G. The Electrical Contractor shall bring adequate power to and make final connections to all equipment furnished under this contract. All control wiring shall be by the Controls Contractor.
- H. Piping, equipment, or ductwork shall not be installed in electrical equipment rooms except as serving only those rooms. Outside of electrical equipment rooms, do not run piping or ductwork, or locate equipment, with respect to switchboards, panel-boards, power panels, or dry type transformers:
 - 1. Within 42 inches in front (and rear if free standing) of equipment; or
 - 2. Within 36 inches of sides of equipment,
 - 3. Clearances apply vertically from floor to structure.
 - 4. Provide access to equipment and apparatus requiring operation, service or maintenance within the life of the system. Including, but not limited to, motors, valves, filters, dampers, shock absorbers, etc. Equipment located above lay-in type ceilings is considered accessible.

3.02 ELECTRICAL WORK

- A. All electrical equipment provided under this Division shall comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 26.

3.03 PROTECTION OF EQUIPMENT

- A. Store equipment, including pipe and valves, off the ground and under cover. For storage outdoors, minimum 4-mil thick plastic shall be fitted to withstand splattering, ground water, precipitation and wind.
- B. Protect air handling units coil by use of protective sheet metal panels or plywood.
- C. Plug ends of pipe when work is stopped and close ends of ducts with plastic taped in place until work resumes.
- D. Damaged equipment shall be repaired or replaced at the option of the Engineer of Record.

3.04 PAINTING

- A. Factory painted equipment that has been scratched or marred shall be repainted to match original factory color.
- B. All un-insulated black ferrous metal items exposed to sight inside the building, such as piping, equipment hangers and supports not provided with factory prime coat, shall be cleaned and painted with one coat of rust inhibitor primer. In addition, such items in finished spaces shall also be painted with two coats of finish paint in a color to match adjacent surfaces or as otherwise selected by the Architect.
- C. Black ferrous metal items exposed outside the building, such as un-insulated pipe and pipe supports not provided with factory prime coat, shall be cleaned and painted with one coat of rust inhibiting primer and two coats of an asphalt base aluminum paint. Insulated pipes outside the building shall be cleaned and painted with one coat of rust inhibiting primer before installing insulation.
- D. In lieu of painting hanger rods, cadmium plated or galvanized rods may be furnished.
- E. No nameplates or equipment shall be painted, and suitable protection shall be afforded to the plates to prevent their being rendered illegible during the painting operation. Labels shall also be protected from becoming illegible due to weathering.
- F. Galvanizing broken during construction shall be re-coated with cold galvanizing compound.
- G. All ductwork, piping, insulation, conduit or other appurtenances visible from finished spaces through grilles, diffusers or other such required openings shall be painted flat black.

3.05 PROTECTION OF EXISTING UTILITIES

- A. The Contractor shall use extreme caution during excavation operations not to damage or otherwise interrupt the operations of existing utilities. The Contractor shall be responsible for the continuous operation of these lines and shall provide bypasses or install such shoring, bracing, or underpinning as may be required for proper protection.

3.06 CUTTING AND PATCHING

- A. The Contractor shall assume all cost of, and be responsible for, arranging for all cutting and patching required to complete the installation of his portion of the Work. All cutting shall be carefully and neatly done so as not to damage or cut away more than is necessary of any existing portions of the structure.
- B. All surfaces shall be patched to the condition of the adjacent surfaces.
- B. The Contractor shall make suitable provisions for adequately water-proofing at his floor penetrations of water proof membrane floors. This shall include but not be limited to floor drains, open sight drains, hub drains, clean-outs, and sleeves for the various piping. This also applies to membrane roofing systems.

3.07 SLEEVES, FLOOR AND CEILING PLATES

- A. The Contractor shall install, as required, in concrete, carpentry or masonry construction, all necessary hangers, sleeves, expansion bolts, inserts and other fixtures and appurtenances necessary for the support of all pipe, duct, equipment and devices furnished under each section of the Specification.

- B. Cutting of openings and installation of sleeves or frames through walls and surfaces shall be done in a neat workmanlike manner. Openings shall be cut only as large as required for the installation; sleeves, except as otherwise indicated, and/or frames shall be installed flush with finished surfaces and grouted in place. Surfaces around opening shall be left smooth and finished to match surrounding surface.
- C. Where pipes pass through floor slabs, sleeves shall be standard weight black steel pipe with top of sleeve 3 inches above finished floor. Where pipes pass through walls, sleeves shall be standard weight black steel pipe or 20-gage galvanized sheet metal with ends flush with wall surfaces.
- D. Each pipe or duct passing through walls, floors, ceilings or partitions shall be provided with sleeves having internal diameter one inch larger than the outside dimensions of insulated pipes or ducts.
- E. All pipe sleeves through floors, roofs and masonry walls shall be built in place as the affected walls, floors, and roofs are built.
- F. All penetrations through rated walls and floors shall be packed, sealed and encapsulated per the applicable U.L. details(s).
- G. Sleeves through exterior wall shall be steel or cast iron pipe, flush with the exterior surfaces, and with the space between the pipe and the sleeves caulked watertight in an approved manner.
- H. Inserts shall be cast iron or galvanized steel individual type, with accommodations for removable nuts and threaded rods up to 3/4 inch diameter, and permitting lateral adjustment.

3.08 ESCUTCHEONS

- A. Escutcheons shall be installed on all pipes where they pass through floors, ceilings, walls, or partitions in finished areas.
- B. The interior of closets, adjacent to finished areas, shall be considered as finished for the intent of these Specifications.
- C. Escutcheons shall be split, hinged, stamped brass type designed to fit the pipe, and to cover the terminating pipe sleeve, in chrome plated finish unless otherwise specified, with securing device to hold the escutcheon tight to the pipe.

3.09 CLEANING

- A. Flush new water piping systems until water runs clean. Mild chemical cleaning may be required. If so, flush all cleaning chemicals out of the piping system before recharging with water.
- B. Remove all stickers, rust, stains, labels, and temporary covers before final acceptance.
- C. The exterior surfaces of all mechanical equipment, piping, ducts, etc., shall be cleaned of all grease, oil, paint, dust and other construction debris.
- D. Ducts, plenums and casings shall be cleaned of all debris and blown free of all particles of rubbish and dust before installing outlet faces.

- E. Bearings that require lubrication shall be lubricated in accordance with the manufacturer's recommendations. Provide written certification of lubrication.
- F. Equipment rooms shall be left broom clean.
- G. Any fans operated during construction shall have temporary filters. Temporary filters shall be changed regularly to prevent contamination of the equipment and duct systems. Permanent filter shall be installed prior to final inspection.
- H. End of open ducts and pipes shall be covered during construction except when working directly on such one prohibits covering. Cover with minimum four (4) mil thick polyethylene taped, tied or wired in place.
- I. Clean and polish identification plates.

3.10 EQUIPMENT, MATERIALS AND BID BASIS

- A. It is the intention of these Specifications to indicate a standard of quality for all material incorporated in this work. Manufacturer's names are used to designate the item of equipment or material as a means of establishing grade and quality. Where several manufacturers are named, only these manufacturers' products will be considered and the Contractor's bid shall be based on their products. Other named manufacturers, although acceptable as manufacturers, must prove their product will perform satisfactorily and will meet space requirements, etc., and shall obtain pre-approval of their equipment, before submitting shop drawings, when their equipment achieves the required results in a manner different than that of the first named manufacturer. Where only one manufacturer is named, unless the Specifications state otherwise, manufacturers of similar quality products will be considered. Such unnamed manufacturer's products will, however, be considered as substitutions and shall not be used as a basis for bidding. In the event the Contractor wishes to submit substitutions to the Architect for review prior to bid, he shall furnish descriptive catalog material, text data, samples, etc., as well as any other pertinent data necessary to demonstrate that the proposed substitutions are acceptable equals to the specified product. No substitutions shall be made without the written consent of the Architect.
- B. The use of one named manufacturer in the schedules on the Drawings is for guide purposes. The provisions of the above paragraph will govern in the selection of products to be used.

3.11 GUARANTEE

- A. All systems and components shall be provided with a one year guarantee from the time of final acceptance or beneficial occupancy (Coordinate with the Architect). The guarantee shall cover all materials and workmanship. During this guarantee period, all defects in materials and workmanship shall be corrected by repair or replacement without incurring additions to the Contract.
- B. All air conditioning compressors shall be guaranteed for an additional four years. This additional guarantee shall be non-prorated on all parts, refrigerant, and labor.

3.12 FOUNDATIONS

- A. All concrete foundations required by equipment furnished under the HVAC Division shall be constructed in conformance with the recommendations of the manufacturer of the respective equipment actually applied, and with the approval of the Architect. All corners of the foundations shall be neatly chamfered. Foundation bolts shall be placed in the forms when the concrete is poured. Allow 1 inch below the equipment bases for alignment, leveling and grouting with non-shrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary. After removal of the forms, the surface of the foundation shall be rubbed. Unless otherwise noted, foundations shall be four inches 4 inches – 6 inches high. All concrete work performed shall conform entirely to the requirements of the General Specifications that describe this class of work.

3.13 RECORDS AND INSTRUCTIONS FOR OWNER

- A. The Contractor shall accumulate during the job's progress the following data in triplicate prepared in neat brochures or packet folders and turned over to the Architect/Engineer for check and subsequent delivery to the Owner:
1. Provide all warranties and guarantees, manufacturer's directions and material covered by the Contractor.
 2. Provide approved fixture brochures, wiring diagrams, and control diagrams.
 3. Provide copies of approved shop drawings.
 4. Three sets of operating instructions for heating and cooling and other mechanical systems. Operating instructions shall also include recommended periodic maintenance and seasonal changeover procedures, and suggested procedures in operation of all systems in this particular building to promote energy conservation. These instructions must be written expressly for this project and shall refer to equipment, valves, etc., by mark number from project schedules. Operating instructions and procedures shall be submitted in draft form, for approval prior to final issue of complete brochures. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.
 5. Any and all other data and/or drawings required during construction.
 6. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.
 7. Valve tag charts and diagrams specified elsewhere herein.
- B. All of the above data shall be submitted to the Architect/ Engineer for approval at such time as the Contractor asks for his last estimate prior to his final estimate, but in no case, less than two weeks before final inspection.
- C. The Contractor shall also give not less than 4 hours of operating instructions, during the adjustment and testing period, to the Owner's operating personnel in order to familiarize them with the proper care and operation of the equipment. The written operating instructions referred to in paragraph above shall be used as a basis for this on-the-job instruction.
- D. A competent technician employed by the Temperature Control Subcontractor shall be required to instruct the Owner in proper operating procedures and shall explain the significance of the temperature control literature filed in the maintenance manual over a period of 4 hours while the system is in continuous operation as specified above.

3.14 RECORD DRAWINGS

- A. The Contractor shall maintain on a daily basis at the project site a complete set of "Record Drawings" reflecting an accurate dimensional record of all buried or concealed work. In addition, the "Record Drawings" shall be marked to show the precise location of concealed work and equipment, including concealed or embedded piping and valves and all changes and deviations in the Mechanical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect. The "Record Drawings" shall consist of a set of mylar sepia prints of the Contract Drawings for this Division with the Engineer's seal and Engineer's firm name removed or blacked out. Prior to commencing work the Contractor shall purchase from the Architect a set of mylar sepia prints to be used for the "Record Drawings".
- B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two (2) dimensions to permanent structures.
- C. The Contractor shall mark all "Record Drawings" on the front lower right hand corner with a rubber stamp impression that states the following:

"RECORD DRAWINGS – "3/8" inch high letters to be used for recording field deviations, and "5/16"inch high letters to be used for dimensional data only.

3.15 INSTALLATION

- A. All equipment shall be installed in strict conformance with manufacturer's recommendations, as specified herein. If any conflict arises between these instructions, notify the Engineer immediately for clarification.

3.16 VALVE CHART AND LABELS

- A. Contractors shall prepare and install in suitable glazed frame typewritten valve charts giving the number, location and function of each line valve installed under this contract. They shall also install on each valve stem a stamped one and one-half inch (1-1/2") diameter brass tag plainly numbered corresponding to the number indicated on the above chart. Tags shall be secured to valves by heavy figure eight hooks.

3.17 ACCESS DOORS

- A. Furnish and install access doors at each point required to provide access to concealed valves, clean-outs, fire dampers and other devices requiring operation, adjustment, or maintenance. Access doors shall be 16 gauge steel, prime coat finish, with mounting straps, concealed hinge and screwdriver locks, designed for the doors to open 180 degrees.
- B. Access doors installed in firewalls or partitions shall be UL Labeled to maintain the fire rating of the wall or partition.
- C. Access doors shall be provided under this section of the specifications and furnished to the General Contractor to be installed.
- D. Access doors shall be MILCOR or approved equal in accordance with the following:
 - 1. Style AT Door for Acoustical Tile Ceilings
 - 2. Style AP Door for Acoustical Plaster Ceilings
 - 3. Style K Door for Plastered Wall and Ceiling Surfaces

4. Style DW Door for Drywall
5. Style ATR for Suspended Drywall Ceilings
6. Style M Door for Masonry, Ceramic Tile, Etc.
7. Fire-Rated 1-1/2 hr. (B-label) Door where required.
8. Security access doors for all security walls and ceilings shall have minimum 3/16 inch by 2 inches by 2 inches welded steel frame with 10 gauge door panel and heavy duty stainless steel hinge welded to door and frame. Door shall have detention type deadbolt lock.

- E. Size and type shall be as required for proper service and/or as may be directed by the Architect.
- F. Access door finish shall be chemically bonded to steel with a prime coat of baked on electrostatic powder. Color shall be as selected by Architect.

3.18 FLAME SPREAD AND SMOKE DEVELOPED PROPERTIES OF MATERIALS

- A. Materials and adhesives used throughout the mechanical and electrical systems for insulation, and jackets or coverings of any kind, or for piping or conduit system components, shall have a flame-spread rating not over 25 without evidence of continued combustion and with a smoke developed rating not higher than 50. If such materials are to be applied with adhesives, they shall be tested as applied with such adhesives, or the adhesives used shall have a flame-spread rating not over 25 and a smoke developed rating not higher than 50. (Note: Materials need not meet these requirements where they are entirely located outside of a building and do not penetrate a wall or roof, and do not create an exposure hazard.)
- B. "Flame-Spread Rating" and "Smoke Developed Rating" shall be as determined by the "Method of Test of Surface Burning Characteristics of Building Materials," NFPA No. 255, ASTM E84, Underwriter's Laboratories, Inc., Standard". Such materials are listed in the Underwriters' Laboratories, Inc., "Building Materials List" under the heading "Hazard Classification (Fire)".

3.19 EQUIPMENT FURNISHED BY OWNER

- A. The contractor shall unload, uncrate, assemble, and connect any and all equipment shown on the drawings or called out in the specifications to be furnished by the owner for installation by the contractor.
- B. The contractor shall take full charge of such equipment from the time the items are delivered to the job, set in place, connected, tested, adjusted, and placed into operation.

3.20 HAZARDOUS MATERIALS

- A. No products shall be used that contain any known hazardous or carcinogenic materials. Products with asbestos or radioactive content shall not be used.
- B. Handling of any hazardous material is not covered in specification Division 23. Any requirements for such are beyond the scope of this contract and shall be done only by those persons contracted to do so.

END OF SECTION

SECTION 23 05 11

HVAC SUBMITTAL DATA

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, and Section 23 05 10 HVAC General Requirements, apply to all work herein.

1.02 QUALITY ASSURANCE

- A. Shop drawings or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this contract. The Contractor shall submit to the Architect a sufficient number of copies of all such Shop Drawings or catalog data to provide him with as many reviewed copies as he may need, plus two (2) copies for retention; one by the Architect and one by the Engineer.
- B. Before submitting Shop Drawings to the Architect for review, the Contractor shall examine them and satisfy himself that they are correctly representative of the material or equipment to which they pertain. The Contractor shall so note these Drawings before submitting them. The Contractor's review of the Shop Drawings is not intended to take the place of the official review by the Architect. Any Shop Drawings which have not been reviewed by the Architect shall not be used in fabricating or installing any work.
- C. The review of Shop Drawings or catalog data by the Architect shall not relieve the Contractor from responsibility for deviations from the Plans and Specification unless he has, in writing, specifically called attention to such deviations at the time of submission and has obtained the permission of the Architect. Also, it shall not relieve him from responsibility for error of any kind in Shop Drawings. When the contractor does call such deviations to the attention of the Architect, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.
- D. Verification and assignment of dimensions, quantities, and construction means, methods, sequences or procedures, the correctness of which is set forth in the Contract Documents or submittal, shall be the sole responsibility of the Contractor.
- E. Reproduction of design documents in any portion for use in a submittal is not acceptable.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All products shall be new and bear all labels which are identified by the applicable specification section and Contract Documents.

PART 3 - EXECUTION

3.01 SUBMITTAL DATA

A. General

1. The submittal data to be furnished for this project shall comply with the Specifications and Contract Documents in their entirety. Any submittals herein scheduled are as a minimum only and shall not be construed to limit the submittal data required within the individual Sections of these Specifications.
2. Shop Drawings will be returned unchecked unless the following information is included: Reference to all pertinent data in the Specifications or on the Drawings, such as sound power levels of motor driven equipment where called for in the specifications, electrical characteristics and horse power, capacities, construction material of equipment, UL labels where required, accessories specified, manufacturer, make and model number, weights where specified, starters where required by Division 15, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings. All submitted equipment must be identified on Shop Drawings with the same "Mark Numbers" as identified on Drawings or in Specifications. All pertinent data such as accessories shall also be marked. Any deviation from any part of the Contract Documents shall be clearly and completely highlighted.
3. HVAC and plumbing submittal data shall be bound into separate 3-ring binders, Each HVAC and plumbing volume shall contain one copy of all specified equipment/shop drawing submittals. Each binder shall be provided with an index of materials and an identification tab for each Specification Section that requires submittals. Each item in each tabbed section shall be identified with the paragraph number relating to the item submitted. **FAILURE to provide BOUND AND IDENTIFIED SUBMITTALS will result in the AUTOMATIC REJECTION of the submittal data with NO EXCEPTION.**

B. The bound submittals are to be submitted for review within 30 days after the Contract is awarded. No submittal will be checked until ALL required submittals have been received by the Engineer. Only Automatic Temperature Controls, ductwork and piping fabrication drawings may be submitted after the completed bound submittal is reviewed and accepted by the Engineer.

C. The Contractor shall submit with the bound and identified submittal data a letter signed by the Contractor's Project Manager (or higher level officer of the firm) stating that all electrical characteristics of the mechanical equipment to be supplied has been fully coordinated with the electrical contractor. No submittal data will be checked until this letter is submitted. Any changes to the electrical requirements from the Contract Documents resulting from alternate equipment being submitted shall be performed without any additions to the Contract Sum. Submit attachment and fastening methods for piping and equipment to the Structural Engineer for approval. Shop Drawings shall be submitted for each of the following:

1. Air Handling Units (AHU)
2. Automatic Temperature Controls
3. Backflow Preventers
4. Cleanouts
5. Coils
6. Condensing Units
7. Disconnect Switches

8. Ductwork Accessories
9. Evaporators
10. Fans
11. Furnaces
12. Grilles, Registers and Diffusers
13. Heat Pumps
14. Insulation
15. Louvers
16. Motor Starters
17. Plumbing Drains
18. Plumbing Fixtures, Carriers and Fittings
19. Refrigerant Piping
20. Starters
21. Test, Adjusting and Balancing Reports and Forms
22. Valves
23. Variable Speed Drive Controllers
24. Vibration Isolators
25. Valve Tag Schedule
26. Water Heaters

- D. The Contractor shall submit three copies of a letter, signed by an officer of the company, which states that the items listed below meet or exceed the criterion of the plans and specifications. This letter is to include a listing of each item to be used on the project along with the manufacturer name and model numbers.

1. Flexible Duct
2. Flexible Connectors
3. Ductwork Access Doors and Panels
4. Strainers
5. Combination Test Plugs
6. Vacuum Breakers
7. Heat Cable
8. Filters
9. Humidifiers
10. Louvers
11. Cleanouts
12. Drains
13. Water Supplies and Stops
14. Pipe Hangers and Supports
15. Hydrants
16. Shock Absorbers

3.02 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Description

1. Complete operating and maintenance instructions shall be provided to the Owner. Four (4) separate copies (three for the owner, one for the Architect) shall be provided, and each copy shall be bound in a separate 3-ring, loose leaf notebook. Operating instructions shall be provided for each system, and shall include a brief system description, a simple schematic and a sequence of operation. Operating and maintenance instruction shall be included for each piece of equipment. Manufacturers' Standard literature is acceptable for each piece of equipment. However, the contractor shall prepare a SYSTEM O&M manual including overall system descriptions, operating and energy conservation techniques.

2. A system wiring and control diagram shall be included in the operating and maintenance instruction.
3. Prior to final acceptance or beneficial occupancy, provide the services of a competent representative to instruct the Owner in the operation of all systems for a period of not less than three (3) days. This instruction shall include a complete walk-through of all equipment and systems. The Architect reserves the right to attend any such meeting and shall be duly notified.

3.03 OTHER SUBMITTALS – CLOSEOUT FORMS

- A. Submit two copies of the following prior to occupancy of the project by the Owner. See Contract Closeout Forms – Section 00 65 00.
 1. As built drawings for ductwork, HVAC piping, plumbing and fire protection systems.
 2. Request for final payment.
 3. Letter or “Release of Liens”.
 4. Letter of “Guarantee”.
 5. Submit two (2) copies of welder’s certificate.
 6. Consent of Surety Company to final payment.
 7. Certify disinfection of domestic water service.
 8. Power of Attorney.
 9. Manufacturer's representative shall certify that HVAC equipment and valves are installed in accordance with the manufacturer's recommendations.
 10. Contractor’s Affidavit of Payment of Debts and Claims.

END OF SECTION

SECTION 23 05 13

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE

- A. All electrical work specified in this section shall comply with the provisions of Division 26. All mechanical work specified shall be in accordance with Division 23.
- B. All motors shall be provided as noted herein.
- C. A motor starter shall be provided under this section for each motor including package units which shall be furnished with integral starters. Motor starters shall be installed either in a motor control center or separately mounted adjacent to the motor served as shown, indicated and/or required. Motor starters not provided in the motor control center under Electrical Specifications Division 26, shall be provided.
- D. Motor power wiring is defined as those conductors between the energy source and the motor. This power wiring shall be terminated at motor terminals and will be provided under Division 26 work.
- E. All control wiring required for automatic starting and stopping of motors shall be provided under this Division unless specifically shown on the electrical drawings.
- F. Power wiring will be connected through all line voltage control devices such as firestats and thermostats by Division 26 work.
- G. Smoke detectors by Division 26.
- H. System power wiring to be under Division 26.

PART 2 - PRODUCTS

2.01 STARTERS

- A. The Mechanical Contractor shall provide for each and every motor that is a part of his equipment, a properly sized motor starter. This includes, but is not limited to the following: Air handling unit motors, system controls, pilot lights, push button controls, etc., and shall be furnished complete as a part of the motor apparatus which it operates. All components shall be in conformance with the requirements of the National Electrical Codes (NEC) and Division 26 of this specification. Starters for fractional horsepower motors shall be furnished and installed under Division 26 and as noted herein.
- B. All motor starters shall be turned over to the Electrical Contractor for installation with the following exceptions:
 - 1. Starters for all motors that are ½ horsepower and smaller and are 120 volts, single phase shall be provided and installed by the Electrical Contractor.
 - 2. Motor starters will be furnished and installed in Division 26.

- C. Manual operated motor with magnetic controllers shall be pushbutton type. All automatic controlled motors shall have automatic (H.O.A.) switches. All magnetic starters shall have red and green pilot lights on cover. Power wiring and control circuits shall be run in rigid conduit and shall conform to the NEC standards.
- D. All poly-phase motors and all motors that are automatically controlled shall be furnished with magnetic starters, full voltage, non-reversing type, complete with necessary auxiliary contacts for controls unless otherwise noted. Heaters shall be of the melting alloy type, sized to the exact nameplate running current of the motor. Overloads shall have visual trip indicators and shall be trip-free with reset button held in. All magnetic motor starters or controllers shall be equipped with one overload element in each phase. All starters for 3-phase motors, 3hp/3kw and larger, shall include protection against loss of any one phase or phase reversal and voltage fluctuations.
- E. Starters for motors 1/3 horsepower or smaller shall be manual unless remote or automatic starting is required, in which case the starters shall be magnetic, full voltage, non-reversing, single speed, unless otherwise indicated.
- F. Each starter for a three-phase motor shall be combination magnetic type with circuit breaker and shall be furnished with three (3) overload relays sized for the full load running current of the motor actually provided. Provide an external "RESET" button or "HAND-OFF-AUTO" selector switch as scheduled with red "RUNNING" light. Provide a green pilot light to indicate motor "STOPPED". Each pilot light shall have a legend plate indicating reason for signal.
- G. Each overload relay shall have normally open alarm contact which will close only when actuated by an overload (not to be confused with N.O. or N.C. auxiliary contacts). These contacts shall be properly wired to their respective blue pilot light provided on the starter front cover and having a "TRIPPED" legend plate.
- H. Provide two sets each of normally open and normally closed auxiliary contacts for all magnetic starters. See equipment schedules on plans for voltage requirements.
- I. Individually mounted motor starters shall be in a NEMA Type 1 general purpose enclosure in unfinished areas and shall be flush mounted in all finished areas. Each starter shall have a laminated nameplate to indicate Division 23 unit number, function and circuit number. Outdoor starters shall be rain-tight weatherproof.
- J. All motor starters, push buttons and pilot lights shall be of the same manufacture as the switchboard.
- K. Combination Starters: Combination starters shall consist of a circuit breaker and a motor starter mounted in a common NEMA Type 1 general purpose enclosure. The circuit breaker component shall be a minimum 22,000 RMS interrupting capacity and shall be as required in the Electrical Division.

2.03 MOTORS

- A. Unless specifically noted otherwise in other sections of this Specification, all motors and motor controllers shall meet the requirements specified in this Section. All motors shall be built in accordance with the current applicable IEEE and NEMA standards, and shall have voltage, phase, frequency and service as scheduled.

- B. Each motor shall be suitable for the brake horsepower of the driven unit, rated with 1.15 minimum service factor and shall be NEMA design B. The motor temperature rise shall not exceed 104 deg F. for drip proof motors, 122 deg F. for splash proof motors and 131 deg F. for totally enclosed or explosion proof motors. The motor shall be capable of operating continuously at such temperature rises, and shall be capable of withstanding momentary overloads of 25 percent without injurious overheating.
- C. Each item of motor driven equipment shall be furnished complete with the motors and drives as required to perform the specific function for which it is intended, scheduled, and specified.
- D. Motors shall be ball bearing type selected for quiet operation and shall be manufactured for general purpose duty unless otherwise indicated. Each bearing shall be accessible for lubrication and designed for the load imposed by the V-belt drive or the driven apparatus. Direct drive motors shall be designed for the specific application with all necessary thrust bearings, shaft capacities, etc.
- E. Motors larger than 1/2 horsepower shall have bearings with pressure grease lubrications fittings.
- F. Motors connected to drive equipment by belt shall be furnished with adjustable slide rail bases except for fractional horsepower motors, which shall have slotted bases. Motor leads shall be permanently identified and supplied with connectors.
- G. Each motor to be installed outdoors shall be of the totally enclosed fan-cooled type, or housed in a weatherproof housing.
- H. Unless otherwise indicated, motors smaller than 1/2 horsepower shall be capacitor start or split phase type designed for 120 volt, single phase, 60 cycle alternating current. Shaded pole motors are not acceptable except 35 watts and smaller. Motors 1/2 horsepower and larger shall be squirrel cage induction type, 3 phase, 60 cycle alternating current.
- I. Multi-speed motors shall, except as noted, be consequent pole, variable torque, single winding. When the speed ratios or the load characteristic dictates, the multi-speed motors shall be separate winding types. Variable speed motors operating over an adjustable range of speeds shall be motors specifically designed and rated for this duty.
- J. If the Contractor proposes to furnish motors varying in horsepower and/or characteristics from those specified, he shall first inform the Architect of the change and shall then coordinate the change and shall pay all additional charges in connection with the change.

2.04 IONIZATION SMOKE DETECTORS

- A. Provide and install ionization smoke detectors in all air handling units. Detectors are to be installed in both the supply and return air duct connections at each unit. Detectors are to be installed by the Mechanical Contractor and furnished and wired by the Electrical Contractor in Division 26.
- B. Detectors shall de-energize air systems when and if particles of combustion are detected in the air stream. Detectors shall be fitted with sampling tubes that are sized to fit duct widths. Provide a manual reset switch and interlock with the building fire alarm system if such exists.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide control wiring and install all motor starters, unless integrally factory mounted on a piece of equipment.
- B. Provide control wiring to all motors except packaged units that are prewired between the starter and motor.
- C. Where line voltage control devices are mounted at or inside a unit, such as aquastats, firestats for single phase devices, etc., the power wiring to the unit shall be connected through such a control device by the work of Division 26.
- D. On final inspection, it shall be demonstrated to the Engineer or his representative that each overload relay control circuit is properly wired and functioning correctly by manually tripping each overload relay individually, one at a time. This inspection procedure shall not involve removal of any wiring or disconnecting any current carrying parts.
- E. Standard minimum one-year warranty on all electrical equipment provided herein shall apply.

3.02 ELECTRICAL WORK

- A. All electrical equipment provided under this Division shall comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 26.
- B. All power wiring and final power connections to the system shall be provided under Division 26.
- C. Control wiring (120V. and less) shall be provided under Division 23 and extended from the 120V power circuits indicated on the Electrical Drawings. All wiring for voltages higher than 30 volts shall be done by a licensed electrician.
- D. All electrical characteristics shall be taken from the Electrical Drawings and Specifications and coordinated before equipment is ordered or submitted.

END OF SECTION

SECTION 23 05 15 DESIGN CONDITIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The requirements of the General Conditions, Supplementary conditions, and Section 22 05 10, "Plumbing General Requirements" and Section 23 05 10 "HVAC General Requirements" apply to all work herein.

1.02 DESIGN CONDITIONS:

- A. Outside conditions are as follows:

	Dry Bulb Deg. F.	Wet Bulb Deg. F.
Summer Outside Air Temperature	98	80
Winter Outside Air Temperature	0	

- B. The indoor design condition for cooling is 75 deg. F. dry bulb/50% relative humidity.
- C. The indoor design condition for heating is 75 deg. F. dry bulb.
- D. Range of indoor design goals for HVAC sound control: All occupied space shall have an Noise Criterion (NC) curve range not to exceed NC 30.
- E. Building envelope design criteria - these values are repeated here to alert the General Contractor to the properties of materials used in the calculation of heating and cooling loads for this project. It shall be the responsibility of the General contractor to notify the Architect and Engineer if materials with properties other than those stated below are used in the construction of this project:
 - 0. Typical vision glass shading coefficient – 0.95
 - 1. Typical vision glass "U" values – 0.95
 - 2. Insulated exterior walls transmission coefficient-0.092 BTU(hr.) (F deg.)(sq.ft.)
 - 3. Roof heat transmission coefficient - 0.091 Btu/(hr.)(F. deg.)(sq. ft.)

1.03 QUALITY ASSURANCE

- A. Codes and regulations referred to are minimum standards. Where the requirements of these specifications or drawings exceed those of the codes and regulations, the drawings and specifications govern.

- B. Temperature/pressure rating of all components shall meet or exceed design conditions for the system in which they are installed. All components shall be designed for operating conditions of not less than

System	Working Pressure PSIG	Temperature Range
1. Sanitary, Waste & Vent	Atmosphere	Ambient
2. Storm Drainage	Atmosphere	Ambient
3. Domestic Cold Water	150	120°F
4. Domestic Hot Water	150	140°F
5. Domestic Hot Water	150	140°F
6. Chilled Drinking Water	150	100°F
7. Natural Gas Low Pressure	14" W.C.	Ambient
8. Natural Gas Medium Pressure	5	Ambient
9. Natural Gas High Pressure	10	Ambient
10. All Remaining Service	125	200°F

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PRESSURE TESTING / RECORDING

- A. All pressure tests shall be observed by the Engineer. He may delegate others, i.e. Architect, General Contractor, Clerk of Works, etc., to observe tests in his absence. Said tests and time duration shall be recorded and posted onto the pipe segments as indicated on the project set of construction documents.

END OF SECTION

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING
AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplemental Conditions, and - Section 23 05 10, "HVAC General Requirements" apply to work of this section.
- B. Refer to Specification Section 23 05 11, titled "HVAC Submittal Data" for the submittal and approval requirements regarding the piping system.

1.02 DESCRIPTION OF WORK

- A. Furnish hangers to support the required loads. Where necessary, supports shall be designed to permit movement due to expansion and contraction. Where drawings show details of supports and anchors, conform to details shown. Where details are not shown, conform to general requirements specified herein.
- B. "C" CLAMPS may be used as point of attachment to building structure for pipe hangers and/or all-thread rods; however, piping shall not be supported directly by "C" clamps.
- C. Do not pierce waterproofing with support bolts.
- D. All ferrous metal hangers and supports, not otherwise coated, shall be provided with a field-applied coat of zinc chromate primer prior to any installation. In lieu of field painting, the contractor may furnish cadmium plated, or galvanized hangers and supports.

1.03 QUALITY ASSURANCE

- A. All hangers, support, anchors, and guides shall be in accordance with the American National Standard Code for Pressure Piping, ANSI B31.1 with addenda 31.1 OA-69.
- B. Provide an adequate suspension system in accordance with recognized engineering practices, using where possible, standard commercially accepted pipe hangers and accessories. Submit fastening methods to the Structural Engineer for approval and as approved copy to the engineer.
- C. Horizontal suspended pipe shall be hung using adjustable pipe hangers with bolted hinged loops or turnbuckles. Chains, wire, perforated strap iron or flat steel straps are not acceptable.
- D. For the purpose of this specification, Grinnell product figure numbers are given. Equal products by B-Line and Michigan Hanger Co. (M-Co) are acceptable.

1.04 DESIGN

- A. Supporting steel not shown for the equipment will be designed, supplied and erected by the Contractor; the supporting steel is that steel which is connected to the structural steel shown on the drawings and carries the weight of the mechanical items. This supporting steel design must carry the dead weight and dynamic load imposed by the equipment, piping and other mechanical components.
- B. The supporting steel shall be connected to the structural steel in such a manner as not to overload the structural steel. It is the responsibility of the General Contractor, Mechanical Contractor and the steel fabricator to verify that this purpose is accomplished. It is the responsibility of the General Contractor to call to the attention of the Architect-Engineer any deficiency prior to bidding.
- C. Where thermal movement in the pipe line will occur, the pipe hanger assembly must be capable of supporting the line in all operating conditions. Accurate weight balance calculations shall be made to determine the supporting force at each hanger in order to prevent excessive stress in either pipe or connected equipment.

PART 2 - PRODUCTS

2.01 UPPER ATTACHMENTS

- A. New Concrete Construction:
 - 1. Support piping in new concrete construction with adjustable type inserts, Grinnell Fig. 282. Where the pipe load exceeds the recommended load of the insert, use two inserts with a trapeze-type connecting member below the concrete.
 - 2. Where hangers are required between structural members, (beams) provide side beam brackets, Grinnell Fig. 202, attached to the upper 1/3 of the beam, and all auxiliary steel for the installation of the pipe hangers. Supports shall be designed in accordance with the AISC Steel Handbook and shall receive a field coat of zinc chromate primer.
- B. Existing Concrete Construction:
 - 1. Support piping in existing concrete construction with Cadmium plated, malleable iron, expansion case, Grinnell Fig. 117.
 - 2. Where hangers are required between structural members (beams) side beam brackets Grinnell Fig. 20, attached to the upper 1/3 of the beam, and all auxiliary steel for the installation of the pipe hanger. Supports shall be designed in accordance with the AISC Steel Handbook and shall receive a field coat of zinc chromate primer.
- C. Steel Construction:
 - 1. Support piping in steel construction with adjust-able beam clamps and tie rods, Grinnell Fig. 218, or side beam brackets bolted or welded to the side of the beam.
 - 2. Where hangers are required between structural members (beams or joist) provide all auxiliary steel for the installation of the pipe hanger. Supports shall be designed in accordance with the AISC steel Handbook and shall receive a field coat of zinc chromate primer.

- D. Wood Construction: Support piping in wood construction with Side Beam Bracket, Grinnell Fig. 202 or Hanger Flange, Grinnell Fig 128R, using lag screws.

2.02 WALL SUPPORTS

- A. Where piping is run adjacent to walls or steel columns welded steel brackets Grinnell Fig. 195 and 199 may be used. The bracket shall be bolted to the wall and a back plate of such size and thickness as to properly distribute the weight.

2.03 FLOOR SUPPORTS

- A. Where pipe lines are located next to the floor and no provision for expansion are required support piping with Grinnell Fig. 258, pipe rest with nipple and floor flange.
- B. Where provisions for expansion are required support piping with Grinnell adjustable pipe stand Fig. 274, or pipe roll stand Fig. 271.
- C. Vertical piping shall be supported at every other floor using riser clamps Grinnell Fig. 261, for steel and cast iron pipe, and copper clad riser clamp Grinnell Fig. CT-121 for all copper piping.

2.04 INTERMEDIATE ATTACHMENTS:

- A. Supports for horizontal piping shall be all-thread galvanized steel rods, ASTM A-107, Grinnell Fig. 146, of the following sizes:

Pipe Size	Hanger Rod Diameter
2 inches and smaller	3/8 inch
2-1/2 and 3 inches	1/2 inch
4 and 5 inches	5/8 inch
6 inches	3/4 inch

2.05 PIPE ATTACHMENTS

- A. Hangers for insulated pipe shall be sized to bear on the outside of the insulation.
- B. Hangers for steel and cast-iron horizontal piping where provision for expansion are not required shall be Grinnell Fig. 260, clevis type with vertical adjustment.
- C. Hangers for uninsulated copper pipe 4 inches and smaller shall be copper plated adjustable band hangers Grinnell Fig. CT. 99C, for pipe sizes over 4 inches provide Grinnell copper clad clevis type hanger with a copper clad saddle at each hanger location.
- D. Hanger for PVC pipe shall be Grinnell Fig. CT. 99, adjustable band hanger.
- E. Hangers for steel and copper piping where provisions for expansion are required shall be Grinnell Fig. 171 or Fig. 181, adjustable roller hanger with Grinnell Fig. 160, pipe covering protection saddles.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Hang pipe from substantial building structure. Pipe shall not be hung from other piping.
- B. Provide a hanger within one foot of each elbow.
- C. Unless specified otherwise, provide the following support spacing.

1. Pipe Size	Support Spacing
1 inch and smaller	5'-0"
1-1/4 inches and larger	10'-0"

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Requirements and Division 01 Specification Sections apply to work in this section.

1.02 SUMMARY

- A. This Section specifies the requirements and procedures total mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the quantities of the mechanical systems as required to meet design specifications, and recording and reporting the results.
- B. Test, adjust, and balance the following mechanical systems: Airside systems: Supply air, return air, relief air, exhaust air, and outside air systems, all pressure ranges; Verify temperature control systems operations.
- C. This Section does not include: Specifications for materials for patching mechanical systems; specifications for materials and installation of adjusting and balancing devices. If devices must be added to achieve proper adjusting and balancing, refer to the respective system sections for materials and installation requirements.

1.03 SCOPE OF WORK

- A. A Test and Balance Agency that is independent of any contractor or manufacturer shall perform the testing, adjusting and balancing and prepare reports, and deliver them to the Architect. The independent Test and Balance Agency shall be a certified member of the Associated Air Balance Council (AABC). The Test and Balance Agency contract shall not be assigned to any Subcontractor; the Agency shall work directly under the General Contractor.
- B. Total System Balance shall be performed in accordance with the 6th edition of the AABC National Standards for Total System Balance, and in accordance with the scope of work defined by the Contract Documents.
- C. Testing and Balance Agency as part of its contract shall act as an authorized inspection agency, responsible to the Owner's Representative, and shall, during the test and balance, list systems that are installed incorrectly, require correction, or have not been installed in accordance with Contract Drawings and Specifications.
- D. Upon the completion of the test and balance work, the Agency shall compile the test data and submit the specified number of copies of the complete report to the Owner's Representative for his evaluation and approval.
- E. Test, adjust and balance the air systems. After testing, adjusting, and balancing is complete, the Contractor shall visit the job during the heating cycle and during the cooling cycle to make adjustments to provide uniform temperatures throughout the building. Schedule the trips during the months of December through February for the heating cycle, and June through August for the cooling cycle. Obtain signed statements from the Using Agency acknowledging these two trips and subsequent adjustments. Submit statements to the Architect.

- F. Owner to furnish test and balance contracting agency for this project. The Test and balance agency shall work under the direction of the Professional.

1.04 DEFINITIONS

- A. Systems testing, adjusting, and balancing is the process of checking and adjusting all the building environmental systems to produce the design objectives. It includes:
 - 1. The balance of air distribution systems;
 - 2. Adjustment of total system to provide design quantities;
 - 3. Electrical measurement;
 - 4. Verification of performance of all equipment and automatic controls;
- B. Test: To determine quantitative performance of equipment.
- C. Adjust: To regulate the specified air patterns as applicable at the terminal equipment (e.g., reduce fan speed, throttling).
- D. Balance: To proportion flows within the distribution system (sub-mains, branches, and terminals) according to specified design quantities.
- E. Procedure: Standardized approach and execution of sequence of work operations to yield reproducible results.
- F. Report Forms: Test data sheets arranged for collecting test data in logical order for submission and review. These data should also form the permanent record to be used as the basis for required future testing, adjusting, and balancing.
- G. Terminal: The point where the controlled fluid enters or leaves the distribution system. These are supply inlets and return outlets on air terminals and exhaust or return inlets on air terminals such as fans, registers, grilles, diffusers and louvers.
- H. Main: Duct containing the system's major or entire air flow.
- I. Sub-main: Duct or pipe containing part of the systems' capacity and serving two or more branch mains.
- J. Branch Main: Duct serving two or more terminals.
- K. Branch: Duct serving a single terminal.

1.05 SUBMITTALS:

- A. Agency Data: Submit proof that the proposed testing, adjusting, and balancing agency meets the qualifications specified below.
- B. Certified Representative and Technicians Data: Submit proof that the Test and Balance certified representative assigned to supervise the procedures, and the technicians proposed to perform the procedures meet the qualifications specified below.

- C. Certified Reports: Submit testing, adjusting, and balancing reports bearing the certified seal and signature of the Test and Balance representative. The reports shall be certified proof that the systems have been tested, adjusted, and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting, and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the systems. Follow the procedures and format specified below:
1. Draft reports: Upon completion of testing, adjusting, and balancing procedures, prepare draft reports on the approved forms. Draft reports may be hand written, but must be complete, factual, accurate, and legible. Organize and format draft reports in the same manner specified for the final reports. Submit 3 complete sets of draft reports. Only 1 complete set of draft reports will be returned.
 2. Final Report: Upon verification and approval of draft reports, prepare final reports, type written, and organized and formatted as specified below. Submit 4 complete sets of final reports.
 3. Report Format: Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data in reinforced, vinyl, three-ring binders. Provide binding edge labels with the project identification and a title descriptive of the contents. Divide the contents of the binder into the below listed divisions, separated by divider tabs:
 - a. General Information and Summary
 - b. Air Systems
 - c. Temperature Control Systems
 - d. Special Systems
 4. Report Contents: Provide the following minimum information, forms and data:
 - a. General Information and Summary: Inside cover sheet to identify testing, adjusting, and balancing agency, Owner, Owner's Representative, and Project. Include addresses, and contact names and telephone numbers. Also include a certification sheet containing the seal and name address, telephone number, and signature of the Certified Test and Balance registered representative. Include in this division a listing of the instrumentations used for the procedures along with the proof of calibration.
 - b. The remainder of the report shall contain the appropriate forms containing as a minimum, the information indicated on the standard report forms prepared by the AABC for each respective item and system. Prepare a schematic diagram for each item of equipment and system to accompany each respective report form.
- D. Calibration Reports: Submit proof that all required instrumentation has been calibrated to tolerances specified in the referenced standards, within a period of six months prior to starting the project.

1.06 QUALITY ASSURANCE

- A. Agency Qualifications: Employ the services of an independent testing, adjusting, and balancing agency meeting the qualifications specified below, to be the single source of responsibility to test, adjust, and balance the building mechanical systems specified to produce the design objectives. Services shall include checking installations for conformity to design, measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, and recording and reporting the results.
- B. The independent testing, adjusting, and balancing agency certified by Associates Air Balance Council (AABC) in those testing and balancing disciplines required for this project, and having at least one registered in the State in which the services are to be performed, certified by AABC as a Test and Balance representative.
- C. Codes and Standards:
 - 1. AABC: "National Standards For Total System Balance".
 - 2. ASHRAE: ASHRAE Handbook, 1984 Systems Volume, Chapter 37, Testing, Adjusting, and Balancing.

1.07 FINAL INSPECTION

- A. All systems, when completed, shall be operated by the organization to test the performance as directed by and to the satisfaction of the Using Agency.
- B. Systems shall be balanced within the stated tolerances at the design conditions. The Owner's Representative may request or perform a check reading on up to 10 per cent of the outlets and duct traverses. If any reading varies beyond the stated tolerances, the system will be considered out of balance and the entire system be readjusted and a new report prepared at no additional cost to the Owner.
- C. Heating, ventilation and air conditioning systems shall maintain uniform temperatures without drafts through the normal change of seasons. The Owner's Representative may request new design settings on up to 20 per cent of the air outlets and coil connections for final adjustment of the system during the first year of operation at no additional cost to the Owner.
- D. Air ducts shall circulate without excessive noise.
- E. All defects demonstrated by inspections and tests shall be remedied immediately to the Architect' satisfaction.

1.08 PROJECT CONDITIONS

- A. Systems Operation: Systems shall be fully operational prior to beginning procedures.

PART 2 - PRODUCTS

2.01 PATCHING MATERIALS

- A. Except as otherwise indicated, use same products as used by original Contractor for patching holes in insulation, ductwork, and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.

PART 3 - EXECUTION

3.01 REQUIRED DOCUMENTS

- A. The Contractor shall provide the following, in a timely fashion, to the Test and Balance Agency:
 - 1. Contract drawings (complete set)
 - 2. Applicable specifications (Div. 23 & 26, as a minimum)
 - 3. Related addenda
 - 4. Related change orders
 - 5. Related reviewed shop drawings
 - 6. Related reviewed equipment manufacturer's submittal data
 - 7. Reviewed equipment control drawings

3.02 COOPERATION

- A. The Contractor and his subcontractors shall cooperate fully with the Test and Balance Agency and provide:
 - 1. Completely operable systems
 - 2. The right to adjust the systems
 - 3. Access to systems components

3.03 BELT DRIVES

- A. Adjustable speed drives are to be adjusted by the Test and Balance Agency. In cases where the specified capacities cannot be obtained with the original adjustable sheave or original fixed drive sheave, the Agency is to report to the Contractor the sheave size required to obtain the specified capacity.
- B. Where larger or smaller sheave sizes are required, the Contractor shall provide new sheaves and, if required, new belts at no additional cost to the Owner.

3.04 CONTROL PERFORMANCE CHECK

- A. The results produced by the operation of air handling units controls shall be checked by the testing agency; controls requiring adjustment shall be listed and reported to the Contractor. This does not reduce the responsibility of the Contractor for the checking and adjustment required for a fully operational control system. The Test and Balance Agency is responsible only for final settings; the Contractor is responsible for completeness and correctness of all the control systems.

3.05 SETTINGS

- A. The Test and Balance Agency shall permanently mark the settings of all dampers, valves and other adjustment devices in a manner that will allow the settings to be restored. If a balancing device is provided with a memory stop, it shall be set and locked.

3.06 MEASUREMENTS

- A. Provide all required instrumentation to obtain proper measurements, calibrated to the tolerances specified in the referenced standards. Instruments shall be properly maintained and protected against damage.

- B. Provide instruments meeting the specifications of the referenced standards.
- C. Use only those instruments which have the maximum field measuring accuracy and are best suited to the function being measured.
- D. When averaging values, take a sufficient quantity of readings which will result in a repeatability error of less than 5 percent. When measuring a single point, repeat readings until 2 consecutive identical values are obtained.
- E. Take all reading with the eye at the level of the indicated value to prevent parallax.
- F. Take measurements in the system where best suited to the task.

3.07 PERFORMING TESTING, ADJUSTING, AND BALANCING

- A. Cut insulation and ductwork, for installation of test probes to the minimum extent necessary to allow adequate performance of procedures.
- B. Patch insulation, ductwork, and housings, using materials identical to those removed. Seal ducts, and test for and repair leaks. Seal insulation to re-establish integrity of the vapor barrier.
- C. Mark equipment settings, including damper control positions, and similar controls and devices, to show final settings. Mark with paint or other suitable, permanent identification materials.
- D. Retest, adjust, and balance systems subsequent to significant system modifications, and resubmit test results.

3.08 RECORD AND REPORT DATA

- A. Record all data obtained during testing, adjusting, and balancing in accordance with, and on the forms recommended by the referenced standards, and as approved on the sample report forms.
- B. Prepare report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.

3.09 REPORT

- A. The following items shall be tested, recorded, and incorporated in the test and balance report. The report shall not be limited to these items, but shall include these tests as minimum requirements.
 - 1. Record each equipment manufacturer, model numbers and serial numbers.
 - 2. Test, adjust and record required and measured total CFM for each air system and component. Test and record quantity of exhaust or relief air in CFM.
 - 3. Test, adjust and record all required and measured outside air quantities and return air CFM.
 - 4. Test and record required and measured system static pressures; filter differential, air coil differential, and fan total static pressure.
 - 5. Record all installed fan drive assemblies; fan sheaves, motor sheaves, and belts.
 - 6. Record each installed motor manufacturer.
 - 7. Record each installed motor horsepower.

8. Test and record each motor name plate and measured voltage and full load amperage.
9. Test, adjust, and record each blower RPM.
10. Test and adjust the CFM delivery of each diffuser, grille, and register.
11. Identify the location of each diffuser, grille, and register.
12. Record the size, type, and manufacturer of each grille, register and diffuser.
13. Data obtained for each diffuser, grille and register shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustments.
14. All diffusers, grilles, and registers shall be adjusted to minimize drafts.
15. All tests shall be made with supply, return, relief and exhaust systems operating, and all doors, windows, etc. closed or in their normal operating condition.
16. All damper positions shall be permanently marked after air balancing is complete.
17. The final balanced condition of each area shall include the testing and adjusting of pressure conditions. Front doors, exits, etc., should be checked for air flow so that exterior conditions do not cause excessive abnormal pressure conditions.
18. Indicate on floor plans the locations and results of the sound measurements taken.

3.10 SYSTEM BALANCING REQUIREMENTS

- A. Testing, adjusting and balancing shall be provided for all airside systems and equipment specified and indicated in the Contract Documents.

END OF SECTION

SECTION 23 07 00

HVAC INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawing and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to work of this Section.

1.02 DESCRIPTION

- A. All insulation products used outside of mechanical rooms shall meet NFPA requirements for Flame Spread Rating 25, Smoke Developed Rating 50, and Fuel Contributed 50.
- B. Staples SHALL NOT BE USED for securing insulation. All insulation shall be installed in accordance with the insulation manufacturer's recommendations. Insulation shall be continuous through wall, ceiling, floor and roof openings and sleeves, except at fire/smoke dampers.
- C. Do not store materials in building until it is enclosed and dry. Wet insulation shall not be installed.
- D. Insulation products with self-sealing type jacket shall not be applied at temperatures below 40 deg F.
- E. Items not to be insulated:
 - 1. Piping installed in enclosures for:
 - a. Unit ventilators
 - b. Unit heaters
 - c. Finned tube radiation
 - 2. Vents from pressure relief valves.
 - 3. Ducts with internal lining or factory insulated ducts.
- F. Clean and dry all surfaces to be insulated from loose scale, dirt, oil, moisture and other foreign matter.
- G. Insulate completely all metal surfaces of piping, ductwork and equipment other than hangers.
- H. Surface finishes shall present a tight smooth appearance.
- I. Permit expansion and contraction without causing damage to insulation or surface finish.
- J. Surface finish shall be extended to protect all surfaces, ends, and raw edges of insulation.
- K. Vapor barriers must be continuous and uninterrupted throughout the system where specified except where insulation is interrupted for fire dampers. See details for special conditions.

1.03 PIPING

- A. Insulate all valves, strainers and fittings. For the purposes of this Specification, fittings include unions and flanges. Use premolded material where available. Insulate valves up to and including bonnets.

- B. Pipe Hangers that are installed in direct contact with the surface of the pipe, such as a pipe clamp shall have the insulation applied over the hanger as well as the pipe. Provide a rain shield on piping supported on hangers outdoors to prevent bulk water from entry.

1.04 DUCTWORK

- A. Insulation shall cover all standing seams and metal surfaces. Materials shall be applied subject to their temperature limits.

1.05 QUALITY ASSURANCE

- A. Codes and regulations referred to are minimum standards. Where the requirements of these specifications or drawings exceed those of the codes and regulations, the drawings and specifications shall govern.
- B. Any methods of application of insulation materials or finishes not specified in detail herein shall be in accordance with the particular manufacturer's published recommendations. Insulation shall be applied by experienced workers regularly employed for this type of work. Material shall be furnished to the job bearing the manufacturer's label.
- C. Insulation products shall be as manufactured by Pittsburgh Corning Corporation, Knauf, Resolco, Owens-Corning, Certainteed or Armstrong.

1.06 FITTING COVERS AND JACKETS

- A. Where applicable, provide and install PVC covers and jacketing on fittings with fiberglass insulation as manufactured by Johns Manville Zeston 300 Series.

PART 2 - PRODUCTS

2.01 FIBERGLASS RIGID DUCT BOARD INSULATION

- A. Exterior Insulation for Rectangular Ductwork: Insulation SHALL BE EQUAL TO Knauf Fiberglass Insulation Board. Fiberglass duct insulation shall have an average thermal conductivity not to exceed 0.27 BTU-in. per sq. ft. per degrees F. per hour at a mean temperature of 75 deg F. Insulation shall have a minimum density of 3.0 lb/cu. ft and a k-value of 0.23 at a mean temperature of 75 deg F. Vapor barrier shall be factory applied FSK reinforced, flame resistant, foil face. Surface burning characteristics shall not exceed 25 flame spread and 50 smoke development.
- B. Insulate externally, all rectangular/square ductwork with 1-1/2 inches rigid fiberglass duct board. All seams to be taped with pressure sensitive tape or mastic. Metal fasteners shall be located 3 inches from the edges and spaced no greater than 18 inches on centers

2.02 EXTERIOR WRAP FOR ROUND DUCTWORK:

- A. Insulation EQUAL TO Knauf Duct Wrap. Insulate externally, all round ductwork with 2 inches thick blanket fiberglass duct insulation. All seams to be taped with pressure sensitive tape and banded with nylon ties on 3'-0" centers.
- B. The board type shall have a minimum 3 lbs. density, 1-1/2 inches thick with ASJ jacket. Insulation board shall have an average conductivity not to exceed 0.27 BTU/inch/ square foot/degree F / hour at a mean temperature of 75 deg F.

- C. All round and rectangular supply, return and outside air ductwork shall be insulated on the exterior with semi-rigid glass fiber insulation board equal to Knauf Insulation Board as noted in the above paragraphs. Board type to be minimum 3 lbs. density, 1-1/2 inches thick with ASJ jacket. Insulation board shall have an average conductivity not to exceed 0.27 BTU/inch/ square foot/degree F / hour at a mean temperature of 75 deg F.

2.03 ACOUSTICAL DUCT LINER:

- A. Duct liner SHALL BE EQUAL TO Knauf Textile Duct Liner. Acoustical duct liner shall be a flexible type with a minimum 1inch thickness using long fiberglass with a smooth firmly bonded fire-resistant surface to prevent erosion of the insulation. Surface not to exceed 25 flame spread and 50 smoke development. Thermal conductivity shall not exceed 0.26 at 75 deg F. mean temperature.
- B. Noise reduction coefficient (NRC) shall not be less than .60 based on acoustical materials test, Mounting No. 6. Completely coat all duct surfaces with Benjamin Foster 85-15 adhesive. Neoprene coated side on liner shall face air stream. Sections shall be jointed by coating the edges with Foster 30-36. Secure liner to duct system with self-adhering pins adhered to clean surface and secure with self locking washers, space pins not more than 4 inches from the edges and not more than 16 inches on centers. Lining shall meet National Board of Fire Underwriters' Standards for Internal Duct Application and shall have a minimum density of 3 lbs. per cu. ft. All duct liner shall be marked with the density located so as to be visible on the exposed surface of the liner. Air friction correction factor shall not exceed 1.40 at 2000 FPM and 1.5 at 4000 FPM.
- C. Insulate all rectangular supply, return, and outside air ductwork internally as described in Paragraphs A and B.

2.04 FOAMED PLASTIC SHEET, AND TUBING:

- A. Sheet Insulation SHALL BE EQUAL TO Armstrong Armaflex. Minimum of 4.5 lbs. per cu. ft. Thermal conductivity shall not exceed 0.28 at 75 deg F. mean temperature.
- B. Piping outside the building may be insulated with 1inch thick flexible foamed plastic insulation with weather proof aluminum as hereinafter specified.
- C. Refrigerant Piping.

PART 3 - EXECUTION

3.01 GENERAL

- A. Surfaces to be insulated shall be clean, dry, and free of foreign material, such as rust, scale and dirt when insulation is applied. Perform pressure tests required by other Sections before applying insulation.
- B. Where existing insulation is damaged due to the new work, repair damage to match existing work or replace damaged portion with insulation specified for new work.

3.02 INSULATION FOR ALL PIPING SYSTEM

- A. Insulate pipe, fittings, flanges, unions and valves.

- B. Install insulation materials with smooth and even surfaces, jackets drawn tight and cemented down smoothly at longitudinal seams and end laps. Do not use scrap pieces of insulation where a full length section will fit.
- C. Install insulation, jackets and coatings continuous through wall and floor openings and sleeves.
- D. Fittings, valves and flanges shall be insulated with field fabricated multiple mitered segments of molded fiberglass insulation of the same thickness as adjoining pipe insulation. Secure fitting insulation segments with 20 gage galvanized steel wire and apply a smoothing coat of insulating cement. White fabric and mastic shall be used on exposed fittings.
- E. Application of all materials shall be in accordance with the manufacturer's instructions.
- F. Butt all joints of pipe insulation together and secure all jacket laps with lap adhesive. Seal all butt joints with joint straps furnished with insulation.
- G. Care shall be taken so as not to place insulation over vent and drain inlets and outlets.
- H. Staples are not permitted on pipe insulation.
- I. Insulate all refrigerant piping appurtenances subject to sweating, such as thermometer wells, gauge cocks, and valve stems with preformed and mitered fiberglass pipe insulation.

END OF SECTION

SECTION 23 23 00 REFRIGERANT PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of the General Conditions and Supplementary Conditions.
- B. Refer to Specification Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment" for specification and installation requirements of the pipe support system.
- C. Refer to Specification Section 23 07 00 "HVAC Insulation" for specification and installation of thermal insulation for the various types of pipe, fittings, and accessories specified in this section.

1.02 DESCRIPTION OF WORK

- A. Extent of the piping systems work is indicated on the Drawings and schedules, and by the requirements of this section.
- B. The construction requirements herein shall include appurtenant structures and buildings to which the piping system is to be connected.

1.03 QUALITY ASSURANCE

- A. Codes and regulations referred to are minimum standards. Where the requirements of these specifications or drawings exceed those of the codes and regulations, the drawings and specifications shall govern.
- B. Firms regularly engaged in manufacture of piping products of types, materials and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years are approved.
- C. Certify brazing procedures, brazes and operators in accordance with Section IX ASME Boiler and Pressure Vessel Code (ANSI B31.5). Two copies of the qualification test report and certification shall be submitted to the Architect.

1.04 DEFINITIONS

- A. Pipe sizes listed are for outside diameter of the pipe (O.D.).

PART 2 - PRODUCTS

2.01 REFRIGERANT PIPE

- A. All Pipe Sizes:
 - 1. Type: Copper tubing of the pipe sizes listed.
 - 2. Class: ACR Type L hard drawn tubing, ASTM B-88
 - 3. Fitting: Sweat type wrought copper.
 - 4. Joints: Socket brazed with 95-5 tin-antimony

- B. Accessories: The refrigeration system shall include all accessories for complete and operable system. Accessories shall include, but not limited to: oil traps, filter dryers, expansion valves, sight glasses, solenoid valves, liquid charging, valves and strainers.

PART 3 - EXECUTION

3.01 GENERAL PIPE SYSTEM

- A. Nonferrous Metallic Pipe: Where nonferrous metallic pipe, e.g., copper tubing, crosses ferrous piping material, a separation must be maintained between pipes.
- B. Cut pipe accurately to measurements, and ream free of burrs and cutting splatter. Carefully align and grade pipe, and work accurately into place. Fittings shall be used for any change in direction. Provide for expansion at every building expansion joint. Protect open pipe ends to prevent trash being placed in the lines during installation. Clean all dirt and cutting debris from pipes before making the next joint.
- C. Install piping so as to preserve access to all valves, air vents, and other equipment and to provide the maximum headroom possible.
- D. Joints shall be made with nitrogen gas in the pipes to prevent oxidation. All piping shall be installed parallel to or at right angles with building walls, columns, and partitions.
- E. Clean inside of refrigerant lines with methyl alcohol before assembly and take care thereafter to prevent foreign matter from entering and being sealed in. Cut pipe ends square and de-burr. Clean pipe and fitting with #00 steel wool before joining.

3.02 TESTS

- A. Test refrigerant piping, equipment, valves and fittings at a pressure of 245 psi on the low side and 300 psi on the high side by introducing refrigerant and dry carbon dioxide (CO₂) or nitrogen throughout the refrigerant circuit. Bubble test joints with soap lather, clean joints of soap and leak-test with a halide torch. The system shall be pumped out and the entire circuit placed under 27 inches of vacuum and allowed to stand sealed off for a period of 8 hours, without any loss of vacuum.
- B. Submit an affidavit signed by the Architect's representative and the Contractor's representative stating they have witnessed and approved the dehydration test.

3.03 SUBMITTALS

- A. Submittals shall include but shall not be limited to a diagram approved by the compressor manufacturer, to include the size and length of the refrigerant piping, all offsets and elbows required for the installation location of all valves, filter dryers, moisture and liquid indicators and flexible connectors where required.

END OF SECTION

SECTION 23 30 00

HVAC AIR DISTRIBUTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section is subject to the provisions of Division 23.
- B. Ductwork shall be provided to meet the minimum capacities indicated, shall meet all constraints of construction, and shall comply with all Specification Sections.
- C. See Section 23 07 00, "HVAC Insulation" for ductwork insulation.
- D. No ductwork shall be fabricated until fabrication shop drawings have been prepared, submitted and reviewed.

PART 2 - PRODUCTS

2.01 DUCTWORK - GENERAL

- A. SMACNA Standards indicated shall mean standard published by the Sheet Metal and Air Conditioning Contractor's National Association, Inc. Ductwork shall be constructed in complete conformance with the latest edition of the SMACNA Manual. Duct classification shall be as follows:
 - 1. From air handling unit to all terminal units: High Pressure - 6" static pressure, to 10" static pressure, Class A seals.
 - 2. From air handling unit to all terminal units: Medium Pressure - 6" static pressure, Class A seals.
 - 3. Round outside air ductwork to supply fans: Medium Pressure - 6" static pressure, Class A seals.
 - 4. From terminal units to diffusers, toilet exhaust ductwork: Low Pressure - 1" static pressure, Class B seals.
 - 5. All other supply, return, and outside air ductwork: Low pressure - 2" static pressure, Class A seals.
- B. Ductwork – Rectangular Low Pressure: Provide all ductwork as indicated in these documents for each and every air conditioning system. This includes all mains, all branches, related fittings and accessories. All duct and fittings shall be manufactured by the same company. Ductwork shall be round, oval or rectangular as indicated on drawings. Ductwork shall be constructed of G90 galvanized sheet steel, unless otherwise specified herein. Low pressure duct including fittings shall be constructed of steel sheet metal. All duct sheet metal gauges for the various duct sizes shall be as listed in the latest edition of SMACNA.
- C. Elbows: The construction of radius type elbows in rectangular ductwork shall maintain a centerline radius of 1-1/2 times the cross sectional dimension of the duct in the horizontal plane of the duct turn. Ductwork shall be constructed of G90 galvanized sheet steel, unless otherwise specified herein. Where radius turns are prohibited, hard 90 degree elbows with turning vanes may be installed. All duct fittings (tees, elbows, etc.) metal gauges for the various fittings shall be as listed in the latest edition of SMACNA. Ductwork fabrication shop drawings shall including drawings of fittings as a part of the shop drawing submittal.

- D. **Turning Vanes:** Turning vanes shall be installed in all 90 degree square and rectangular elbows and at other locations as shown. Vanes shall also be installed on all turns greater than 40 degrees in all rectangular supply, return, outside air and exhaust ductwork. All turning vanes shall be constructed of galvanized steel, two metal gauges heavier than that of the adjacent ductwork. All vanes shall have minimum 4" radius of the curvature, a maximum 4" spacing and no less than 3 vanes in each installation. The turning vanes shall be double thickness type, with vanes secured to the runners and runners secured to the duct. Elbows in round ductwork and other radius elbows shall have an inside radius equal to the diameter of the duct. All duct specialties, i.e. turning vanes, shall be as listed in the latest edition of SMACNA.
- E. **Ductwork – Round Low Pressure:** Low pressure round ducts up to and including 12 inches in diameter shall be longitudinal lock seam construction. Low pressure round ducts larger than 12 inches and all medium pressure round ducts shall be spiral lock seam construction. All duct sheet metal gauges for the various duct sizes shall be as listed in the latest edition of SMACNA.
2. Girth joints in ducts up to and including 12 inches shall be beaded crimp type and each joint shall be fastened with sheet metal screws, equally spaced, not more than 8 inches on centers and with a minimum of 3 screws in each joint. The beaded-crimp joint shall provide at least a 1 inch lap to accommodate the sheet metal screws.
 3. Girth joints in ducts larger than 12 inches shall be the beaded sleeve type. The beaded sleeve joints shall be fabricated of the same gauge galvanized sheet steel and the duct shall be a minimum of 3 screws in each section.
- F. **Support For Rectangular Ductwork:** For ductwork with static pressures greater than 2 inches, provide and install sufficient angle iron steel supports to maintain the rectangular configuration. The angle iron sizes and the dimensions of spacing of the supports shall be as listed by the latest edition of SMACNA.
- G. **Hangers and Supports:** Duct hangers and supports shall be in accordance with Section IV (pages 4-1 through 4-13) of the referenced SMACNA Standard, except:
1. Hangers shall be spaced not over 8'-0" on centers.
 2. For rectangular ducts with longest dimensions up through 60 inches, hangers shall be the galvanized steel strap type; with the longest dimension 61 inches and larger, hangers shall be trapeze type constructed of galvanized steel angles with round hanger rods. Sizes for strap hangers and trapeze angles and rods shall be based on duct size as scheduled in the SMACNA Standard, Table 4-1 (page 4-8) for strap hangers and Table 4-3 (page 4-10) for trapeze hangers.
 3. For round ducts, hangers shall be galvanized steel strap hangers. Sizes and number of strap hangers shall be based on duct size as scheduled in the SMACNA Standard, Table 4-2 (page 4-9). For duct sizes requiring 2 hangers, the hanger supports shall be minimum 3/8 inch round steel hanger rods.
 4. Exposed ductwork on the roof shall be welded, watertight construction and shall be painted with an asphaltic based paint to inhibit rust. Ductwork passing through roof curbs shall be flashed watertight.

2.02 DOUBLE WALLED, INSULATED, SPIRAL DUCTWORK

- A. All exposed round ductwork throughout this project shall be doubled walled type with full thick insulation between walls. Ductwork SHALL BE as manufactured by Hamlin Sheet Metal, Inc., or as approved by the Engineer.
- B. Duct system shall consist of fittings that are factory fitted with a sealing gasket and spiral duct which will seal the duct joint airtight without use of a duct sealer when installed as per manufacturer's recommendations.
- C. All ductwork and fittings shall be constructed as per SMACNA's Duct Construction Standards to 10" W.C. pressure. Duct and fittings shall be constructed of a minimum of G-60 galvanized steel in accordance with ASTM-A-653 and A-924. All fittings shall come factory equipped with a double lipped U-profile, EPDM rubber gasket. Gaskets shall be manufactured by gauge and flexibility to meet all published performance criteria.
- D. Gaskets shall be classified by U.L. to conform to ASTM-E84-91a and NFPA-90A flame spread and smoke developed ratings of 25/50.
- E. All fitting ends from 3 to 12 inches diameter shall have rolled over edges. Elbows from 3 to 12 inches diameter shall be constructed of two piece die stamped and continuously stitch welded. Elbows 14 inches diameter and larger shall be standing seam gorelock construction. All radiuses of 90 deg and 45 deg shall be 1.5 times the elbow diameter unless noted otherwise. The radius of all 15 deg, 30 deg and 60 deg elbows shall be 1.0 times the elbow diameter.
- F. Volume dampers shall be SPIRO safe type DRU, DSU, or DTU or approved equal by Engineer. Dampers shall be fitting sized to fit into the spiral ductwork. Dampers to be complete with the following:
 - 1. Locking quadrant with blade position indicator,
 - 2. 2 inch sheet metal insulated stand-off,
 - 3. Integral shaft/blade assembly,
 - 4. Shaft mounted, load bearing bushings,
 - 5. Gasketed shaft penetrations to minimize leakage.
- G. Spiral Ductwork: Spiral ductwork shall be calibrated to the manufacturer's published dimensional standards. All spiral ductwork 14 inches diameter and larger shall be corrugated for strength and rigidity. Seam slippage shall be reduced by means of a flat seam and a mechanically formed indentation spaced along the spiral seam.
- H. Leakage: Spiral duct system performance shall meet SMACNA's Leakage Class 3 requirements at the system design static pressure as indicated on the Contract Documents. Duct pressures shall not exceed minus 20 inches W.G. or plus 12 inches W.G.

2.03 MANUAL DAMPERS AND DAMPER HARDWARE

- A. Splitter dampers shall be constructed of not less than 20 gage galvanized steel sheet. The length of the damper blade shall be the same as the width of the widest duct section at the split, but in no case shall blade length be less than 12 inches.

B. Volume Control Dampers

1. Dampers shall be single blade butterfly type in ducts up to and including 12 inches by 12 inches size; for ducts larger than 12 inches by 12 inches, in either or both dimensions, the dampers shall be the multi-blade type. All dampers in O.A. ductwork shall shut tightly and have vinyl edge seals.
2. Single blade butterfly dampers shall be constructed of not less than 16 gage galvanized steel blade mounted in a galvanized steel frame. For rectangular dampers, the top and bottom edges of the blade shall be crimped to stiffen the blade. Damper shall be provided with an extended rod to permit installation of a damper regulator.
3. Dampers larger than 12 inches in either direction shall be multi-blade dampers and shall be the opposed blade type, constructed of not less than 16 gage galvanized steel blade mounted in galvanized steel channel frame. Blade spacing shall not exceed 6 inches and the top and bottom edges of the blade shall be crimped to stiffen the blades. Damper blades shall be interconnected by rods and linkages to provide simultaneous operation of all blades. Damper shall be provided with an extended rod to permit installation of a damper regulator.
4. When dampers occur above other than lay-in ceilings, provide Young Model No. 270-275 controller mounted on top of diffuser with the 5020CC damper. Damper assembly complete with supports, bearings and Young No. 1 regulators with an additional end bearing and chromium plated ceiling escutcheon.

C. Hardware for Manual Dampers:

1. Splitter damper hardware - When neither dimension of a damper exceeds 18", the damper shall be provided with a ball joint bracket attached to the outside of the duct. The bracket shall have a setscrew for securing damper rod in position. The damper operating rod shall be not less than 1/4" diameter steel rod and shall be secured to the damper blade with a clip. When either dimension of a damper exceeds 18", the damper shall be provided with 2 ball joint brackets and rods. The rods shall be located at quarter points on the damper.
2. Duct mounted regulators with operating handle and locking quadrant shall be provided on manual volume control dampers.
3. Damper hardware shall be Ventfabrics, Young Regulator or Duro-Dyne provided the equipment meets or exceeds the Contract Documents.

- D. Dampers shall be Ruskin or approved equal by Air Balance, Price, or American Warming and Ventilating.

2.04 FLEXIBLE DUCTWORK

- A. Flexible ductwork shall be Class 1, UL 181-air duct with an aluminized mylar or polyester inner liner laminated to a corrosion resistant steel wire helix. Aluminum helix is not acceptable.
- B. A 1 inch thick, one (1) pound density fiberglass insulation and vinyl outer jacket shall cover the wire helix.
- C. The maximum allowable length of low pressure flexible ductwork shall be 4'-0" and shall be limited to short run-outs and end runs connected to round neck ceiling supply diffusers. Provide a spin-in fitting with integral volume damper at all flexible run-out connections in low-pressure ductwork.

- D. The maximum allowable length of medium pressure flexible ductwork shall be 1'-0" and shall be limited to short run-outs connecting FPB and VAV units to medium pressure sheet metal ductwork.
- E. Flexible ductwork shall be designed for pressures up to 4" inches W.G. for low-pressure ductwork and 10 inches W.G. for medium pressure ductwork.
- F. Low pressure flexible ductwork SHALL BE Clecon Model Flex 28 VF Series or Genflex Type SLS-181 or Wiremold Type WGC and medium pressure flexible ductwork SHALL BE Clecon Model FLEX 28 VF Series, Genflex 1HPL-181 or Wiremold Type WGC.

2.05 FLEXIBLE DUCT CONNECTIONS

- A. Flexible duct connections shall be non-combustible, installed at all belt-driven equipment and where shown. Material shall be glass fabric double coated with neoprene (30 Oz. per square yard minimum) and shall be Vent Fabrics, Duro-Dyne or Young Regulator, provided the equipment meets or exceeds the Contract Documents. Provide duct supports on each side of flexible connections.

2.06 ACCESS DOORS

- A. Provide a duct access door at each fire and/or smoke damper where required for access. Access doors 18 inches by 18 inches and larger shall have a continuous hinge on one side with latch on the other side. Access door shall be designed for five (5) times the pressure of the duct in which it is mounted. Access doors shall be of sufficient size to provide access to the dampers for resetting or replacing thermal links. Access doors shall be double metal faced, internally insulated same as duct, and provided for gasket seal. Access doors downstream of fire dampers in medium pressure ductwork shall be the implosion type.
- B. Coordinate the location of access doors above inaccessible ceilings with the Architect.
- C. Access doors SHALL BE EQUAL TO Ruskin Model"ADR16" for round duct and Model "ADC22" for square ductwork.

2.07 COMPUTER CHECK

- A. Allow the cost of making an acceptable computer check of the air terminal units and duct design as shown on the sheet metal shop drawings.
- B. Do not fabricate ductwork for computer designed medium pressure systems without written approval of computer check from engineer.

2.08 AIR EXTRACTORS

- A. Provide in duct mounted supply outlets and takeoff or extension collars to supply outlets. Air extractors shall be factory-fabricated and factory or field assembled units consisting of curved turning vanes or louver blades for uniform air distribution and change of direction with minimum turbulence and pressure loss. Where adjustable devices such as air deflectors or extractors are inaccessible they shall be provided with means for adjustment and position lock external to the duct in which they are located. SIMILAR TO Young Regulator Model No. 1.

2.09 DUCT INSTRUMENT TEST HOLES

- A. Provide for each system four (4) test holes two (2) in supply duct and two (2) in return air plenum at opposite ends near air handling units with screwed caps. Also, at duct mounted coils and electric duct heaters provide one (1) on either side of the coil or duct heater.

2.10 REGISTER AND GRILLE CONNECTION

- A. Where take-offs are on the side of a duct, clinch lock short tee sections onto trunk. Install collars with slip joints and 3/4 inch flange at outlet end. At plastered surfaces set collars exactly flush with plaster surface (mechanic must be on job to make adjustments during plaster application). Set flange face so as to receive register gasket, and be concealed by register flange. Collars may be deleted where mounting frames are furnished with registers.
- B. Install boots above lay-in ceilings simultaneously with ceiling work; mechanic must be on job during this phase of construction work.
- C. At return relief and exhaust grilles 4'-0" or more in either dimension, collars shall be 1 by 2 by 1/8 inch steel angle frames with corners mitered, welded and ground smooth. Frames in ceilings shall be independently suspended from the ceiling structure.
- D. Interior of ductwork visible through grilles and diffusers shall be painted flat black.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install all ductwork and accessories as shown and in accordance with applicable SMACNA Standards.
- B. All joints in ductwork shall be sealed with a fire retardant duct sealant. Tape is not acceptable.
- C. Duct liner shall be cut to provide overlapped and compressed longitudinal corner joints. Liner shall be installed with coated surface facing the air stream. Duct liner shall be adhered to the ductwork with a 100 percent coverage of the sheet metal surfaces using a fire retardant adhesive applied by spraying. Coat all exposed leading edges and all transverse joints with fire retardant adhesive. All leading and trailing edges shall be secured with sheet metal airfoils.
- D. Sound Proof Construction for Duct Penetrations is required for openings between ductwork and interior spaces. The method for soundproofing shall be as follows:
 - 1. Fill openings with fibrous glass blanket or board for full depth of penetration.
 - 2. Caulk each side of opening with non-hardening, non-aging caulking compound equal to Johns-Manville "Duxeal".
 - 3. Penetrations through fire-rated partitions and shafts shall be sealed with Dow-Corning RTV fire-retardant foam.
 - 4. Duct system sound levels shall be maintained at such as level as to not exceed a maximum of NC 35 for all spaces. Duct fabrication and installation shall be altered if noise levels are exceeded at no cost to the Contract.

- 5. All exterior kitchen exhaust ductwork shall be painted with rust inhibiting primer.
- 6. Unavoidable obstruction: Where structural elements or pipes must pass through a duct, provide two-piece streamliners, and enlarge duct to compensate for net loss of area. Round pipes and rods smaller than three (3) inches need not have special treatment. Note: This provision will not be used to justify obstructions, which can be avoided.

E. Splitter Dampers

- 1. Provide where shown on drawings. Fabricate blades of same thickness galvanized steel as the duct where used; minimum 20 gage thickness.
- 2. Anchor splitters at the air entering edge by 3/16 inch adjustable galvanized steel rods that pass through set screw clamps on the outside of duct. Use one (1) rod and clamp on splitters with leading edge up to 15 inches, (2) rods up to 30 inches, and on 15-inch centers above 30 inches.
- 3. When splitter dampers occur above other than lay-in ceilings, provide Young Model No. 270-275 Controller Mounted on Top of Diffuser with the 5020CC Damper. Damper assembly complete with supports, bearings and Young No. 1 regulators with an additional end bearing and chromium plated ceiling escutcheon.

3.02 PRESSURE TESTING OF DUCTWORK

- A. Testing Procedures: All pressure testing of ductwork shall be performed prior to the installation of external insulation. Duct sealant shall be applied within the factory recommended temperature range and fully cured prior to any tests.
- B. The contractor shall determine pressure range and capacity of the test apparatus to insure the pressure is suitable for the ductwork being tested.
- C. Allowable leakage chart:

System Types	Minimum Test Press	Max Allowable Leakage
1) Fan coil systems, small exhaust/supply fans. Fractional HP fan systems.	0.5 inch W.C.	2 percent
2) Small split D.X systems	1.00 inch W.C.	2 percent
3) VAV and constant terminal units including LP downstream ductwork.	1.00 inch W.C.	2 percent
4) Single zone systems/ L.P. VAV and CAV systems, RA duct systems.	2.00 inches W.C.	2 percent
5) Constant volume ductwork in chases, concealed spaces, main R.A. ducts on VAV and CAV systems & main ducts on exhaust and/or supply systems.	3.00 inches W.C.	1 percent
6) Supply air ductwork to VAV and CAV terminal units	4.00 inches W.C.	1 percent
7) High pressure induction system	6.00 inches W.C.	0.5 percent

D. Report of Test Data:

1. Once the testing of all duct systems has been completed, this contractor shall provide a report of leakage results that will include the following:
 - a) The project name and location
 - b) Date of test
 - c) Name of person making test including the name of Architect, Engineers, Contractor, or witness to said test.
 - d) Description of test including the sealing clarification and duct classification
 - e) The design and actual test static pressure
 - f) The design and actual leakage rate
 - g) Duct test to conclude if test passed or failed

- E. All pressure testing of ductwork shall be in accordance with the Associated Air Balance Council (AABC) standards for Total System Balance, 2002 Edition.

END OF SECTION

SECTION 23 34 00

HVAC FANS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Requirements of the General Conditions, Supplementary Conditions, and Section 23 05 10 "HVAC General Requirements" apply to all work specified in this Section.
- B. Refer to Specification Section 23 05 11 titled "HVAC Submittal Data" for the submittal and approval requirements regarding fan systems.
- C. See other sections of these specifications that may specify accessories or features.
- D. Refer to the schedules on the drawings where equipment capacities are not included in this section.
- E. Review other sections of the specifications and the plans for services required to each piece of mechanical equipment. Any required accessories, appurtenances, or service omitted from the plans or specifications that are not called to the attention of the Architect at least 72 hours before bidding and corrected by addendum shall be provided as though shown.
- F. V-belt drives shall be designed for not less than 150 percent of connected driving capacity and motor sheaves shall be adjustable to provide not less than 20 percent speed variation. Sheaves shall be selected to drive the fan at a speed to produce the scheduled capacity indicated on the drawings when set at the approximate midpoint of the sheave adjustment. Motors with V-belt drives shall be provided with adjustable bases.
- G. Fan motor enclosure shall be the drip-proof type unless specifically indicated otherwise.
- H. Belt driven power assemblies shall be mounted on vibration isolators.
- I. Centrifugal fan wheel shall be statically and dynamically balanced.

1.02 COORDINATION

- A. Motors required in connection with equipment shall be of sufficient size and speed for duty to be performed, not exceeding their full-rated load when driven equipment is operated at specified capacity under most severe conditions likely to be encountered.
- B. Belt drives shall be adjustable "V" belt type. Selection shall be based on 150 percent of the motor horsepower. Selection shall be factory-set so that specified capacity is at midpoint setting, allowing 20 percent overall speed adjustment. Motors shall be selected on 110 percent of the brake horsepower required with a service factor of 1. Motors and/or drives shall be changed if required to delivery specified CFM should static pressure differ from that specified.
- C. All exposed rotating machinery shall be equipped with guards.
- D. Submit all equipment for approval.

1.03 SUBMITTALS

- A. In accordance with Section 23 05 11, submittals shall be furnished for the following:
 - 1. All fan sections, including motors and drives. All centrifugal fans, including motors and drives.
 - 2. Ceiling and inline cabinet fans
- B. Complete maintenance and operating manuals.
- C. Sound power levels for all fans (Db and/or some levels).
- D. Provide fan curves for each fan showing CFM versus static pressure, horsepower and fan efficiency at the specified design point.

1.04 APPLICABLE STANDARDS

- A. All fans and power exhausters shall be listed in the current edition of AMCA and shall bear the AMCA seal.
- B. Fan performance criteria: Fans shall be scheduled on plans indicating manufacturer's name and model number, CFM, static pressure, sones, drive, horsepower and voltage. Fan motors 1/2 horsepower and larger shall be sized based on full design CFM at 115 percent design static pressure.

PART 2 – PRODUCTS

2.01 COORDINATION

- A. Units of one manufacturer have been used as the basis of design. Any modifications to electrical connections, building structure, etc., that result from the use of another manufacturer shall be coordinated with all other trades. This coordination shall occur before delivery of equipment from the manufacturer. Any modifications shall be performed without incurring any additional cost to the contract.

2.02 FANS

- A. Furnish and install all supply and exhaust fans as scheduled on drawings. Fans shall be of the type size and capacity as scheduled and shall be furnished as hereinafter specified and scheduled.
- B. All fans shall have been statically and dynamically balanced prior to leaving the factory. Fans found vibrating noticeable in the field, due to damage in shipment, improper handling, etc., shall be removed and replaced at no additional cost to the Owner.

2.03 DESCRIPTION

- A. Ceiling and Inline Cabinet Fans:
 - 1. Fans as indicated on drawings shall have acoustically insulated housings and shall not exceed sound level ratings shown.
 - 2. Fans shall bear the AMCA Certified Ratings Seal and UL Label.
 - 3. Integral back-draft damper shall be chatter-proof. Fans shall have true centrifugal wheels.
 - 4. Face grille shall be aerodynamic white egg crate design and provide 85% free area.

5. Manufacturers shall submit vibration amplitudes and magnetic motor hum in decibels.
6. Fans shall be provided with cord, plug, and receptacle inside the housing. Entire fan, motor and wheel assembly shall be removable without disturbing the housing. Fan motors shall be suitably grounded and mounted on vibration isolators.
7. Fans SHALL BE Greenheck, Cook or approved equal by Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The Contractor, prior to installing any equipment, shall examine the conditions under which the equipment is to be installed, and shall notify the Architect of conditions detrimental to the proper installation of the equipment.
- B. All equipment shall be installed in accordance with the latest manufacturer's written instructions, and in accordance with governing codes and recognized industry standards and practices.
- C. Coordinate all work with other trades as necessary for proper interfacing.
- D. All proper equipment shall be protected from any form of damage. Any damaged equipment shall be replaced without additional cost.

3.02 START-UP

- A. An authorized representative of the equipment manufacturer shall make the initial start-up. The balancing contractor shall be responsible for final verification and reporting of all airflows.

3.03 ADJUSTMENT

- A. The equipment shall be tested and adjusted to ensure the scheduled capacities as indicated. All controls shall be tested and adjusted.

END OF SECTION

SECTION 23 37 13

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section is subject to the provisions of HVAC General Requirements Section 23 05 10.
- B. Grilles, registers and diffusers shall be provided to meet the minimum capacities indicated on the drawings and shall meet all constraints of construction.

1.02 COORDINATION

- A. The grilles, registers and diffusers of one manufacturer have been used as the basis of design. Any modifications to ductwork, controls, building structure, etc., that result from the use of any other units shall be coordinated with all trades. This coordination shall occur before delivery of equipment from the manufacturer. Any modifications shall be performed without incurring any additional costs to the Contract.

1.03 ACCEPTABLE MANUFACTURERS

- A. Manufacturers listed below are acceptable. Approved equal products which are ADC tested, rated and certified may be Price, Metalaire or Titus.
- B. All devices selected must meet or exceed all the requirements of these contract documents.

PART 2 - PRODUCTS

2.01 DESCRIPTION

- A. Color of all grilles, registers and diffusers are to be selected by Architect. Also, ceiling mounted items shall be selected to fit the ceiling in which they are applied.
- B. Air distribution devices shall be as follows:
 - 1. Exhaust air register shall have a fixed core of 1/2 inch by 1/2 inch by 1/2 inch aluminum squares. Register shall have opposed blade dampers. Registers shall be as scheduled on plans or equal.
 - 2. Return air grilles (ceiling mounted) shall have a fixed core of 1/2 inch by 1/2 inch by 1/2 inch aluminum squares. Grilles shall be as scheduled on plans or equal. Finish shall be white baked enamel.
 - 3. Sidewall air registers shall have 1 inch framed border and aluminum face bars on 1/2 inch centers. Unit shall be extruded aluminum with natural anodized finish. Sidewall registers shall be as scheduled on plans or approved equal.
- C. The Contractor shall verify that all air distribution devices are suitable for the ceiling and wall types in which they are installed.
- D. All air distribution devices shall be shown in grille, register and diffuser schedule.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Grilles, registers and diffusers shall be installed as indicated in conformance with the manufacturer's recommendations. Coordinate the actual units to be provided with all trades.
- B. All grilles, registers and diffusers shall be selected and submitted at a NC level of 35 or less.
- C. The grilles, registers and diffusers shall be tested and adjusted to provide the scheduled capacities.

END OF SECTION

SECTION 23 41 00

PARTICULATE AIR FILTRATION

PART 1 – GENERAL

1.01 SCOPE

- A. Provide all material, equipment and labor, etc., required to complete installation specified herein and/or shown or scheduled on Contract Drawings.
- B. Descriptions:
 - 1. Air filters for Heating, Ventilating and Air Conditioning.
 - 2. Definitions: Refer to ASHRAE 52.2 (MERV) for definitions of face velocity, net effective filtering area, media velocity, resistance (pressure drop), atmospheric dust spot efficiency, dust-holding capacity, etc.

1.02 COORDINATION

- A. The Filters of one manufacturer (Farr) have been used as the basis of design. Any modifications to ductwork, building structure, ect., that result from the use of any other units shall be coordinated with all trades; this coordination shall occur before delivery of equipment from the manufacturer. Any modifications shall be performed without incurring any additional cost to the Owner.

1.03 ACCEPTABLE MANUFACTURERS

- A. Manufacturers listed below are acceptable:
 - 1. Farr
 - 2. American Filter
 - 3. Cambridge
- B. All devices selected must meet or exceed all the requirements of the Contract Documents.
- C. Manufacturer's Literature:
 - 1. Holding frames
 - 2. Side access housing
 - 3. Throwaway filters (T.A.)

PART 2 – PRODUCTS

2.01 HOLDING FRAMES

- A. Filter Classification: Underwriters' Laboratories (UL) approved class 2 conforming to UL's latest Standard.
- B. Temporary Filters: For temporary use of HVAC systems during the construction period, all systems shall be equipped with replacement filters as described herein:
 - 1. For HVAC systems with pre-filter and final filter banks, contractor to provide to the owner two complete sets of pre and final sets of replacement filters.

2. HVAC systems with only one filter bank; provide the owner with two complete sets of replacement filters.
 3. Refer to Section 23 05 10 "HVAC General Requirements"; paragraph 1.04-Temporary HVAC for the operation of HVAC systems during the construction period.
- C. Side Servicing Housing: Minimum 16 gage galvanized steel, or aluminum, completely factory assembled with upstream and downstream flanges for connection into the duct system. Furnish housing with sufficient length to provide for a fully extended filter.
 - D. Access Doors: Double skin insulated, on each side of the housing with continuous gasketing on the perimeter a positive air lock.
 - E. Filter Slide Channels: Channels shall incorporate a positive-sealing gasket material to seal the top and bottom of the filter cartridge frames to prevent bypass. Provide factory installed gasketing to prevent leakage between cartridges, and between cartridges and doors.
 - F. Holding Frame System: To be constructed of 16 Gage galvanized steel. Frames to be equipped with polyurethane foam gaskets and filter centering dimples. All framing members shall be permanently gasketed to prevent any bypass of air.
 - G. The framing system shall include a factory installed positive sealing device for each row of filters. This device shall allow for easy installation and removal of cartridges and shall insure the seal between the gasketed filter elements while the bank is in operation.
 - H. Provide Magnehelic Differential Pressure Gauges at each air unit's filter section. Gages to be nominal 4 inches diameter with a zero to 2 inch range.
- 2.02 PRE-FILTER 2 INCHES THICK, MERV VALUE 6 (DISPOSABLE)
- A. Filter shall be equal to Farr 30/30 series, 2 inches thick, pleated, of the disposable type. Filter media shall consist of non-woven cotton fabric with supporting grid and frame mounted. The filter shall be listed by Underwriters Laboratories with Class 2 Classification.
 - B. The filter media shall have an efficiency resistance per MERV standards in accordance with ASHRAE Testing Standard 52.2. The initial resistance shall not exceed 0.28 inches W. G. at 500 FPM velocity.
 - C. The media shall be supported on a wire grid with an effective free area of 96 percent. The wire grip to be bonded to the filter to prevent media from pulling away.
 - D. The holding frame shall be constructed of 16 gage galvanized steel. The frame shall be gasket equipped and held in place with spring loaded fasteners.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install supports, filters, housing and gauges in accordance with manufacturer's instructions.

3.02 START-UP AND TEMPORARY USE

- A. Prior to the start-up of all air handling units, all AHU's, and plenums to be cleaned inside and out to the satisfaction of the ENGINEER.
- B. Provide and install new filter media as specified into each air system. Provide and deliver replacement filters to the Owner as directed by the Engineer.

3.03 SPARES

- A. Provide two (2) extra sets of replacement filters of each type for each air system.

END OF SECTION

SECTION 23 81 13

PACKAGED TERMINAL AIR-CONDITIONERS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section is subject to the provisions of Section 23 05 10, "HVAC General Requirements".
- B. Packaged Terminal Air-Conditioner shall be provided with minimum capacities scheduled, shall meet all constraints of construction, and shall comply with all sections of this specification.

1.02 COORDINATION

- A. The units of one manufacturer (GE) have been used as a basis of design. Any modifications to wiring, building structure, etc., that results from the use of any other unit shall be coordinated with all trades prior to delivery of approved equipment from the manufacturer to the job site. Any costs incurred because of these modifications shall be the responsibility of the Contractor.

1.03 ACCEPTABLE MANUFACTURERS

- A. The following manufacturers are acceptable on this project:
 - 1. GE
 - 2. Friedrich
 - 3. LG
 - 4. Or as approved by the Engineer.

PART 2 - PRODUCTS

2.01 HEAT PUMP

- A. Furnish and install Packaged Terminal Heat Pump with the capacities and efficiencies as shown on the plans. Units shall be rated in accordance with ARI and bear UL approval.
- B. The wall case shall be constructed of heavy-gauge, insulated, zinc-coated phosphated steel with a protective baked-on enamel finish. The discharge shall be sloped to prevent obstructions from being placed on the unit and shall have an adjustable discharge grille. The bulk head shall be insulated.
- C. Unit shall include a hermetically sealed refrigerant system with external vibration isolated rotary-type compressor, condenser and evaporator coils and capillary refrigerant control. Cooling shall be possible to outdoor temperature of 35 deg F. without damage to the compressor. Airflow system consisting of one permanently lubricated two-speed fan motor for the outdoor fan and a separate permanently lubricated two-speed fan motor for the indoor fan. Outdoor fan shall be multi-blade axial-flow design made of non-corrosive material. Indoor fan shall be of a design to optimize airflow and operating sound. All motors on the exterior side of the weather barrier shall be of an enclosed design to reduce the effects of moisture and corrosion.

- D. The room cabinet shall have slide-out washable filters accessible without requiring removal of room cabinet from chassis.
- E. Unit shall have means of electrical connection listed by Underwriters Laboratories and compatible with the unit's required voltage and ampacity in conformance with National Electrical Code® (NEC) and local codes.
- F. Units shall provide operation that will automatically phase-in partial electric resistance heat, if outdoor temperature is below 46 deg F., simultaneously with heat pump if heat pump alone is unable to maintain room temperature. The unit will switch to full resistance heat if room temperature continues to decline or the outdoor temperature falls below 25 deg F. If the outdoor temperature is above 46 degF., unit will lock-out electric resistance heat and operate on heat pump only.
- G. Unit shall include Reverse Cycle Defrost that automatically begins a defrost cycle when microprocessor determines criteria for defrosting has been met. Defrosting shall be accomplished by systematically ceasing heat pump operation, pausing to allow internal refrigerant pressures to equalize, then operating the compressor with the flow of refrigerant reversed to allow the hot gas to flow through the outdoor coil melting the accumulated frost. The unit shall automatically resume heat pump operation, after pausing to allow refrigerant pressures to equalize, at conclusion of defrost cycle.
- H. Each unit shall have a field-installed UL-listed electrical sub-base. The sub-base shall be attached to the lower inside flange of the wall case prior to installation in the exterior wall. It shall include adjustable screws at the bottom corners to permit exact leveling of the wall case. The sub-base shall have a factory-installed receptacle to allow unit line cord to plug into mating receptacle and shall have a chaseway to contain and conceal the line cord.
- I. Unit controls shall include a dry bulb thermostat at the evaporator fan inlet; vent control knob to adjust outside air damper; push button panel with on, fan only, high cool, low cool, high heat, and low heat buttons; and hinged control panel cover.

2.02 WARRANTY

- A. The warranty shall be a full one-year parts and labor on the entire unit, plus an additional full four years parts and labor for the sealed refrigerating system, including service call for diagnosis and transportation to and from service shop (if necessary) at no charge to the customer. The warranty shall also include a limited second through fifth year parts only warranty for fan motors, switches, thermostat, heater, heater protectors, compressor overload, solenoids, circuit boards, auxiliary controls, thermistors, frost controls, ICR pump, capacitors, varistors and indoor blower bearing.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. The Contractor, prior to installing any equipment, shall examine the conditions under which the equipment is to be installed, and shall notify the Architect of conditions detrimental to the proper installation of the equipment.
- B. All equipment shall be installed in accordance with the latest manufacturer's written instructions, and in accordance with governing codes and recognized industry standards and practices.

- C. Coordinate all work with other trades as necessary for proper interfacing.
- D. All equipment shall be protected from any form of damage. Any damaged equipment shall be replaced without additional cost.

END OF SECTION

SECTION 23 81 26

SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section is subject to the provisions of Section 23 05 10, "HVAC General Requirements".
- B. Split system air handler shall be provided with minimum capacities scheduled, shall meet all constraints of construction, and shall comply with all sections of this specification.

1.02 COORDINATION

- A. The units of one manufacturer have been used as a basis of design. Any modifications to ductwork, piping, wiring, building structure, etc., that results from the use of any other unit shall be coordinated with all trades prior to delivery of approved equipment from the manufacturer to the job site. Any costs incurred because of these modifications shall be the responsibility of the Contractor.

1.03 ACCEPTABLE MANUFACTURERS:

- A. The following manufacturers are acceptable on this project:
 - 1. Trane,
 - 2. Carrier,
 - 3. Lennox
 - 4. Or as approved by the engineer.

PART 2 - PRODUCTS

2.01 ELECTRIC FURNACE

- A. Electric Furnace: Electric furnace shall include an electric heating element, blower, filter and accessories enclosed in factory cabinet. Electric furnaces shall be up-flow as indicated on the contract documents.
- B. The Heating Elements: The heating element shall be constructed of a helix wound bare wire directly exposed to the air stream providing a transfer of heat from the element to the air. The element support frame shall be constructed of heavy gauge steel. The elements shall be shielded with porcelain insulators located for proper spacing of heat transfer operation. The elements shall be easily removable from the unit for servicing.
- C. Blowers: Furnace shall be furnished with variable speed direct drive or belt drive blower as indicated on the contract drawings. Blowers shall be statically and dynamically balanced as an assembly before being installed in the furnace. A choice of variable speeds shall be available in the direct drive configuration.
- D. Filters: Furnaces shall be equipped with 2 inch disposable filters complete with filter mounting rack. See Section 15841, "Filters".

- E. Controls: Furnace shall be complete with pre-wired factor controls, including thermal sequencer relay, blower unit relay, limit controls, transformer, circuit breakers, thermostats, etc. Thermal sequencer relay shall bring the heating element on in 5 KW stages with a time delay between each stage. The blower controller shall sequence the blower operation simultaneously with the first element on and last element off. The blower cooling relay to be factory installed for cooling operation. Each heating element is to be equipped with an accurately located limit control with a fixed temperature “off” setting and an automatic reset. In addition, furnace controls shall include thermal safety fuses to provide additional protection in case of overheating. Furnaces shall be equipped with circuit breakers to provide overload and short circuit protection. These circuit breakers shall be factory mounted and wired in the control compartment.
- F. Cabinet: Furnace cabinets shall be constructed of heavy gauge cold rolled steel with factory finish. The cabinet interior shall be insulated/lined with 1/2 inch thick by 1-1/2 lbs. fiberglass insulation. Service access shall be provided through front access panels. The blower assembly shall be completely removable by sliding through the access panel/door. The return air is possible through either a bottom or side access for up-flow cabinets. Down flow cabinets shall be fitted for top side return air through sections added to the top of the furnaces.
- G. See the contract documents for capacities and characteristics of furnaces.

2.02 EVAPORATOR COIL

- A. Evaporator coil shall have aluminum fins bonded to seamless copper tubes. Coil shall be factory tested under 300 psig pressure to assure leak-proof construction. Units shall ship with thermal expansion valve, metering devices, quick-connect couplings and an operating charge of refrigerant.
- B. Coil casing shall be heavy-gauge steel lined with 1/2 inch thick sheet Armaflex insulation. Insulate pipe drain from pan with 3/4 inch Armaflex.
- C. Coil shall be provided with a secondary drain pan either factory installed or field fabricated.

2.03 CONDENSING UNIT

- A. Condensing Unit: Air cooled outdoor unit shall be factory assembled into a weatherproof cabinet. Unit shall be UL Listed and comply with ARI Standard No. 240.
- B. Cabinet shall be heavy-gauge, zinc coated steel, phosphatized, painted with an epoxy resin primer (exterior) and finished with an acrylic topcoat. Electrical and refrigeration connections shall be located at accessible points. Removable panel shall allow access to all components and connections. Drainage hole shall be provided in base-pan for removal of moisture.
- C. Each refrigerant circuit shall be complete with hermetic or semi-hermetic compressor with high and low pressure cut-outs crankcase heater, moisture indicating sight glass, filter drier, and access and service valves. Compressor shall be mounted on rubber grommets to minimize noise and vibration transmission.
- D. Condenser coil shall have heavy aluminum fins bonded to copper tubes. Unit shall be factory tested under pressure at 425 psig to assure leak-proof construction. Condenser coils shall include a protective coated, metal grille guard on all sides of unit.

- E. Condenser fans shall be propeller type, direct driven by permanently lubricated motors, designed for outdoor installation. Entire fan/motor assembly shall be isolated from unit with rubber-in-shear vibration isolators. Provide fan guard on outside of fan.

2.04 FILTRATION

- A. Filters: Each furnace unit shall be furnished with filters as indicated in Section 23 41 00. Furnaces shall either be provided with side filter racks or bottom return plenums and filter racks as shown on the drawings.

2.05 CONTROL SYSTEM

- A. Units shall be complete with a manufacturer's supplied solid state temperature controls package.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. The entire split system air handler and associated items shall be installed in complete conformance with the manufacturer's recommendations and these Contract Documents.
- B. Units shall be provided with duct connections as indicated on the drawings, and all connections shall be made with flexible connectors as specified herein.
- C. All low voltage wiring shall be installed in conduit by a licensed electrician. Low voltage control wiring shall be installed under this division. All line voltage wiring (115V and higher) shall be installed under Division 16 Electrical.

END OF SECTION

SECTION 26 05 10

ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE

- A. This Division and the accompanying electrical drawings cover furnishing all labor, equipment and materials and performing all operations in connection with the installation of a complete and operational electrical system.
- B. There are many interfaces between the work involved with this Division and the work in other Divisions, particularly with Division 23. Be aware of the responsibilities at the interfaces. The exact locations of apparatus, fixtures, equipment and raceways shall be ascertained from all concerned and the work shall be installed accordingly. In addition, coordinate with all equipment suppliers and other trades to verify the actual installation requirements prior to rough-ins.
- C. The plans and specifications are considered cooperative and complimentary. Where one contradicts the other the specifications shall govern the Architect for clarification prior to any installation.
- D. All applicable portions of the General and Specific Conditions are included herein by reference.

1.02 DEFINITIONS

- A. Install: Receive, store, place, fix in position, secure, anchor, etc., including necessary appurtenances and labor so the equipment or installation will function as specified and intended.
- B. Furnish: Purchase and supply equipment and components, including shipping and receiving.
- C. Provide: Furnish, install, connect, test, demonstrate and leave operational.
- D. Wiring: Wire or cable installed in raceway with all required boxes, fittings, connectors, etc.
- E. Work: Materials completely installed, including the labor involved.
- F. Or approved equal: Equal in type, design, quality and appearance, as determined by the Architect.
- G. Raceway: Galvanized rigid steel conduit (GRC), electrical metallic tubing (EMT), intermediate metal conduit (IMC), schedule 40 Polyvinyl Chloride (PVC), flexible steel (FLX), sheathed flexible steel (SLT), code gauge wireway (WW).

1.03 CODES AND REGULATIONS

- A. All work shall comply with all local laws, ordinances and regulations applicable to the electrical and fire alarm/life safety system installation, NFPA, OSHA, ANSI, SBC, municipal ordinances governing electrical work, and with the requirements of the latest edition of the National Electrical Code.

- B. Where different sections of any of the aforementioned codes and regulations, the specifications or the plans require different materials, methods of construction, or other requirements, the most restrictive or stringent shall govern. In any conflict between a general provision and a special provision, the special provision shall govern.
- C. Obtain all permits and licenses, and pay all fees as required for execution of the Contract. Arrange for necessary inspections required by the Architect, city, county, state and other local authorities having jurisdiction (LAHJ) and present certificates of approval to the Architect or his designated representative.
- D. Under no circumstances will asbestos, or asbestos related materials, be allowed on this project.
- E. Communicate with all required utility offices to meet utility schedules and regulations. Coordinate the local utility requirements with the requirements of these contract documents. Should conflicts arise, notify the Architect immediately. Acquire services to avoid project delays. Conform to regulations of the local utility company with respect to metering, service entrance and service access.

1.04 SITE VISIT

- A. All parties shall visit the site and thoroughly familiarize themselves with the local conditions and existing conditions which may affect the cost of the Work prior to any project activity or submission of bids.
- B. Where work under this Division requires extension, relocation, reconnection or modifications to the existing equipment or systems, the existing equipment or systems shall be restored to their original condition prior to completion of this Project.
- C. No allowances will be made for lack of knowledge of existing job conditions which could reasonably be identified during site visit.
- D. Verify the service entrance voltage and short circuit contribution with the serving power utility and provide written confirmation of same to the Architect prior to submitting shop drawings or ordering any materials for use in the building served. Provide service entrance equipment fully rated to interrupt the available fault current from the serving utility.

1.05 DRAWINGS AND SPECIFICATIONS

- A. The Electrical Drawings are diagrammatic, and are not intended to show the exact location of raceways, outlets, boxes, bends, sleeves, fire sealant, couplings or other such elements except where dimensions are noted. Provide all required offsets, extensions or pull boxes required for a fully coordinated and operational system.
- B. The Drawings and Specifications shall both be considered as part of the Contract. Any work or material shown in one and omitted in the other, or which may fairly be implied by both or either, shall be provided in order to give a complete job.
- C. Should conflicts exist between the Drawings and Specifications, notify the Architect/Engineer for clarification prior to installation.
- D. Refer to the Architectural (Interiors), Structural, Mechanical, Civil, and Kitchen plans in conjunction with other project construction and shop drawings for dimensions, and properly fit the work to conform to the details of building construction.

- E. Review the drawings for door swings, cabinets, millwork, counters and other built-in equipment. Coordinate installation of the electrical equipment with structural systems and mechanical systems such that full maintenance access is provided.
- F. The right is reserved to shift any switch, receptacle, ceiling outlet or other outlet which has been roughed-in a maximum of 10'-0" from its location as shown before it is permanently installed, without incurring additions to the Contract in time or cost. In addition, refer to the Architectural Drawings for exact location of devices and equipment.
- G. All conduit and wiring shown on the Electrical Drawings shall be provided under this Division regardless of its function.
- H. Review the drawings and specifications provided for other systems such as Elevator Equipment, Sound System, Computer, Landscape, etc., for additional work which may be required under this Division. Provide service to and make connections to all such equipment requiring electrical service.
- I. Equipment configuration is based upon one manufacturer's product. Where the equipment selected by the Contractor for use on this Project differs from the configuration shown, the Contractor shall be responsible for coordinating space requirements, connection arrangements, interfaces with mechanical and plumbing equipment and all other affected trades and providing access for future maintenance and repair. Submit proposed revisions for approval by the Architect.

1.06 DEVIATIONS

- A. No deviations from the drawings and specifications shall be made without the full knowledge and consent of the Architect.
- B. If it is found that existing conditions make desirable a modification in requirements covering any particular item, report such item to the Architect for their review and instructions.

1.07 EQUIPMENT CONNECTIONS

- A. The horsepower, wattage (or amperes) of mechanical equipment indicated is the estimated requirement of equipment furnished under another Division. All wiring, protective devices and disconnect switches shall be of the voltage, size and ampacity required for the actual equipment installed, when equipment varies from that specified on the drawings, without increase or additional costs. In no case shall these items be of smaller capacity than permitted by EQUIPMENT NAMEPLATE/NATIONAL ELECTRIC CODE.
- B. Coordinate with other trades and review the drawings of other divisions and provide suitable control equipment and feeders/branch circuits so that the above requirements shall be met without incurring additions to the Contract in time or cost. Conform with UL Listing and nameplate requirements for equipment furnished. Such adjustments shall be subject to the approval of the Architect.
- C. Provide suitable overcurrent protection and disconnecting means in conformance with the requirements of the NEC, for all items or equipment utilized on the project no matter how, or by whom, furnished. However, duplication, or redundancy, is not required. Coordinate said requirements with equipment furnished and with applicable trades.

- D. Branch circuits supplying control panels and other equipment master and local unit locations and quantities shall be coordinated at the submittal stage and provided under Division 26. Provide emergency power where required to accomplish emergency equipment operations in accordance with Division 23 requirements. All control wiring for plumbing and heating, ventilation and air conditioning systems shall be installed under Division 23. Review Division 23 specifications and shop drawings for control systems to assure system compatibility between equipment furnished under Division 26 and system wiring and controls furnished under Division 23.
- E. Motor controllers shall be furnished and installed by Division 26 where automatic control of equipment is required, unless specified to be furnished as an integral part of packaged equipment. Provide the number and type of auxiliary contacts and relays necessary to interlock the equipment and provide the specified control sequence, reserving spare NO and NC contacts for future use. Power wiring to all motors and motor controllers and between motors and controllers shall be furnished under Division 26.
- F. Where drawings indicate or specifications require equipment to be controlled by line voltage interlock, safety device or control, provide line voltage control wiring in Division 26.
- G. For each electrical connection required, provide pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire connectors, and other items required to complete splices and terminations of the necessary types. Cover splices or terminations with electrical insulation equivalent to insulation of conductors terminated.

PART 2 - PRODUCTS

2.01 STANDARDS FOR MATERIALS AND WORKMANSHIP

- A. All material shall be new and shall bear the inspection label of Underwriter's Laboratories, Inc. (UL).
- B. The published standards and requirements of the National Electrical Manufacturer's Association (NEMA), Underwriters' Laboratories (UL), Electrical Testing Laboratories (ETL), American National Standards Institute (ANSI), Institute of Electrical and Electronic Engineers (IEEE), Insulated Cable Engineers Association (ICEA), National Fire Protection Association (NFPA), Occupational safety Health Association (OSHA) and the American Society for Testing and Materials (ASTM) shall govern and apply where such have been established for the particular material in question.
- C. Specified catalog numbers and trade or manufacturers names are intended to describe the material, devices, or apparatus desired for type, construction features, electrical characteristics, ratings, operating functions, style and quality. Similar materials of other manufacturers, not less than specified quality, capacity or character may be substituted in conformity with the provisions of the General and Supplementary Conditions. Materials of the same type shall be the product of one manufacturer. Refer to Shop Drawing requirements.
- D. Furnish all materials specified herein or indicated on the drawings.
- E. All work shall be installed in a practical and workmanlike manner by competent workmen, licensed and skilled in their trade.

2.02 SHOP DRAWINGS

- A. Provide complete electrical characteristics for all equipment. Submit for approval data of the materials and equipment to be incorporated into the Work. Submittals shall include descriptive materials, catalog cuts, diagrams, performance characteristics, and charts published by the manufacturer indicating conformance to the specification and drawing requirements; model numbers alone will not be acceptable. Submittals shall be made by Specification section number, tabbed, within three ring binders, grouped and submitted in packages as indicated below. Submittals for lighting fixtures shall include full photometric data. Shop drawings shall be submitted for the following equipment and items suitably bound, and marked:
1. Package I:
 - a. Section 26 05 33 Raceways, Boxes and Fittings
 - b. Section 26 05 19 Wires and Cables
 - c. Section 26 27 26 Wiring Devices
 2. Package II:
 - a. Section 26 29 10 Motor Controls
 - b. Section 26 24 16 Panelboards
 - c. Section 26 28 16 Motor and Feeder Disconnect Switches
 3. Package III:
 - a. Section 26 50 00 Lighting
- B. Shop drawings and/or catalog data submittals on all items of equipment and materials shall be submitted in conformity with requirements of the General and Supplementary Conditions. Do not submit more than the required number of sets as indicated by Architect. Do not submit equipment or materials not requested in the Specifications.
- C. All material lists and shop drawing submittals shall include a stamped indication by the Contractor signifying that the submittals have been previously reviewed for complete compliance with the Contract Documents, that all coordination required between trades prior to field installation has occurred and that the material being submitted is approved for installation. The stamped indication shall include the name of the contracting firm, the date of the review and the signature of the contractor. The Engineer will not review the shop drawing submittals without the contractor's stamped approval already on the shop drawings. The responsibility of complying with the Contract Documents will not be relieved by the Architect's review, which requires 10 working days from the date the shop drawings are received by the Architect.
- D. All pricing is to be based upon the products, manufacturers, and processes described in the Contract Documents. Requests for approval of substitutions shall be written and delivered to the Architect's/Engineer's office in conformity with the provisions of the General and Supplemental Conditions. Do not submit any shop drawing or product data that does not conform with the contract documents.
- E. Resubmittals, if necessary, shall be made as specified above. Resubmittals will highlight and indicate any and all revisions made there to and will include the following text " Resubmittal #____", typed in a prominent location on the cover sheet.
- F. The Contractor shall provide with the shop drawing submittal dimensioned layouts of all electrical rooms and spaces using the equipment he intends to furnish. Switchboard, panelboards, distribution panels, etc., will be rejected without dimensioned room layouts.
- G. Samples of all materials proposed for use shall be presented to the Architect/Engineer for his approval when requested.

- H. Submittals shall be noted with any deviations, alterations or limitations of product from the specified materials. The product will be rejected upon failure to indicate this information. Any conflict or failure to perform comparably to the originally specified materials will result in product rejection. It will be the Contractor's responsibility to replace the alternate material or equipment with the originally specified one and to demolish, replace, repair and retest the equipment, including repair or replacement of any component of the building, finishes or other systems affected by said replacement, at no additional costs to the Owner.

2.03 SUPPORT FASTENER DEVICES

- A. Anchors for post tensioned concrete applications shall be cast in place continuous or spot insert channel providing a safety factor of 3 in 3000 lb hard rock concrete.
- B. Anchors for cast in place concrete shall be insert type expansion shields and bolts, lead shields and bolts or self drilling expansion shields and bolts. Powder actuated pins of 1500 pound pull out strength may be utilized in concrete.
- C. Anchors for wood construction shall be lag bolts or power driven wood screws.
- D. Anchors in hollow masonry shall be toggle bolts.
- E. Anchors for steel attachment shall be machine screws, bolts, or beam clamps.
- F. Equipment mounted to drywall construction shall be secured to power channel (13/16 inch by 1 5/8 inch minimum). Secure channel to a minimum of 2 dry wall studs with drywall screws and washers.

2.04 SUPPORTS

- A. Furnish and install under this contract all angle iron, channel iron, rods, threaded rod, supports or hangers required to install or mount all electrical equipment, material or related devices. Conduit shall not be supported from steel decking, roof decking, bridging, ceiling or ceiling support wires.

2.05 IDENTIFICATION

- A. All equipment or devices specified in Division 26 shall be identified with an engraved plastic nameplate. Identification of flush equipment shall be on the inside of the cover. Surface equipment shall be identified on the outside. Plastic nameplates shall be multicolored laminated plastic with engraved lettering. Nameplates shall be provided as scheduled:
 1. 480/277 volt normal power equipment shall be black faceplate/white core (1-1/2 inches by 6 inches with 3/8 inch high letters).
 2. 480/277 volt emergency power equipment shall be red faceplate/white core (1-1/2 inches by 8 inches with 1/2 inch high letters). Faceplate shall read "Emergency - 480 Volts".
 3. 208/120 volt normal power equipment shall be white faceplate/black core (1-1/2 inches by 6 inches with 3/8 inch high letters).
 4. 208/120 volt emergency power equipment shall be white faceplate/red core (1-1/2 inches by 8 inches with 1/2 inch high letters). Face plate shall read "Emergency - 120 Volts".

5. Computer power equipment (ie UPS, isolated ground, etc.) shall be orange faceplate/white core (1-1/2 inches by 8 inches with 3/8 inch). Faceplate shall read "Computer - _____ Volts".
6. Provide 3 inches high by (length as required) for electrical switchboards.
7. Junction boxes for emergency power, lighting, fire alarm systems, etc. shall have circuit numbers indicated and labeled as required.
8. Junction boxes for general power, lighting and misc systems etc. shall have circuit numbers indicated and voltage (system) labeled as required.

2.06 AS-BUILT (RECORD) DRAWINGS

- A. Maintain on the job site at all times during construction a set of "As-Built" mylar sepias with all changes during construction marked thereon. This set shall be utilized for no other purpose. Include any addenda, change orders, field orders, project sketches or "marked-up" drawing prints as may be generated on the job site to assist in recording the changes.
- B. The "As-Built" sepias shall show all changes and deviations from the Contract Drawings including relocation of outlets, conduit and equipment. Record final dimensioned locations of switchboards, panelboards, transformers, disconnect switches, etc. Make sufficient measurements to locate all underground conduit. Show exact locations of underground cable and conduits, both interior and exterior, fully dimensioned from building column lines or permanent exterior structures. These drawings shall be available for reference at the time of final inspection.
- C. At the completion of construction, the Contractor shall purchase a set of reproducible from the Architect/Engineer at cost of printing and shipping. All changes noted above shall be incorporated thereon by the Contractor. The reproducible drawings, with one set of blueline prints thereof and the original sketches and marked-up "As-Built" prints shall be presented to the Owner.

2.07 MAINTENANCE AND INSTRUCTION MANUALS

- A. Submit to the Architect/Engineer/Owners Representative upon completion of the work and prior to final inspection, copies of maintenance and instruction manuals for equipment provided as outlined below:
 1. Three sets of the following data are required:
 - a. Operating and maintenance instructions.
 - b. Spare parts list.
 - c. Copies of approved submittal data.
 - d. Copies of panelboard circuit directories reflecting all field changes.
 - e. Test reports of all tests performed.
 - f. Contact names and phone numbers for parts suppliers of submitted equipment.
- B. Arrange each set of data in a orderly way and bind each set in a separate 3-ring hard-cover binder with appropriate label identifying the Project, Architect, Engineer, Contractor, Subcontractor and Date.

2.08 SUBMISSION OF DRAWINGS

- A. Submission of Architect's drawings for shop drawings and unaltered Architect's drawings for "As-Built" will not be acceptable.

2.09 SPARE PARTS STOCK

- A. Prior to final inspection, turn over to the Owner the following materials of the type and quantity specified. Material shall be new, in original shipping containers or cartons, of the same manufacture and type as installed on the Project. Obtain receipt for all materials turned over to the Using Agency.
 - 1. Lamps - Ten percent of each lamp type.
 - 2. Fuses - Ten percent of each size.
 - 3. Ballasts - Ten two-lamp ballasts and ten one-lamp ballasts.

PART 3 - EXECUTION

3.01 COORDINATION

- A. Before any piping, conduit, outlets, equipment or lighting fixtures are located in any area, coordinate the space requirements with all trades. Such shall be arranged so that space conditions will allow all trades to install their work, and will also permit access for future maintenance and repair. Coordinate the installation of recessed electrical equipment with concealed ductwork, piping, insulation, structural appurtances and wall thickness.
- B. Piping, ductwork, conduit and equipment installed at variance with the above requirements shall be relocated and/or revised to conform with the above requirements without incurring additions to the Contract.
- C. Coordination of space requirements with all trades shall be performed so that:
 - 1. No piping or ductwork, other than electrical, shall be run within 42 inches of panelboards, switchboards or transformers.
 - 2. No pipes or ducts that operate at a temperature in excess of 120 degrees F. shall be installed nearer than 3 inches to any electrical conductor.
- D. Do not scale drawings. Obtain dimensions for layout of equipment from the Architectural drawings unless noted on the Electrical drawings.
- E. Contractor for work under this division shall be fully responsible for determining in advance of purchase that proposed equipment and materials for installation shall fit into the confines indicated and allow sufficient clearance for maintenance and service of all equipment including other trades.
- F. Clearances in front of electrical switchboards, panelboards, motor starters, bus plugs etc. (equipment requiring maintenance while energized) shall be installed in accordance with N.E.C. 110-162 condition number 2.

3.02 PROTECTION OF MATERIALS

- A. Refer to the general requirements section of the Specifications for storage, protection and handling requirements.

- B. Provide dry, weathertight staging and storage for materials and equipment requiring protection from weather and moisture per manufacturer's recommendations. Install temporary lighting or heat sources to prevent moisture accumulation. Provide protection against direct sunlight, precipitation, wind, ice, fire or excessive heat. Store materials in original undamaged packaging with manufacturer's labels and seals intact. Containers which are broken, damaged or watermarked are not acceptable and are subject to rejection.
- C. Materials and equipment will not be installed until the environmental conditions of the project are suitable to protect same per manufacturer's recommendations. Equipment or materials damaged or subjected to moisture, precipitation, direct sunlight, cold or heat are not acceptable and shall be removed from the project and replaced at no additional costs to the Owner.
- D. All conduit and other openings shall be kept protected to prevent entry of foreign matter or construction debris. Fixtures, equipment, and apparatus shall be kept covered for protection against dirt, water, chemical or mechanical damage before and during construction.
- E. The original finish, including shop coat of paint of fixtures, apparatus or equipment that has been damaged shall be restored without incurring additions to the Contract in time or price.

3.03 HOUSEKEEPING PADS

- A. Provide 4 inches minimum height concrete pad, integral with floor, under all floor mounted electrical equipment or apparatus.

3.04 CUTTING AND PATCHING

- A. The Contractor is responsible for all cutting and patching, including escutcheon plates where necessary, whether or not such cutting and patching is shown or indicated.

3.05 CLEANING AND PAINTING

- A. Remove foreign materials, drywall compound, overspray, oil, dirt and grease from all raceway, fittings, supports, boxes, cabinets, pull boxes, panelboard trims and equipment to provide clean surfaces for painting. Remove surface oxidation and restore galvanized surfaces with cold process galvanizing compounds. Touchup marred or scratched surfaces of fixtures, panelboard and cabinet trims, motor control centers, switchboards, cabinets, and equipment enclosures with paint furnished by the equipment manufacturer specifically for that purpose. When touchup is required, provide one base coat over imperfection and subsequent coat over entire side or surface of equipment.
- B. Do not paint trim hinges, latches, clamps, locks, device covers or trim covers. Mask or remove such items prior to finishing.
- C. Unless otherwise noted herein, all painting shall conform to the "Painting" section of the specifications.
- D. Where plywood backboards are utilized to mount electrical or electronic equipment provided under Division 26, finish same with two (2) coats of light gray semi-gloss paint.

3.06 ACCESS TO ELECTRICAL ITEMS

- A. Install all concealed electrical equipment, junction and pull boxes, apparatus, or devices so as to maintain access for maintenance, operations and replacement. Access doors or covers shall be provided where required by NEC or LAHJ and shall be installed in accordance with manufacturer's instructions. Refer to the Architect for approved types, means, methods and appearance. Locate each access unit accurately in relation to electrical work requiring access.

3.07 ELECTRICAL ROOMS AND CLOSETS

- A. Manufacturer's equipment shall not be larger than that dimensioned, or scaled, on plans. Conflicts shall be brought to the attention of the Architect, for resolution prior to ordering equipment.
- B. Clear working space in electric rooms and closets shall be no less than required by the N.E.C.
- C. Submit for review, prior to construction or purchase of any equipment, scaled drawings of electrical rooms, closets, or spaces showing, in detail, planned installation locations of the equipment. These shall clearly show compliance with A and B above.

3.08 EQUIPMENT CONNECTIONS

- A. Review all divisions of specifications, where equipment requiring electrical service is specified, to determine the complete scope of work under this division of the specifications. Provide electrical connections and service to all equipment specified elsewhere requiring such connections or service.
- B. Connect all equipment requiring electrical connections, in accordance with the equipment manufacturer's requirements. Where equipment connections require specific locations, determine and coordinate same with submittals. Provide concealed service to central plant equipment locations and pads.

3.09 NAMEPLATES AND IDENTIFICATION

- A. Provide and install nameplates for transformers, switchboards, switchgear, power and lighting panels, disconnect switches, time switches, pull boxes, junction boxes, fire alarm equipment, contactors, relays and other unit equipment. Nameplates shall be affixed with epoxy cement. Refer to 16010-2.5 for additional requirements.
- B. Install nameplates plumb and level.
- C. Provide and install sleeve type wire markers on all conductors at all termination points and access points. Branch circuit identification (as LP-21") shall be installed on hot and neutral conductors. Dedicated circuits and isolated ground technical power circuits shall have wire markers installed on ground conductor. Label junction and pull box covers with all circuit numbers contained therein.

3.10 EXCAVATION AND BACKFILLING:

- A. Provide and perform all excavation required to install conduit, ductbanks and manholes indicated on the drawings and/or specified. Trenches shall be of uniform width required with minimum 8" clearance on both sides. Remove and dispose of all materials not to be used for backfill. Maintain dry excavations for electrical work, by removing water. Grade areas to prevent surface water from entering excavation. Remove any accumulated water by pumping. Perform all excavation by open cut. Excavate with vertical-sided excavations where possible. Where necessary, provide sheeting and cross-bracing to sustain sides of excavations. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Establish requirements for trench shoring and bracing to comply with local codes and LAHJ. No tunneling shall be permitted.
- B. The bottom of all trenches and excavation shall be graded to provide uniform bearing surface for conduits or ductbanks on undisturbed soil at every point along entire length. Tamp overexcavation with specified backfill materials. Remove unstable materials unsuitable for supporting equipment or installation and replace with specified materials for a minimum of twelve (12) inches below invert of equipment or installation.
- C. Specified materials shall be utilized for backfilling, in not more than six (6) inch layers and tamped until the installation has cover of not less than the adjacent grade and not more than two (2) inches above same. Remove sheeting and cross-bracing during backfilling wherever such removal would not endanger the work or other property. Equalize backfilling operation to avoid shifting of materials and equipment installed. Compaction of backfill materials shall be at least equal to surrounding undisturbed material. Backfill trenches with concrete where excavations pass within 18" of footings or other utility lines. Do not settle backfill with water. Conform to compaction requirements and methods specified elsewhere.
- D. Electrical duct shall be installed a minimum of 24" below finished grade with bottom of duct below geographic frost line. Duct shall not be in direct contact with building structure (slab) except for vertical riser supports.

3.11 TESTS AND CERTIFICATIONS

- A. Upon completion of the electrical work and prior to final inspection, conduct an operating test in the presence of the Architect or his designated representative.
- B. The installation shall be demonstrated to operate in accordance with the Contract Documents. Any material or workmanship which does not meet with the approval of the Architect shall be removed, repaired or replaced as directed without incurring additions to the Contract in time or cost. All electrical systems shall be tested for compliance with the specifications.
- C. Furnish all instructions, tools, test equipment and personnel required for the test. Have sufficient tools and personnel available to remove equipment covers, coverplates, etc., as required for review of internal wiring and proper inspection. Provide hand tools, flashlights, ladders, outlet testers, VOM, meters and keys required to access and observe system operation and characteristics. Turn circuits on and off as directed and demonstrate operation of equipment as directed.

- D. Contractor shall test all wiring and connections for continuity and grounds by megger testing. Upon indication of defective insulation, Contractor shall remove and replace the defective conductor and demonstrate by testing that the new conductor is acceptable. Record feeder load currents and line voltages measured at each transformer, switchboard and panelboard after installation of all equipment and lighting. Adjust transformer taps as required to provide optimum voltage levels. Adjust single phase load connections to balance feeder load and document on as-built drawings. Provide the Owner with full documentation of all testing for future reference.
- E. Refer to the individual specification sections and the electrical systems testing section of the specifications for specific testing requirements.
- F. The authorized manufacturer's service representative shall review systems and equipment for correct operation, conformance with specification requirements and manufacturer's requirements and submit certification indicating above mentioned conformances for the following systems:
 - 1. Life Safety System
 - 2. Emergency Generator Set
 - 3. Automatic Transfer Switches
 - 4. Fire Communications System
 - 5. Interfaces to Mechanical & Building Systems

3.12 DEMONSTRATION AND INSTRUCTION

- A. Present to the Owner and the Architect/Engineer or his designated representative a physical demonstration and oral instructions for proper operation and maintenance of each of the electrical equipment and systems installed. Authorized manufacturer's representatives familiar with the specified equipment shall conduct training for the following systems:
 - 1. Life Safety System
 - 2. Emergency Generator Set
 - 3. Automatic Transfer Switches
 - 4. Fire Communications System
 - 5. Interfaces to Mechanical & Building systems

3.13 TEMPORARY WIRING

- A. Provide a temporary electrical lighting and power distribution system of adequate size to properly serve the construction requirements, including adequate feeder sizes to prevent excessive voltage drop. Temporary work to be installed in accordance with the National Electrical Code, Article 305, and as required by OSHA or applicable local safety codes, rules and regulations.

3.14 WARRANTY

- A. All systems and components shall be provided with a one-year warranty from the time of final acceptance. The warranty shall cover all defects in materials, design and workmanship. During this warranty period, all defects in materials and workmanship shall be corrected without incurring additions to the Contract. The correction shall include removing the defective part(s), replacing and installing the new parts (including shipping and handling), all required cutting, patching, repainting, or other work involved, including repair or restoration of any damaged sections or parts of the premises resulting from any fault included in the warranty, entirely at the expense of the Contractor.
- B. In addition to this general warranty, present to the Architect any other guarantees or warranties from equipment or system manufacturers. These supplemental guarantees or warranties shall not invalidate the general warranty.

END OF SECTION

SECTION 26 05 11

ELECTRICAL SUBMITTAL DATA

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, and Section 26 05 10 Electrical General Requirements, apply to all work herein.

1.02 QUALITY ASSURANCE

- A. Shop drawings or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this contract. The Contractor shall submit to the Architect a sufficient number of copies of all such Shop Drawings or catalog data to provide him with as many reviewed copies as he may need, plus two (2) copies for retention; one by the Architect and one by the Engineer.
- B. Before submitting Shop Drawings to the Architect for review, the Contractor shall examine them and satisfy himself that they are correctly representative of the material or equipment to which they pertain. The Contractor shall so note these Drawings before submitting them. The Contractor's review of the Shop Drawings is not intended to take the place of the official review by the Architect. Any Shop Drawings which have not been reviewed by the Architect shall not be used in fabricating or installing any work.
- C. The review of Shop Drawings or catalog data by the Architect shall not relieve the Contractor from responsibility for deviations from the Plans and Specification unless he has, in writing, specifically called attention to such deviations at the time of submission and has obtained the permission of the Architect. Also, it shall not relieve him from responsibility for error of any kind in Shop Drawings. When the contractor does call such deviations to the attention of the Architect, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.
- D. Verification and assignment of dimensions, quantities, and construction means, methods, sequences or procedures, the correctness of which is set forth in the Contract Documents or submittal, shall be the sole responsibility of the Contractor.
- E. Reproduction of design documents in any portion for use in a submittal is not acceptable.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All products shall be new and bear all labels which are identified by the applicable specification section and Contract Documents.

PART 3 - EXECUTION

3.01 SUBMITTAL DATA

A. General:

1. The submittal data to be furnished for this project shall comply with the Specifications and Contract Documents in their entirety. Any submittals herein scheduled are as a minimum only and shall not be construed to limit the submittal data required within the individual Sections of these Specifications.
2. Shop Drawings will be returned unchecked unless the following information is included: Reference to all pertinent data in the Specifications or on the Drawings, such as sound power levels of motor driven equipment where called for in the specifications, electrical characteristics and horse power, capacities, construction material of equipment, UL labels where required, accessories specified, manufacturer, make and model number, weights where specified, starters where required by Division 23, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings. All submitted equipment must be identified on Shop Drawings with the same "Mark Numbers" as identified on Drawings or in Specifications. All pertinent data such as accessories shall also be marked. Any deviation from any part of the Contract Documents shall be clearly and completely highlighted.
3. Electrical submittal data shall be bound into separate 3-ring binders, each volume shall contain one copy of all specified equipment/shop drawing submittals. Each binder shall be provided with an index of materials and an identification tab for each Specification Section that requires submittals. Each item in each tabbed section shall be identified with the paragraph number relating to the item submitted. FAILURE to provide BOUND AND IDENTIFIED SUBMITTALS will result in the AUTOMATIC REJECTION of the submittal data with NO EXCEPTION.

B. The bound submittals are to be submitted for review within 30 days after the Contract is awarded. No submittal will be checked until ALL required submittals have been received by the Engineer.

C. The Contractor shall submit with the bound and identified submittal data a letter signed by the Contractor's Project Manager (or higher level officer of the firm) stating that all electrical characteristics of the mechanical equipment to be supplied has been fully coordinated with the mechanical contractor. No submittal data will be checked until this letter is submitted. Any changes to the electrical requirements from the Contract Documents resulting from alternate equipment being submitted shall be performed without any additions to the Contract Sum. Shop Drawings shall be submitted for each of the following:

1. Disconnect Switches
2. Starters

3.02 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Description:

1. A system wiring and control diagram shall be included in the operating and maintenance instruction.
2. Prior to final acceptance or beneficial occupancy, provide the services of a competent representative to instruct the Owner in the operation of all systems for a period of not less than three (3) days. This instruction shall include a complete walk-through of all equipment and systems. The Architect reserves the right to attend any such meeting and shall be duly notified.

3.03 OTHER SUBMITTALS – CLOSEOUT FORMS

A. Submit two copies of the following prior to occupancy of the project by the Owner. See Contract Closeout Forms – Section 00 65 00.

1. As built drawings for the electrical systems.
2. Request for final payment.
3. Letter or “Release of Liens”.
4. Letter of “Guarantee”.
5. Consent of Surety Company to final payment.
6. Power of Attorney.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER
CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section shall comply with the provisions of Section 26 05 10.
- B. This Section covers the furnishing, installation and connections of the building wiring system. Interior wiring, power distribution, lighting, appliance and equipment, motor and exterior wiring systems extending beyond the building are included. The wiring system shall be complete from electrical service entrance to every electrical device requiring an electrical connection.

PART 2 - PRODUCTS

2.01 CONDUCTORS

- A. Conductors shall be copper of 98% conductivity, soft temper, 600 volt insulation. Sizes specified are American Wire Gage (AWG) for No. 4/0 and smaller and thousand circular mils (kcmil) for all sizes larger than No. 4/0. Service entrance conductors shall be 600 volt, type XHHW.
- B. Conductors No. 10 and smaller shall be solid and type "THHN" / THWN" insulation. No. 8 and larger shall be stranded and type "THHN" / "THWN" or "XHHW" insulation.
- C. All wire and cable shall be U. L. Listed and shall bear the U. L. Label.
- D. All conductors shall have size, grade of insulation, voltage and manufacturer's name permanently marked on the exterior at maximum 24 inch intervals.
- E. Conductor size shall be a minimum of No. 12 AWG. Conductor size shall be not less than indicated on the drawings. The minimum size of all emergency circuits shall be No. 10 AWG.
- F. Fixture wire shall be No. 14 AWG silicone rubber insulated, stranded fixture wire, Type THAN (90 degrees C.).
- G. Control conductors for use on 120 volt control wiring shall be No. 14 AWG stranded Type THHN/THWN, unless indicated otherwise on the drawings or as required for compliance with voltage drop requirements.
- H. Where cables are used for switch leg, the white conductor shall be permitted to supply the switch, but not as a return to the switchboard outlet for 277 volt lighting switch legs and phase conductor shall be.

2.02 PREFABRICATED CABLE ASSEMBLIES

- A. Metal clad cable type MC may be utilized for concealed branch circuit wiring only as permitted by local authority having jurisdiction. Insulated ground conductor shall be provided.

2.03 CONNECTORS

- A. Terminations and connections shall be made with U. L. Listed connectors applied per manufacturer's recommendations.
- B. Connections of No.10 AWG and smaller size power and lighting branch circuit conductors shall be made with insulated spring steel wire nut connectors. Size #8 AWG and larger connections shall be made with hydraulically applied compression type connectors with insulated covers.
- C. Connections of special system conductors shall be made via dedicated terminal strips labeled to indicate wire number and system type. Wire nut connections in system junction box are not acceptable.

2.04 ALTERNATE MATERIAL DESCRIPTION: (OPTIONAL)

- A. Where permitted by local authority having jurisdiction, aluminum conductors may be utilized for conductor sizes No. 4/0 and larger in lieu of copper conductors specified and indicated on the drawings. Insulation of aluminum conductors shall be identical to insulation specified and indicated for copper conductors. Aluminum conductor's sizes shall be based upon not less than equivalent copper ampacities (NEC Table 310-16) and voltage drop characteristics. Submit table of proposed substitution for review and approval in accordance with submittal requirements.
- B. Fittings utilized to terminate aluminum conductors shall be compression type, U. L. Listed for the application.
- C. Where aluminum conductors are utilized, raceways shall be increased in size in accordance with the conduit fill limitations of the National Electrical Code. Derating factors of NEC Article 310-10 or note 8/ NEC 310-16 shall be applied, where applicable. As-built drawings shall reflect the size of aluminum conductors and raceway installed.

2.05 ACCEPTABLE MANUFACTURERS

- B. Wire and Cable products:
 - 1. Southwire Co.
 - 2. Rome Cable
 - 3. Alcan Cable
 - 4. Carol Cable
 - 5. AFC Cable Systems
 - 6. American Insulated Wire
 - 7. Cerro Wire & Cable
 - 8. General Cable
 - 9. Triangle PWC
 - 10. Cabelec
 - 11. Okonite
- C. Signal Cable products:
 - 1. Belden
 - 2. Continental

3. Dekoron
4. West Penn

D. Connector products:

1. AMP
2. Burndy
3. Eagle
4. Gould
5. Ideal
6. Joslyn
7. O-Z Gedney
8. Thomas & Betts
9. Buchanan
10. King

E. Wire management products:

1. AMP
2. Thomas & Betts
3. Panduit
4. Wieland

E. Wire & Cable identification products:

1. Thomas & Betts SM series
2. Wieland C type
3. Brady type XC

F. Wire Pulling lubrication products:

1. Ideal Yellow 77
2. Electro Y ER EAS
3. Burndy Silkon

PART 3 - EXECUTION

3.01 WIRING:

- A. All conductors shall be installed in conduit, unless noted otherwise. All conductors shall be pulled in at the same time. No conductors shall be pulled into the conduit until the conduit system is complete and plaster/drywall construction has dried. Clean, swab and evacuate conduit system before pulling in conductors. Do not exceed the manufacturer's maximum pulling tension.
- B. Conductors shall be continuous from outlet to outlet and from outlet to junction box or pull box. All splices and joints shall be carefully and securely made to be mechanically and electrically solid with proper U. L. Listed connectors. Where connection is made to any terminals of more than 30 amperes capacity and where conductors larger than No. 10 are connected to any terminal, copper terminal lugs shall be secured to the conductors. Where multiple connections are made to the same terminal, individual lugs for each conductor shall be used.

- C. Each conduit shall have a minimum of three (3) conductors pulled in unless that particular conduit is noted as being for systems other than electrical circuitry and/or future use or unless noted otherwise. Grounding conductors are not shown in wire count, but are required from circuit origin to last device.
- D. Conductors for lighting and receptacle circuits shall have color coded jackets. The wiring shall be color coded with the same color used with its respective phase through the entire job as follows:

208/120 Volt Systems	Type	480/277 Volt Systems
Black	Phase A	Brown
Red	Phase B	Orange
Blue	Phase C	Yellow
White	Neutral	Gray
Green	Ground	Green/tracer
White/Green Stripe	IG Neutral	Black w/ Black Stripe
Green/White Stripe	IG Ground	Green

- E. The feeder and service entrance conductors shall be color coded by the use of one (1) inch wide colored plastic tape applied within 6" of each conductor end.
- F. Branch circuit conductors shall not be smaller than No. 12 and where the home run from panel to first device exceeds 60'-0", the conductors from home run outlet to panel shall be No. 10 minimum.
- G. Branch circuit wiring which supplies more than one fluorescent fixture through wireway of other fixtures shall be rated for use at 105 degrees C.
- H. For branch circuits terminating in outlet without device, leave minimum of 12" of slack wire coiled for connection of equipment.
- I. All conductors shall be identified with proper circuit numbers at all access points, terminals, junction boxes and at panelboards within 6" of conductor ends.
- J. Special systems conductors shall be color coded in accordance with system manufacturer's recommendations or in a manner approved by the Engineer.
- K. Furniture system branch circuits shall have minimum #10 neutral home run conductors pulled to system junction box.
- L. Maintain phase rotation established at service entrance point throughout entire project.
- M. Taps and splices, where permitted by these specifications, shall be performed with an encapsulating watertight connection kit which insulates and moisture seals the connection.
- N. Grounding conductors are not indicate in the wire count shown on the drawings, but are required in all branch circuit and feeder installations. Provide insulated ground conductor (sized per NEC requirements) in all raceways.

3.02 CONTROL WIRING

- A. Control wiring is defined as the wiring which provides connections between control circuit elements and does not provide the power circuit.

- B. Generally, control wiring is specified in Division 15; however, where a control device such as a push-button, thermostat, firestat, etc. is to be installed in the power circuit, these devices shall be received, stored and installed as part of the work of this Division. Control wiring, conduit etc. shall be coordinated with division 15 and provided as required.

3.03 CONNECTIONS

- A. All connectors shall be U.L. Listed and shall be utilized in full accordance with manufacturer's requirements.
- B. Splices shall be made only where specifically approved by the Engineer. Conductors shall be continuous from origin to first outlet box or manhole. Splices made exterior to the structure, or below grade, shall be compression type connections with insulated, waterproof covers. Submit splicing requests for review and approval prior to installation.
- C. Termination lugs shall be applied to all single cables #8 and larger, and shall be compression type fittings. The use of mechanical type lugs, kerneys or other pressure type connections will not be permitted.
- D. All compression connections shall be long barrel type installed using hydraulic tools designed for the purpose.
- E. Insulated spring steel wire nut connectors shall be used for branch circuit connections of No.10 and smaller conductors. Connections of No.8 and larger sizes shall be made with compression type connections with insulated covers. Where exposed to moisture or corrosion spring steel wire nut connectors shall be silicone filled.
- F. Control and special system riser and junction boxes shall be fitted with terminal strips and all conductors shall be labeled per system requirements. The installation of wirenuts in special system riser and junction boxes is not acceptable.
- G. Phase rotation at service equipment shall be maintained throughout entire project, color coding of conductors shall be consistent for feeders and branch circuits through out entire project.

3.04 IDENTIFICATION

- A. All conductors shall be identified with full circuit number at all access points, boxes, and at panelboards within 6 inches of conductor end. Identification shall be permanently marked PVC split sleeve or tubing type
- B. Tape or laminated type wire markers are not acceptable
- C. Permanently mark the junction box cover with the circuit numbers for all conductors contained within. Utilize black marker for normal power and red marker for emergency power and fire alarm.

3.05 WIRE MANAGEMENT

- A. Power and control wiring within all special system cabinets and enclosures, and within switchboards and electrical equipment shall be bundled or routed within slotted wiring duct in a workmanlike manner.
- B. Any knockout, cutout or slot containing wiring shall be fitted with bushing or continuous grommet strip to avoid fraying or abrasion.
- C. Train and lace all conductors within panelboard or control enclosures with cable ties or spiral wrapping.
- D. Spare conductors installed shall be identified and capped.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section shall comply with the provisions of Section 26 05 10.
- B. This section covers the installation of the building grounding system. The grounding system shall be established with equipment grounding conductors; the use of metallic raceways as the only method of equipment grounding is not acceptable.
- C. In addition, this section covers ground fault protection for the main service entrance equipment.

PART 2 - PRODUCTS

2.01 GROUNDING CONDUCTORS

- A. Grounding electrode conductors shall be bare or green insulated copper conductor sized as indicated on the drawings.
- B. Equipment grounding conductors shall be green insulated type THHN/THWN, or XHHW conductors sized as indicated on the drawings. Where size is not indicated on the drawings, conductor size shall be determined from the National Electrical Code table on sizes of equipment grounding conductors.
- C. Bonding jumpers shall be flexible copper bonding jumpers sized in accordance with the National Electrical Code tables for grounding electrode conductors.

2.02 PANELBOARDS, TRANSFORMERS, MOTOR CONTROLLERS, AND DISCONNECT SWITCHES

- A. Provide each low voltage distribution and branch circuit panelboard with a copper equipment grounding bar brazed or riveted to the associated enclosures or cabinet and an insulated neutral bar.
- B. Provide a conductor termination grounding lug bonded to the enclosure of each equipment item.

2.03 DEVICES

- A. Each receptacle and switch device shall be furnished with a grounding screw connected to the metallic device frame.

2.04 GROUND RODS:

- A. Ground rods shall be 3/4 inch by 10'-0 copper clad steel.
- B. Sectional ground rods shall be hot dip galvanized 5/8 inch by 10'-0" sections with an internal stainless steel splined coupling pin.

2.05 HYDRAULIC TERMINATIONS

- A. Acceptable manufacturers for hydraulically applied terminations are as follows:
 - 1. Square D
 - 2. Burndy
 - 3. Thomas and Betts (T & B).

- B. Acceptable manufacturers for mechanically applied terminations are as follows:
 - 1. Ideal,
 - 2. Burndy
 - 3. Thomas and Betts (T & B).

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Ground all non-current carrying parts of the electrical system, i.e. raceways, equipment enclosures and frames, junction and outlet boxes, machine frames and other conductive items in close proximity with electrical circuits, to provide a low impedance path for potential grounded faults.

- B. Service entrance and separately derived electrical systems, grounding electrode system:
 - 1. The neutral conductor of the electrical service serving the premises wiring system shall be grounded to the ground bus bar in the service equipment which shall be grounded to the cold water system, the ground rod system, and other grounding electrodes specified herein or indicated on the drawings. Grounding electrode conductors shall be installed in rigid, nonmetallic conduit to point of ground connection, unless subject to physical damage in which case it shall be installed in galvanized rigid steel. Where metallic conduit is permitted, bond conduit at both ends to grounding electrode conductor with a U.L. bonding busing.
 - 2. Make connection to main water line entering the building. Make connections ahead of any valve or fittings whose removal may interrupt ground continuity. Install a bonding jumper of the same size as the grounding conductor around the water meter.
 - 3. Bond together the following systems to form the grounding electrode system. All system connections shall be made to the electrodes as close as possible to the service entrance equipment and each connected at the service entrance equipment ground bus. Do not connect electrode systems together except at ground bus.
 - a. Cold water piping system
 - b. Ground rod system
 - c. Lightning protection system
 - d. Steam and chilled water piping
 - e. Main rebar in foundation footing
 - f. Building structural steel components.
 - 4. Ground the neutral of all dry type transformers with #4/0 cu. conductor riser tied back to main switchgear which shall serve as the grounding electrode for the separately derived system. In reinforced concrete structures, building steel shall be considered to be reinforcing steel of vertical columns. Make connection to building steel with chemical weld type connector, in a location in unfinished space where the connection will not be subject to physical abuse.

5. Ground the neutral and frame of the emergency generator to building steel and the ground rod system, which shall serve as the grounding electrode for the separately derived system. In reinforced concrete structures building steel shall be considered to be reinforcing steel in vertical columns. Make connection to building steel with chemical weld type connector, in a location in unfinished space where the connection will not be subject to physical abuse.
6. Grounding Electrode connections to structural steel, reinforcing bars, ground rods, or where indicated on the drawings shall be with chemical exothermic weld connection devices recommended for the particular connection type. Connections to piping shall be with U.L. listed mechanical ground clamps.
7. Bonding shall be in accordance with the National Electrical Code.
8. Install ground rods where indicated on the drawings with the top of the ground rods 12 inches below finished grade.

C. Equipment Grounding Conductor:

1. Grounding conductors for branch circuits are not shown on the drawings; however, grounding conductors shall be provided in all branch circuit raceways and cables. Grounding conductors shall be the same AWG size as branch circuit conductors.
2. Grounding conductors for feeders are typically indicated on the drawings and the raceway is sized to accommodate grounding conductor shown. Where grounding conductor size is not indicated on the drawings, conductor shall be in accordance with the equipment grounding conductor table of the National Electrical Code.
3. A grounding conductor shall be installed in all flexible conduit installations. For branch circuits, grounding conductor shall be sized to match branch circuit conductors.
4. A feeder serving several panelboards shall have a continuous grounding conductor which shall be connected to each related cabinet grounding bar.
5. The equipment grounding conductor shall be attached to equipment with bolt or sheet metal screw used for no other purpose. Where grounding conductor is stranded, attachment shall be made with lug attached to grounding conductor with crimping tool.
6. Ground all motors by drilling and tapping the bottom of the motor junction box and attaching the equipment grounding conductor to the box with a round head bolt used for no other purpose. Conductor attachment shall be through the use of lug attached to conductor with crimping tool.
7. Equipment grounding conductors shall terminate on panelboard, switchboard, or motor control center grounding bus only. Do not terminate on neutral bus. Provide a single terminal lug for each conductor. Conductor shall terminate in the same section as the phase conductors originate. Do not terminate neutral conductors on the ground bus or equipment grounding conductors on the neutral bus.

D. Other Grounding Requirements:

1. Each telephone backboard shall be provided with a No. 6 grounding conductor. When backboard is located in vicinity of electrical service equipment, the "point of grounding" of this conductor shall be the main cold water service with connections made ahead of any valves or joints. Remote backboards shall use building steel as "point of ground". Terminate conductor by stapling to backboard.

2. At each building expansion joint flexible copper bonding jumpers shall be attached to building structure by chemical weld process. Install bonding jumpers in concealed locations that will not subject connections or jumpers to physical abuse. Install 100' on centers across expansion joints.
3. Bond all metal at pools or fountains to grounding electrode system per NEC requirements.

3.02 TESTING

- A. Upon completion of the ground rod installation, the Contractor shall test the installation in accordance with the "Electrical System Tests" section of this Specification. Grounding resistance reading shall be taken before connection is made to the building cold water piping system. Ground resistance readings shall not be taken within forty-eight hours of rainfall. Results of ground resistance readings shall be forwarded, in writing, immediately to the Project Engineer.
- B. If the resistance to ground exceeds 5 ohms, additional rods shall be driven and bonded together, until a reading of 5 ohms or less to ground is obtained. After completion of the grounding system, measure the system ground resistance with a "Megger Earth Tester". Submit directly to the Project Engineer two (2) copies of each test report certified by the testing technician and the electrical contractor.
- C. All grounding electrode conductors and ground bus shall be measured by the Contractor for objectionable levels of current, and to detect any inadvertent connection of neutral to ground.
- D. If the ground current exceeds 10% of the rating of the conductor ampacity, all devices on that feeder or circuit shall be rechecked for proper connection.
- E. All grounding system connections shall be rechecked at final checkout for correct wiring termination methods and mechanical strength.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section shall comply with the provisions of Section 26 05 10.
- B. This Section covers the complete interior and exterior conduit and raceway systems.

PART 2 - PRODUCTS

2.01 CONDUIT

- A. Galvanized rigid steel conduit (GRC) shall be low carbon, hot-dipped zinc galvanized steel to meet U.L. 6 Standards, ANSI C80.1 and shall have NPT (ANSI B1.20.1) full cut threaded joints, galvanized after forming. IMC shall carry U. L. Label. Conduit with integral couplings may be utilized for 2.5 inch sizes and above provided it conforms to U. L. Safety Standard #514-B.
- B. Intermediate metal conduit (IMC) shall be premium hardened steel conforming to ASTM-A568, hot galvanized with zinc chromate exterior with polymer sealcoat to meet U.L. 1242 and ANSI C80.6 standards. Interior to be finished with corrosion inhibiting organic coating. Both coatings shall conform to ANSI C80.6 requirements. IMC shall have NPT (ANSI B1.20.1) full cut threaded joints, galvanized after forming. Conduit with integral couplings may be utilized for 2.5 inch sizes and above provided it conforms to U. L. Safety Standard #514-B. IMC shall carry U. L. Label.
- C. Electrical metallic tubing (EMT) shall be high grade mild ductile steel, hot galvanized exterior with a clear organic polymer topcoat to meet U.L. 797 Standards and ANSI C80.3. Interior to be finished with corrosion inhibiting clear organic coating. Conduit with integral set screw couplings may be utilized for 2.5 inch sizes and above provided it conforms to U. L. Safety Standard No.514-B.
- D. Plastic conduit (PVC) shall be schedule 40 PVC heavy wall type for 4 inches and smaller, Schedule 20 for 5 inches and larger. PVC shall be U.L. Listed, NEMA TC 2, sunlight resistant and suitable for use with 90 degree C conductors.
- E. Flexible metal conduit (FLX) shall be extra flexible, extra strength galvanized steel conduit tubing and shall meet U. L. Standard for Flexible Steel Conduit and U.L. Standard for Safety No.1. The use of aluminum flexible conduit is not permitted.
- F. Liquid-tight flexible metal conduit (WFX) shall be UL Listed with galvanized steel core of square locked or interlocked design, integral ground conductor and thermoplastic PVC (polyvinyl chloride) cover. The use of aluminum core or non-metallic types is not permitted.
- G. Electrical non-metallic tubing (ENT) shall be UL Listed and manufactured to the requirements of NEMA TC-13. This raceway is permitted to be utilized with concrete encasement or unexposed installations only. Do not install exposed in plenums or other open areas. Utilize steel outlet boxes in all partition construction. Utilize plastic boxes only in concrete encasement.

- H. Steel conduit approved manufacturers are Allied, Triangle, Republic, Wheatland and Pittsburg.
- I. Flexible conduit approved manufacturers are Anamet (Anaconda) and Republic.
- J. PVC conduit approved manufacturers are Carlon, Triangle, and Johns-Manville.
- K. PVC coated metallic conduit approved manufacturers are Robroy, Permacote and Occidental.

2.02 CONDUIT FITTINGS

- A. GRC and IMC conduit fittings shall be zinc-coated, ferrous metal and taper threaded type, U. L. Labeled.
- B. EMT fittings shall be zinc-coated steel and shall be Type 1 or 2 (raintight compression or concrete tight set-screw type). EMT connectors shall have insulated throats. Die cast, malleable iron or pressure cast material will not be accepted. Fittings shall bear U. L. Label. Two (2) inch and larger fittings shall be compression type or shall utilize dual set screws for each side of fitting.
- C. PVC fittings, elbows and cement shall be NEMA TC3, produced by the same manufacturer. All joints shall be solvent welded in accordance with the manufacturer's recommendations.
- D. Conduit connections to switchboards, motor control centers, transformers, panels, cabinets, and pull boxes shall have locknuts designed to bite into the metal.
- E. Each conduit end shall be provided with either an insulated throat connector or separate locknut and insulated bushing. Bushing shall be installed before any wire is pulled.
- F. Expansion fittings shall be provided in all conduits which crosses an expansion joint either in, across, or through same. Fittings shall be U.L. 467 and 514 Listed. Fittings shall contain an internal flexible metal braid to maintain system ground continuity.
- G. Flexible conduit fittings shall be cast malleable iron or stamped steel type with integral fastener. Fittings shall be U.L. Listed for the application. The use of "squeeze" type cast or stamped steel connectors is not permitted.
- H. Liquidtight flexible metal conduit fittings shall be liquidtight with neoprene bushing, nylon gland, tapered hub threads and outlet bushing. Fittings shall be U.L. Listed for the application. The use of non-metallic or thermo-plastic insert connectors is not permitted.
 - 1. EMT conduit fittings approved manufacturers are as follows:
 - a. Raco
 - b. Steel City
 - c. Crouse-Hinds
 - d. O.Z Gedney
 - e. Thomas & Betts
 - f. Efcor
 - g. Appleton
 - 2. GRC and IMC fittings approved manufacturers are as follows:
 - a. Appleton,
 - b. Crouse-Hinds,
 - c. O.Z. Gedney
 - d. Thomas & Betts.

2.03 SMOKE AND FIRE STOP FITTINGS

- A. If and where required, smoke and fire stop fittings shall be U.L. listed for that purpose. The fittings used to seal conduit either on the outside of the conduit or cable or internally shall have heat activated intumescent material which expands to fill all voids and shall be O.Z./Gedney "FIRE-SEAL" or Dow Corning silicone RTV foam with an hourly fire-rating equal to or higher than the rating of the floor, ceiling or wall through which the cable or conduit passes. The seals for conduit shall be of the flanged type. Penetration of any fire rated wall, floor, or ceiling shall use Through-Penetration Firestop Systems described in the current Underwriters Laboratories Building Materials Directory.

2.04 RACEWAY SUPPORTS

- A. Raceways and systems shall be supported independent of any other equipment or appurtances except the building structure. Suspended ceiling systems will not be considered as structure for support purposes, even if so rated by the manufacturer.
- B. All support components shall be zinc-coated or have equivalent corrosion protection. Unprotected components shall be removed and replaced at no additional costs to the Owner.
- C. Conduit support straps shall be single hole cast malleable iron or dual hole stamped steel type with zinc coating sized for type of raceway used. Conduit clamps for single conduit support shall be stamped steel with bolt & nut fastener and threaded rod support. Multiple conduit support channel straps shall be galvanized stamped steel two piece clamps with bolt & nut fasteners.
- D. Conduit support channel shall be minimum 1-5/8 inches by 1- 5/8 Inches x 12 gage rollformed pre-galvanized steel or painted steel conforming to ASTM A-570 Grade 33 or ASTM A-446 Grade A requirements. Channel cross section shall be increased to provide higher load bearing capability, if required by this installation. Channel shall have elongated holes at two (2) inch centers.
- E. Drop wire type hangers will not be permitted. Any hanger which may distort the ceiling support structure will not be permitted. Lathers channel and chain are not acceptable for conduit hangers.
- F. Furnish and install under this contract all angle iron, channel iron, rods, threaded rod, supports or hangers required to install or mount all electrical equipment, material or related devices. Conduit SHALL NOT be supported from steel decking, roof decking, bridging, ceiling or ceiling support wires.
- G. Before any piping, conduit, outlets, equipment or lighting fixtures are located in any area, coordinate the space requirements with all trades. Such shall be arranged so that space conditions will allow all trades to install their work, and will also permit access for future maintenance and repair. Coordinate the installation of recessed electrical equipment with concealed ductwork, piping, insulation, structural appurtances and wall thickness.
- H. Support branch circuit conduits and raceways at intervals not exceeding ten (10) feet and within three (3) feet of each termination. Support feeder conduit and raceway at intervals not exceeding twelve (12) feet and within three (3) feet of each termination.
- I. Piping, ductwork, conduit and equipment installed at variance with the above requirements shall be relocated and/or revised to conform with the above requirements without incurring additions to the Contract.

- J. Raceway installed within reinforcing steel of elevated or slab on grade concrete construction shall be tied to the re-steel at intervals not exceeding three (3) feet.

2.05 SUPPORT FASTENER DEVICES

- A. Anchors for post tensioned concrete applications shall be cast in place continuous or spot insert channel providing a safety factor of 3 in 3000 lb hard rock concrete.
- B. Anchors for cast in place concrete shall be insert type expansion shields and bolts, lead shields and bolts or self drilling expansion shields and bolts. Powder actuated pins of 1500 pound pull out strength may be utilized in concrete.
- C. Anchors for wood construction shall be lag bolts or power driven wood screws.
- D. Anchors in hollow masonry shall be toggle bolts.
- E. Anchors for steel attachment shall be machine screws, bolts, or beam clamps.
- F. Equipment mounted to drywall construction shall be secured to power channel (13/16 inch by 1-5/8 inches minimum). Secure channel to a minimum of two (2) dry wall studs with drywall screws and washers.
- G. Under no circumstance will nylon or composition type tie wraps or straps be permitted for use in supporting electrical raceway. Utilize galvanized tie wire or prefabricated steel clips for such support.

PART 3 - EXECUTION

3.01 CONDUIT

- A. Rigid galvanized conduit or intermediate metal conduit shall be used for service entrance and all feeders and branch circuits where exposed to damage or moist conditions.
- B. EMT shall be used for feeders, branch circuits, fire alarm and telephone when not underground or in concrete in contact with the earth. Raceway underground or in concrete in contact with the earth shall be rigid galvanized conduit, intermediate metal conduit or Schedule 40 PVC. Conduit exiting elevated slabs or slab on grade shall be IMC. PVC conduit exiting slab is not permitted.
- C. Conduit shall be continuous from outlet to outlet, from outlet to cabinet, junction box and pull box. Conduit shall enter and be secured to all boxes, etc., in such a manner that each system will be electrically continuous from service to all outlets. All conduit from cabinets and junction boxes shall terminate in approved outlet box or conduit fittings. Conduit connections to any box which has no threaded hub shall be double locknotted and bushing installed.
- D. Provide junction boxes or pull boxes where shown and where necessary to avoid excessively long runs or too many bends between outlets. The conduit sizes shown may be increased if desired to facilitate the pulling of cables.
- E. All conduit shall be concealed unless indicated otherwise. Install exposed conduit parallel with or at right angles to the building walls and support from walls or ceilings at intervals required by Code with approved galvanized malleable iron or stamped steel clamps or hangers. Concealed conduit above the ceiling shall be supported independent of ceiling construction.

Where ceilings of lay-in type are used, conduit must be installed minimum six (6) inches above ceiling structure to permit removal of ceiling panels and lighting fixtures.

- F. Use threaded rods and hangers consisting of double-nutted threaded rods and channel or angles of 12 gage minimum steel for supporting multiple conduit. Refer to drawing details.
- G. Minimum size conduit for exposed branch circuits shall not be smaller than 1/2 inch. Raceway installed in concrete slabs shall be minimum 3/4 inch. Home runs shall extend from outlets shown to panel designated. Home runs shown shall not be combined. Home run conduit shall not be smaller than 3/4 inch.
- H. Type GRC and IMC conduit shall be cut and threaded with similar die heads. Deburr outside of all cuts prior to cutting threads. Cut threads one thread short so that they meet in the coupling and all threads are covered when wrench tight. Deburr inside of end after cutting threads. Right and left hand couplings shall not be used; conduit couplings of the Erikson Type shall be used at locations requiring such joints. Utilize only rigid type hand benders, "Chicago" type benders or power benders with required IMC shoes. DO NOT attempt to bend IMC with "hickey" type hand benders. Any such bends will be replaced at no additional costs to the Owner. Utilize only U.L. Listed conduit fittings, elbows and junction boxes (IMC or GRC types).
- I. All conduit for future use and for special systems such as telephone, data or TV wire shall be left with No. 16 gage wire or approved pull cord pulled in them.
- J. Expansion fittings shall be installed in all conduit penetrations through, around or in expansion joints, and all straight runs in excess of 150 feet. Watertight flexible metallic conduit, connectors and couplings may be utilized for exposed transitions. U.L. 467 & 514 Listed fittings are required in slab.
- K. Provide non-hardening elastic type duct seal compound, Neer No. DC, 3M Co. "Scotchfil," or Gardner Bender duct seal, for each conduit entering the building from outside, for each conduit entering refrigerated spaces, for each conduit entering exterior equipment and for each conduit passing from one space into another which is normally at a lower temperature. Conduits entering refrigerated spaces shall be IMC.
- L. Provide intermediate metal conduit and watertight conduit hubs on conduit terminating in a box or cabinet exposed to the weather or damp locations.
- M. Space in sleeves or around conduit that pass through fire resistive or fire rated walls, partitions, floors or ceilings shall be closed by packing with an U.L. labeled fire resistive material, or provide mechanical fire stop fittings that will maintain the rating of the barrier penetrated. Conform with local authority requirements and UL Building Materials Directory.
- N. Coordinate the conduit routing and installation location with the actual electrical equipment furnished. Review submittals for termination locations. Coordinate with all Specification Divisions and submittals to determine termination and access locations. Coordinate installation sequence with all other trades to avoid conflicts and provide the fastest overall installation schedule.
- O. Dented, misformed or flattened conduits are not permitted and shall be removed and replaced.
- P. Protect conduits against dirt, plaster, and construction debris with the use of conduit plugs. Tape is not acceptable. Plugs shall remain in place until all masonry or/and drywall construction is complete. Protect conduit stubups during construction from damage, and replace any bent conduits.

- Q. Conduits serving roof mounted equipment shall pass through roof curb where such is provided. Roof penetrations outside this equipment will not be permitted.
- R. Separate raceway systems shall be provided for power systems and for control, signal and communications systems. Do not install above systems cables in the same raceway as branch circuit or feeder cables.
- S. Service entrance and fire pump feeders shall be installed "Outside" of the building as defined by NFPA and the N.E.C. Provide concrete encasement where required to conform with Code requirements.
- T. All conduits installed exposed shall be IMC to a minimum elevation of ten (10) feet AFF. Exposed boxes shall be type FS cast metal.
- U. Where hazardous locations, as classified by the National Electrical Code, exist, all raceway and fittings and the installation of these materials shall comply with Article 500 requirements.
- V. All conduits for interior wiring systems operating above 600 volts shall be galvanized rigid conduit, painted red at access points and labeled per OSHA requirements.
- W. Maintain minimum three (3) inch clearance when raceway crosses piping and/or systems operating above 75 deg F. and provide twelve (12) inches separation when installed parallel to hot piping, flues or appliances operating above 75 deg F.
- X. Nonmetallic fittings shall be applied with compatible solvent welding cement and shall be fitted while solvent is liquid. Overwrap all fittings used in concrete encasement with suitable tape. Provide o-rings at terminal points to provide watertight seal.

3.02 FLEXIBLE CONDUIT

- A. Watertight flexible metallic conduit shall be used in making short flexible connections to all motors, transformers, bus duct switches, kitchen equipment and rotating or vibrating machinery or equipment. The flexible conduit at these locations shall be as short as possible, but shall have a minimum length of 12 inches. Flexible metallic conduit shall be used in making connections to heaters, fixed equipment or flush mounted light fixtures.
- B. A green stranded bonding jumper shall be installed inside of all flexible conduit that extends directly from a non-flex conduit to a rotating or vibrating machine. Where a junction box is used, the green stranded bonding jumper shall be installed inside the flexible conduit and attached to the junction box and to the machine

3.03 CONDUIT PROTECTION

- A. All threaded joints in galvanized rigid conduit that is encased in concrete shall have a U.L. listed joint compound applied. All conduit installed outside the building underground shall be buried a minimum of 30 inches below finished grade but in no case shall be buried deeper than 48 inches. Where conduit inside building is installed below the floor slab, the vapor barrier shall be run below the conduit concrete encasement. Conduit installed in any slab, where permitted above, shall be above the bottom steel and below the top steel. No conduit shall be spaced less than 3 inches apart. Submit conduit layout to structural consultant for review and approval prior to rough-in.

- B. Conduit shall be secured in place and protected where necessary to prevent damage to work during construction. The ends of all conduit shall be plugged with suitable caps (not tape) to avoid filling with any foreign matter. All conduit shall be blown out and swabbed clear of water and trash prior to pulling wire.
- C. Provide identifying marker tape the entire length of each conduit installed in the ground outside the building. The tape shall be constructed of inert polyethylene, resistant to acids, alkalis, etc., in the soil, and shall be a minimum 4 mil thickness. The tape shall be yellow, 6 inches wide, and shall have the words, "CAUTION - ELECTRIC LINE BURIED BELOW," imprinted with contrasting permanent ink. The imprint shall repeat itself for the entire length of the tape. The tape shall be buried at a maximum of 18 inches below finished grade, above a portion of the earth fill. Identify all underground and underslab conduit locations on as-built drawings for future reference.
- D. Damaged, oxidized, warped or improperly stored raceway will be removed from the jobsite and replaced with new materials. Non-metallic conduit stored on site prior to installation shall be stored on a flat surface off the ground and shall be protected from direct sunlight and debris.

3.04 CORING, CUTTING AND PATCHING

- A. Perform all coring, cutting and patching of existing walls and floors in order to install the work. Set sleeves for conduit accurately before the concrete floors are poured, or set boxes on the forms so as to leave openings in the floors in which the required sleeves can be subsequently located. Fill in the voids around the sleeves with concrete.
- B. Should the performance of this preliminary work be neglected and should cutting be required in order to install conduit, then the expense of the cutting and restoring of surfaces to their original conditions shall be accomplished without incurring additions to the Contract.

3.05 BELOW GRADE RACEWAY INSTALLATION

- A. Provide and perform all excavation required to install conduit, ductbanks and manholes indicated on the drawings and/or specified. Trenches shall be of uniform width required with minimum 8 inches clearance on both sides. Remove and dispose of all materials not to be used for backfill. Maintain dry excavations for electrical work, by removing water. Grade areas to prevent surface water from entering excavation. Remove any accumulated water by pumping. Perform all excavation by open cut. Excavate with vertical-sided excavations where possible. Where necessary, provide sheeting and cross-bracing to sustain sides of excavations. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Establish requirements for trench shoring and bracing to comply with local codes and LAHJ. No tunneling shall be permitted.
- B. The bottom of all trenches and excavation shall be graded to provide uniform bearing surface for conduits or ductbanks on undisturbed soil at every point along entire length. Tamp overexcavation with specified backfill materials. Remove unstable materials unsuitable for supporting equipment or installation and replace with specified materials for a minimum of twelve (12) inches below invert of equipment or installation.

- C. Specified materials shall be utilized for backfilling, in not more than six (6) inch layers and tamped until the installation has cover of not less than the adjacent grade and not more than two (2) inches above same. Remove sheeting and cross-bracing during backfilling wherever such removal would not endanger the work or other property. Equalize backfilling operation to avoid shifting of materials and equipment installed. Compaction of backfill materials shall be at least equal to surrounding undisturbed material. Backfill trenches with concrete where excavations pass within 18 inches of footings or other utility lines. Do not settle backfill with water. Conform to compaction requirements and methods specified elsewhere.
- D. Concrete encased underground ductbanks shall be installed where indicated on the drawings. Ductbank conduits shall be non-metallic type EB, thin wall PVC with concrete encasement.
 - 1. Stagger couplings of adjacent conduit runs by a minimum of two (2) feet. Provide pre-fabricated conduit supports installed per manufacturer's recommendation. Anchor ductbank assembly in trench to avoid "floating" during concrete pour.
 - 2. Changes in direction shall be made by the installation of long sweep bends of minimum twenty-five (25) foot radius. All 90 degree ells shall be long sweep type of minimum twenty-four (24) inch radius.
 - 3. Below all paving and traffic areas, all ductbank shall be reinforced with the installation of No. 5 rebar six (6) inches on center at each corner and on all sides, parallel to duct, and with continuous No. 3 rebar perpendicular to duct on sixteen (16) inch centers. Concrete cover for reinforced ductbanks shall be minimum six (6) inches with at least three (3) inches above rebar. Reinforcing of duct bank shall continue at least ten (10) feet to each side of required areas.
 - 4. All ductbanks shall be sloped to drain toward manholes and shall be laid with minimum grade of four (4) inches per hundred feet.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section shall comply with the provisions of Section 26 05 10.
- B. This section covers lighting and appliance panelboards and load centers.

PART 2 - PRODUCTS

2.01 PANELBOARDS

- A. Panelboards (panels) shall be general purpose enclosures and shall be surface or flush mounted as indicated. Panels shall be of the automatic circuit breaker type, factory assembled by the manufacturer of the circuit breakers. Panels shall be for the voltage indicated with the quantity of poles and ampacity of circuit breakers shown.
- B. Boxes and trim shall be made from code gauge steel. Boxes shall be of sufficient size to provide a minimum gutter space of 4 inches on all sides. Boxes shall be minimum 20 inches width and 5-3/4 inches depth.
- C. Hinged door covering all device handles shall be included in all panel trim. Doors shall have flush-type cylinder lock and catch, except that doors over 48 inches in height shall have auxiliary fasteners at top and bottom of door in addition to flush-type cylinder lock and catch. Door hinges shall be concealed. All locks shall be keyed alike. Directory frame and card having a transparent cover shall be furnished with each panel door.
- D. Trims for flush panels shall overlap the box by at least 3/4 inch all around. Surface trims shall have the same width and height as the box. Trims shall be mountable by a screwdriver without the need for special tools. After installation, trim mounting mechanism or hardware shall not be accessible when panel door is closed and locked.
- E. All exterior and interior steel surfaces of the trim shall be cleaned and finished with gray paint over a rust-inhibiting phosphatized coating.
- F. All interiors shall be completely factory assembled with protective devices, wire connectors, and shall be so designed that devices may be changed without machining, drilling or tapping.
- G. Interiors shall be so designed that devices can be replaced without disturbing adjacent units and without removing the main bus connectors.
- H. Bus bars for the mains shall be of copper in accordance with U.L. Standards. Full size bars shall be included. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of the branch circuit devices.
- I. Phase bussing shall be full height without reduction. Cross and center connectors shall be of the same material as the bus.

- J. The neutral bus shall have 100% rating and utilize set-screws to bond the neutral wire to the neutral bus through holes drilled in the neutral bar. A sheet copper neutral bus utilizing flathead screws to hold the neutral wires will not be acceptable. Ground bus shall be sized in accordance with U.L. standards.
- K. Spaces for future devices shall be molded case, included as indicated and shall be bussed for the maximum rated device that can be fitted into them.
- L. All circuit breakers shall be manually operated, thermal-magnetic, automatic, of the ampacity and poles as indicated. They shall be quick-make, quick-break, both on manual and automatic operation. Breakers shall be over-the-center toggle operating type, with the handle going to a position between ON and OFF to indicate automatic tripping. All multi-pole breakers shall have internal common trip. Breakers shall have a minimum of 10,000 RMS symmetrical amperes interrupting capacity unless designated otherwise.
- M. The breakers furnished shall be determined by the specifications and by the minimum U.L. labeled RMS symmetrical amperes interrupting capacity at circuit voltage. All circuit breakers shall be bolted on and rigidly braced.
- N. Panels having sub-feed lugs for feeding through shall have 8" minimum extra gutter space at the lug end and on one side.
- O. Each panel as a complete unit shall have a short-circuit current rating equal to or greater than the equipment rating indicated.
- P. Acceptable manufacturers are General Electric, Square D, Siemens or Cutler Hammer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide a typewritten directory under plastic for all panelboards with spares left blank.
- B. Provide all necessary hardware to secure panelboards to structure as required by the manufacturer's instructions. Make all electrical connections for supply and load circuits and leave in operating condition.
- C. Clean enclosure of all panelboards of all foreign matter, including dust.
- D. Bond separate ground bars to panelboard 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.
- E. Provide six circuit breaker handle lock-on devices for each lighting panelboard for circuits as directed by the Project Engineer to prevent unauthorized personnel from turning off circuits to controls, unit heaters, clocks, night lights, etc. Turn spare lock-on devices over to the Owner for his use.

END OF SECTION

SECTION 26 27 00

LOW-VOLTAGE DISTRIBUTION EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section shall comply with the provisions of Section 26 05 10.
- B. This section covers describes the Electrical service entrance requirements to the building from the power company transformer.
- C. Electric service shall be obtained from the local Electrical Utility Company having jurisdiction.
- D. Transformers pads, barriers, clearances and primary service shall be provided and installed as directed by the Electric Utility Company rules, regulations and installation guide.
- E. Electric service shall be 480/277 Volts and 208/120 Volts, 3 Phase, 4 Wire, Wye connected, Ampacity as indicated on the plans.
- F. Electrical Contractor shall make all arrangements with the Electric Utility that are necessary to obtain electrical service, both temporary and permanent.
- G. Metering and current transformers shall be provided and installed as directed by the Electric Utility Company. This contractor shall make all provisions necessary for the installation of the Electric Utility metering equipment in accordance with utility company.
- H. Electrical Contractor shall make all arrangements for temporary electrical service to the site during the construction phase, and maintain electric service to existing facilities as required.

PART 2 - PRODUCTS

2.01 SERVICE ENTRANCE CABLES

- A. Install service entrance cables as shown on drawings and as specified herein.
- B. All materials and methods of construction for service provisions shall comply with the Electric Utility Company requirements.
- C. Provide 4 inch PVC primary conduit from the utility demarcation point to the primary side of the power company transformer. Coordinate routing with the power company representative.

PART 3 - DISTRIBUTION

3.01 INSTALLATION

- A. Obtain all necessary standards and detail drawings from the Electric Utility Company before building construction or excavation adjacent to service equipment is started.
- B. Coordinate service and connections with the Electric Utility.

- C. Make arrangements with the Owner and the Electric Utility Company to install, terminate, relocate, or transfer primary electric service without disruption of the normal operation of the Owner's business, or any other electric services (eg. adjacent tenants...etc.) as required. Installation cost of the electric service should included provision for the work of both the electrical contractor and utility company (if so required) for non normal work hours (eg. nighttime or weekend...etc.).

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section shall comply with the provisions of Section 26 05 10.
- B. This Section covers wiring devices and cover plates including receptacles, switches, dimmer controls, plugs, plug connectors, floor outlets, concealed service floor outlets and poke-through device assemblies.

PART 2 - PRODUCTS

2.01 MANUFACTURED WIRING DEVICES

- A. Provide manufactured wiring devices and cover plates, in types, colors, and electrical ratings for applications indicated and complying with NEMA Standard WD 1. Where types and grades are not indicated, provide specification grade selection as determined to fulfill wiring requirements, and complying with NEC and NEMA standards for wiring devices. Provide white color devices and cover plates except as noted otherwise. Color selection shall be verified with the Architect prior to purchase and installation.
- B. The devices specified herein are the products of one manufacturer. Provide heavy-duty specification grade devices selected from approved manufacturer listing.

2.02 WALL SWITCHES

- A. Wall switches shall be Institutional, heavy-duty specification grade, plastic body, nylon or lexan toggle, totally enclosed base & cover, quiet type, self-grounding, back wired, 277 volts AC and 20A rating.
 - 1. Single Pole: Hubbell No. 1221
 - 2. Double Pole: Hubbell No. 1222
 - 3. Three-way: Hubbell No. 1223
 - 4. Four-way: Hubbell No. 1224
- B. Flush motor switches shall have a red pilot light and overload protection for actual fractional horsepower motors furnished. Square D FSJ-1P or approved equal.

2.03 RECEPTACLES

- A. Duplex receptacles shall be heavy-duty specification grade, plastic base, nylon face, two-pole, three wire, self-grounding, back/side wired, 125 volts AC and NEMA 5-15R (15A) or NEMA 5-20R (20A) rating as indicated on drawings.
 - 1. Duplex NEMA 5-15R Hubbell CR5262
 - 2. Duplex NEMA 5-20R Hubbell CR5362

- B. Isolated ground duplex receptacles shall be orange heavy-duty specification grade, plastic base, nylon face, two-pole, three wire, self-grounding, back/side wired, 125 volts AC and NEMA 5-15R (15A) or NEMA 5-20R (20A) rating as indicated on drawings.
 - 1. Duplex IG NEMA 5-15R Hubbell IG5262
 - 2. Duplex IG NEMA 5-20R Hubbell IG5362

- C. Ground fault circuit interrupting (GFCI) duplex receptacles shall be heavy-duty, specification grade, plastic base, nylon face, two-pole, three wire, supplied with pre-stripped wire leads, feed-through protection, 125 volts AC and NEMA 5-15R (15A) or NEMA 5-20R (20A) rating as indicated on drawings.
 - 1. Duplex GFCI NEMA 5-15R Hubbell GFR5262
 - 2. Duplex GFCI NEMA 5-20R Hubbell GFR5362

- D. Single receptacles shall be heavy-duty specification grade, plastic base, nylon face, two-pole, three wire, self-grounding, back/side wired, 125 volts AC and NEMA 5-20R (20A) rating.
 - 1. Single NEMA 5-20R Hubbell 5361

- E. Clock outlets shall be specification grade, plastic base, phenolic face, two-pole, three wire, side wired, stainless steel plate with recessed outlet, 125 volts AC and NEMA 5-15R (15A) rating.
 - 1. Clock outlet NEMA 5-15R Hubbell 5235

- F. Special purpose outlets shall be heavy-duty specification grade, plastic base, nylon face, poles as noted, wires as noted, grounding type, back/side wired, with voltage and capacity rating noted. Conform to NEMA configuration requirements.

- G. Exterior flush mounted duplex outlets shall be GFCI heavy-duty, industrial specification grade, plastic base, nylon face, two-pole, three wire, supplied with pre-stripped wire leads, feed-through protection, 125 volts AC and NEMA 5-15R (15A) recessed mounted in TayMac gasketed enclosure model Masque 72206 or approved equal. Unit assembly shall protrude no more than 1/2 inch and shall be rainproof in use per NEC 410-57. Provide color as specified by the Architect.

2.04 COVERPLATES

- A. Coverplates for flush mounted devices shall be one piece standard size high impact smooth nylon surface. Color shall match wiring device finishes. Device plates for masonry walls shall be jumbo type.
- B. Telephone/data outlet coverplates shall be the same finish as above and have two (2) modular jack openings with blank fillers as required. All Computer Lab coverplates shall have four (4) modular jack openings.
- C. Coverplates for flush mounted GFCI devices shall be premarked "GFCI PROTECTED".
- D. Coverplates for flush mounted IG devices shall be premarked "ISOLATED GROUND".
- E. Coverplates for flush mounted EMERGENCY POWER devices shall be premarked "EMERGENCY".

- F. Coverplates for flush mounted UPS POWER devices shall be premarked "COMPUTER ONLY".

2.05 PLUGS & CONNECTORS

- A. Plugs and connectors shall be of nylon construction, heavy duty specification grade, brass contacts and terminations, conforming to UL 94 & 498, with cord grips, 600 VAC working range, straight blade or locking type and NEMA type as noted.

2.06 FLOOR OUTLETS

- A. Where installation of floor mounted device box requires penetration of a fire rated floor slab, the installation shall be made with a fire rated floor fitting, U. L. Listed for use in this specific fire rated floor design. Fire barrier shall be rated to prohibit passage of smoke when heat is not present.
- B. If and where required, floor outlets shall be single gang floor boxes, Steel city No. 601 Series, complete with cast iron body, vertical angular adjustment, with brass frame, brass floorplate (No.P60-CACP for duplex receptacle and No.P60-3/4-2-CACP for phone/data) and gasket. Larger than standard tapings shall be furnished where required. Adjacent boxes shall be installed on minimum 7 inch centers.

2.07 POKE-THROUGH ASSEMBLIES:

- A. Flush poke-through fittings shall be U. L. Listed for fire rating, with retaining ring, suitable for use in three (3) inch core or insert, consisting of flush service fitting, poke-through device and outlet box. Fittings shall be U. L. Listed for dual service use (power and phone/data) in a single service fitting and shall have neoprene seals at base of fitting. Minimum spacing shall be two (2) feet between similar fittings. Specific fitting requirements shall be as specified on the drawings. Carpet flange with epoxy finish shall be provided.

2.08 ACCEPTABLE MANUFACTURERS:

- A. Wiring devices & cover plates:

1. Arrow-Hart
2. Sierra
3. Eagle
4. Hubbell
5. Leviton
6. Pass & Seymour
7. Square D
8. TayMac

- B. Wall dimmers:

1. Lutron
2. Prescolite
3. Hunt
4. Lightolier

- C. Plugs & connectors:

1. Arrow-Hart
2. Eagle
3. Hubbell

4. Leviton
5. Pass & Seymour

D. Floor outlets & concealed service floor outlets:

1. Steel City
2. Hubbell
3. Walker

E. Poke through assemblies:

1. Steel City
2. Hubbell
3. Raceway Components
4. Walker

PART 3 - EXECUTION

3.01 STANDARDS COMPLIANCE

A. Installation and provision of all specified equipment shall be in accordance with:

1. National Electrical Code NFPA 70
2. Underwriters Laboratories (UL) UL 20, 498, 943
3. National Electrical Manufacturer's Association (NEMA) NEMA STDS WD 1, 2, 5

3.02 INSTALLATION

- A. Coordinate installation roughin requirements with architectural and structural features, equipment installed under other portions of these specifications, and electrical equipment.
- B. Coordinate the installation of switches with the door swings to insure that the devices are located on the strike side of the door.
- C. Review the architectural and/or interiors drawings and elevations for devices requiring specific locations.
- D. Coordinate access to poke-through assembly junction boxes such that these are readily accessible after completion of construction.
- E. The mounting height of devices is indicated in the legend on the drawings and is intended to mean the bottom of the device above the finished floor unless otherwise noted.
- F. Mount all devices within outlet boxes to allow device cover plates to be in contact with wall on all sides. Verify all outlet boxes in grouping are at the same elevation.
- G. Install vertically mounted receptacles with the ground connection up.
- H. Install switches with "Off" position down.

3.03 WIRING DEVICES

- A. Install wiring devices as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized standard industry practices to fulfill project requirements.
- B. Where more than one wiring device is indicated at a location, the devices shall be gang-mounted in combined multi-gang boxes and covered jointly by a common coverplate. Provide barriers as required by the devices and voltages being used.
- C. Install wiring devices only in electrical outlet boxes which are clean, free from construction debris, drywall compound and dirt. At final inspection all wiring devices shall be clean, free of paint overspray, unbroken and in new condition.
- D. Ground all wiring devices by electrically continuous, pigtail connection such that removal of device does not open grounding path to any downstream device. Connect the grounding screw of each device to the equipment grounding conductor.
- E. Prior to energizing circuits, test wiring system for electrical continuity, freedom from faults, and proper polarity of connections. After energizing circuits, test wiring devices to demonstrate compliance with these requirements.

3.04 COVERPLATES

- A. All junction boxes, outlet boxes, multi-gang switch boxes, utility boxes, etc., shall be covered with a coverplate. The coverplate shall be a finished plate as specified unless designated otherwise.
- B. Coverplates shall be mounted vertically unless designated otherwise.
- C. Do not install cover plates until after painting and/or other finish work is complete.
- D. Where the cover plate does not completely cover the wall opening, replace the plate with an oversized (midi or jumbo) plate or repair the wall opening. Where one oversize plate is used, replace all cover plates in the room with the oversize plates.
- E. Remove concrete protectors and clean all floor boxes after concrete pour. Adjust boxes to be flush with finish floor elevation.
- F. At final inspection, all wiring devices and cover plates shall be clean, without paint overspray, undamaged and unscratched or broken.

END OF SECTION

SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section shall comply with the provisions of Section 26 05 10.
- B. This Section covers disconnect switches for electrical equipment, 600 volts or less, and fuses mounted in the disconnect switches.
- C. Furnish and install disconnect switches for the following conditions:
 - 1. Where indicated on the drawings or schedules.
 - 2. For all motor controllers unless installation conforms to exceptions in the NEC.
 - 3. For all motors located out-of-sight of its motor controller.
 - 4. For all transformers as required by NEC.
 - 5. For all water heaters.
 - 6. For electrical duct heaters.
 - 7. Where required by the National Electrical Code.

1.02 QUALITY ASSURANCE:

- A. Industry Reference Standards:
 - 1. Underwriters Laboratories Inc. Publications:
 - a. UL 98 Enclosed Switches
 - b. UL 198.2 High Interrupting Fuses,
 - c. Current Limiting Type
 - d. UL 198.4 Class R Fuses
 - 2. National Fire Protection Association (NFPA):NFPA 70,
 - 3. National Electrical Manufacturers Association:
 - a. KS-1 Enclosed Switches
 - b. PUB 250 Enclosures for Electrical Equipment
 - 4. American National Standards Institute: C97.1Low Voltage Cartridge Fuses (600 v)
- B. All equipment furnished shall be U.L. Listed and Labeled.

PART 2 - PRODUCTS

2.01 DISCONNECT SWITCHES

- A. Disconnect switches shall be "heavy-duty" type enclosed switches of quick-make, quick-break construction. Current carrying parts shall be copper, with silver tungsten type switch contacts and positive pressure type reinforced fuse clips. Switches shall be horsepower rated type HD where motor is served and rated for either 250 volt AC or 600 volt AC as required for voltages utilized. Size in accordance with the NEC. Lugs shall be UL listed for copper and aluminum cable.
- B. Switches shall be furnished in NEMA I General Purpose enclosure unless noted otherwise. Switches located on the exterior of the building or in "wet" locations shall have NEMA 3R enclosures. When subject to splashing water, seepage of water, or falling or hose-directed water, switches shall be furnished in NEMA 4 enclosures. When located in an industrial plant subject to fibers, lint, dust, dirt, etc., switches shall be furnished in NEMA 12 enclosures.

- C. Fused disconnect switches shall have rejection type fuse clips with dual element, current limiting fuses of rating shown.
- D. Furnish a solid neutral bus or lug for each switch being installed in a circuit which contains a neutral conductor.
- E. Furnish an equipment grounding conductor lug bonded to the switch enclosure by dedicated fastener.
- F. Disconnect switches shall be non-fusible type safety switch, unless fused type is specified or indicated on the drawings, with the number of poles required to disconnect all ungrounded conductors serving equipment.
- G. Provide multi-pole disconnect switches for all dual speed motors to disconnect all ungrounded conductors serving equipment.
- H. Switches shall have the following features:
 - 1. Line terminal shields on line and load lugs.
 - 2. Padlocking provisions shall be provided for padlocking in the "Off" position.
 - 3. Each switch shall have defeatable door interlock mechanism to prevent door from being opened when switch is in closed position.
 - 4. Provide arc chute for each pole.
 - 5. Provide nameplate for each switch as previously specified.
- I. Fusible switches through 600 ampere shall be provided with rejection clips to accept RK1 or RK5 fuses only. Fusible switches larger than 600 ampere shall be suitable for Class L fuses. Furnish and install a complete set of fuses in each disconnect switch sized as indicated on the drawings. Fuses serving predominantly motor or transformer loads shall be dual element, time-delay type, otherwise non-time delay type is required. Fuses shall be current limiting type.

2.02 ACCEPTABLE MANUFACTURERS:

- A. Acceptable disconnect switch manufacturers are:
 - 1. General Electric
 - 2. Square D
 - 3. Cutler Hammer
 - 4. Siemens-Allis
 - 5. Allen-Bradley
 - 6. Appleton Electric
 - 7. Crouse-Hinds
- B. Acceptable fuse manufacturer's are:
 - 1. Chase-Shawmu
 - 2. Buss
 - 3. GEC Alsthom
- C. Equipment supplied under this section shall be the same manufacturer as the Service and Distribution Equipment.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Locate disconnect switches to provide working clearance and full accessibility as required by the NEC.
- B. Unless indicated otherwise on the drawings, locate disconnect switches adjacent to equipment served.
- C. Provide power wiring to and install all disconnect switches and extend feeders to motors or other loads, unless integrally factory mounted on a piece of equipment.
- D. Provide power wiring to all roof mounted equipment via roof curb openings provided. Do not penetrate roof membrane with conduit stubups.
- E. Coordinate exact location of motor termination boxes with raceway roughin provisions to insure correct installation.
- F. Connect all heating and air conditioning equipment and have this equipment complete and ready for operation. Contractor shall be responsible for checking equipment manufacturer submittal data to obtain exact location of all electrical connections for equipment before installation.
- G. A short section of watertight metallic flexible conduit shall be used at each motor connection.
- H. Restore factory finish to all equipment provided herein and touch up scratched or marred surfaces to match original finish. Clean enclosure interior and exterior of dirt, paint, and construction debris.
- I. Maintain conductor phase relationship originating at service entrance throughout motor control center. Group and strap all conductors installed in starter and wiring gutters with nylon straps. Install only one conductor under each terminal. Connect extra conductors via terminal strips. Form and train conductors neatly in enclosures parallel and at right angles to sides of box. Uninsulated conductors shall not extend more than 1/8" from terminal lug.
- J. Do not splice conductors in enclosure. Connections shall be made in suitable junction box located exterior of switch.
- K. Conductors not terminating in switch shall not extend through or enter switch enclosure.

3.02 MOUNTING AND SUPPORT

- A. Locate switches to provide working clearance and fully accessible as required by the NEC. Do not mount switches directly to or on any mechanical equipment.
- B. Enclosure shall be secured to structure by a minimum of four (4) fastening devices. Disconnect switches 600 ampere and larger shall have a minimum of eight (8) fastening devices. A fender washer (minimum 1-1/4 inches OD) shall be used between head of screw and enclosure.
- C. Install equipment with operating handle at 5'-0" AFF, unless otherwise noted.
- D. Where enclosure is not indicated on a wall or structure, construct a metal channel (power strut) free standing frame secured to floor, pad, or building structure. In exterior applications, all support structure shall be galvanized.

- E. Where disconnect switch is mounted on drywall partitions, provide 3/4" painted plywood backboard exceeding switch size by one (1) foot in each direction, secured to drywall studs and fasten switch to backboard.
- F. Provide specified nameplates on feeder switches, fused disconnect switches and non-fused disconnect switches.

END OF SECTION

SECTION 26 29 14

MOTOR CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work specified in this Section shall comply with the provisions of Section 26 05 10.
- B. This Section covers the provision and installation of manual and magnetic motor starters for use on 600 VAC and below for all integral or fractional horsepower motors furnished on the project, except as noted on mechanical drawings or specifications to be packaged units with integral starters. Motor starters shall be separately mounted adjacent to the equipment served.
- C. Motor power wiring is defined as those conductors between the energy source and the motor termination. Power wiring shall be connected through all line voltage control devices such as firestats and thermostats.
- D. Control wiring is defined as those conductors required for starting and stopping of motors, as well as safety devices. All control wiring required for automatic starting and stopping of motors shall be provided under Division 23 unless specifically shown on the electrical drawings.
- E. Review submittals under this and other sections, as well as other divisions, to ensure coordination between for work required by different trades. Coordinate the installation sequence with other contractors to avoid conflicts and to provide the fastest overall installation schedule. Coordinate installation with architectural and structural features, equipment installed under other sections of the specifications and electrical equipment to insure access and so that clearance minimums are provided.
- F. All motors shall be provided under other Divisions, unless noted otherwise, and shall be connected under Division 26 scope of work.

1.02 QUALITY ASSURANCE

- A. Industry Reference Standards:
 - 1. Underwriters Laboratories Inc. Publications:
 - a. UL 94 Test for Flammability of Plastic Materials for Parts for Devices and Appliances
 - b. UL 198.2 High Interrupting Fuses, Current Limiting Type
 - c. UL 198.4 Class R Fuses
 - d. UL 489 Molded Case Circuit Breakers and Circuit Breaker Enclosures
 - e. UL 508 Industrial Control Equipment
 - f. UL 845 Standards for Motor Control Centers
 - g. UL 991 Tests for Safety-related Controls Employing Solid-state Devices
 - 2. National Fire Protection Association (NFPA): NFPA 70, latest edition.
 - 3. National Electrical Manufacturers Association:
 - a. AB-1 Molded Case Circuit Breakers
 - b. ICS-1 General Standards for Industrial Control and Systems
 - c. ICS-2 Industrial Control Devices, Controllers and Assemblies
 - d. ICS-3 Industrial Systems
 - e. ICS-4 Terminal Blocks for Industrial Control Equipment and Systems
 - f. ICS-6 Enclosures for Industrial Controls and Systems

- g. PUB MG1 Motors and Generators
- h. PUB 250 Enclosures for Electrical Equipment
- 4. American National Standards Institute:
 - a. C37.90.1 IEEE Standard Surge Withstand Capability Tests for Protective Relays and Relay Systems
 - b. C62.41 IEEE Guide for Surge Voltages in Low-voltage AC Power Circuits
 - c. C97.1 Low Voltage Cartridge Fuses (600 V)

B. All equipment furnished shall be UL Listed and Labeled.

1.03 SUBMITTALS

- A. Coordinate fully the requirements of equipment provided by other sections of the specifications, and by vendors, to verify that correct control components are provided without incurring additions to the Contract.
- B. Submit manufacturer's product data and production drawings for the following items:
 - 1. Motor Starters
 - 2. Motor Switches
 - 3. Combination Starters

PART 2 - PRODUCTS

2.01 MOTOR STARTERS

- A. Starters for motors 1/2 horsepower or smaller shall be manual unless remote or automatic starting is required, in which case the starters shall be magnetic, full voltage, non-reversing, single-speed, unless otherwise indicated. Manual motor starters shall be quick-make, quick break trip, free toggle or push-button operating mechanism with provisions for positive padlocking in the "OFF position, with green pilot lights, hand-off-auto selector switch. Equip with thermal overload relay (field adjustable) for protection of 120 VAC motors of 1/2 hp or less. All other starters shall be magnetic. Enclosures shall be of NEMA 1 gasketed construction in interior locations and NEMA 3R in exterior and damp or wet locations. Equipment shall be fully rated for the system operating voltage utilized. Furnish a dedicated equipment grounding lug installed via dedicated fastener in each unit.
- B. Each starter for a three-phase motor shall be furnished with three (3) overload protection relays sized per NEC for the full load running current of the motor actually provided. Provide an external "RESET" button or "HAND-OFF-AUTO" selector switch as scheduled with red "RUNNING" light. Provide a green pilot light to indicate motor "STOPPED". Each pilot light shall have a legend plate indicating reason for signal.
- C. Each overload protection relay shall have a normally open alarm contact which will close only when actuated by an overload (not to be confused with N.O. or N.C. auxiliary contacts). These contacts shall be properly wired to their respective blue pilot light provided on the starter front cover and having a "TRIPPED" legend plate.
- D. Individually mounted motor starters shall be surface mounted in unfinished areas and shall be flush mounted in all finished areas. Starters mounted exterior or in wet or damp conditions shall be NEMA 3R. Each starter shall have a laminated nameplate to indicate Division 23 unit number, function and circuit number.
- E. All motor starters, push buttons and pilot lights shall be of the same manufacturer as the switchboard.

- F. Magnetic starters shall be minimum NEMA Size 0.
- G. In size 3 & 4 reduced voltage non-reversing and Size 5 & 6 starters, the contactor coil shall be operated at line voltage. The starters shall be operated by a control relay with 120 volt coil. Two NEMA Class J fuses shall be provided connected from line to starter coil circuit.
- H. Motor starter sizes are based on design conditions using horsepower ratings of motors indicated on the drawings. If motors actually furnished have horsepower ratings other than those indicated, motor starters and feeders shall be adjusted in accordance with the actual horsepower at no additional costs to the Owner.

2.02 COMBINATION STARTERS

- A. Combination starters shall consist of a fused switch with Class R fuses or motor circuit protector and a magnetic motor starter mounted in a common NEMA Type 1 general purpose enclosure unless indicated otherwise on the drawings. Motor circuit protectors shall be rated minimum 22,000 rms. interrupting capacity.
- B. The motor starter components shall be as specified in paragraph 2.01 for motor starters.

2.03 CONTROL TRANSFORMERS

- A. Control transformers, when required, shall be provided. Both legs of the primary and one leg of the secondary of the control transformer shall be fused. The other leg of the secondary shall be grounded. The capacity of the control transformers shall be adequate to operate all the control devices in the circuit.

2.04 OVERLOAD AND SHORT CIRCUIT PROTECTION

- A. Heater elements shall be provided for overload protection. Motor circuit protectors or Class R fuses shall be provided for motor short circuit protection. Motor circuit protectors shall be rated minimum 22,000 rms. interrupting capacity.
- B. Where fused switches are provided, furnish additional fuses, amounting to one set of three (3) fuses for each ten (10) units provided, but not less than six (6) fuses of each size.
- C. Provide a fuse cabinet located in the main electrical room for storage of spare fuses.

2.05 NAMEPLATES

- A. Nameplates shall have 3/8" high engraved letters, core and finish as previously specified.
- B. Flush motor switches shall have a red nameplate identifying equipment controlled.

2.06 ACCEPTABLE MANUFACTURERS:

- A. Acceptable motor controllers manufacturers are:
 - 1. General Electric
 - 2. Square D
 - 3. Cutler Hammer
 - 4. Siemens
 - 5. Allen-Bradley
 - 6. Appleton Electric
 - 7. Crouse-Hinds

- B. Acceptable fuse manufacturer's are:
 - 1. Chase-Shawmut
 - 2. Bussmann
 - 3. GEC Alsthom
- C. Equipment supplied under this section shall be the same manufacturer as the Service and Distribution Equipment.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide power wiring to and install all motor starters and extend feeders to motors, unless integrally factory mounted on a piece of equipment.
- B. Provide power wiring to all roof mounted equipment via roof curb openings provided. Do not penetrate roof membrane with conduit stub-ups.
- C. Where line voltage control devices are mounted at, on or inside a unit, such as aquastats, firestat for single phase devices, etc., the power wiring to the unit shall be connected through such control device.
- D. Coordinate exact location of motor termination boxes with raceway roughen provisions to insure correct installation. Coordinate with controls contractor to insure compatibility with motor control center control wiring provisions.
- E. Connect all heating and air conditioning equipment and have this equipment complete and ready for operation. Contractor shall be responsible for checking equipment manufacturer submittal data to obtain exact location of all electrical connections for equipment before installation.
- F. A short section of watertight metallic flexible conduit shall be used at each motor connection. Watertight flexible conduit shall be used on any motors installed in damp locations or outside
- G. Restore factory finish to all equipment provided herein and touch up scratched or marred surfaces to match original finish. Clean enclosure interior and exterior of dirt, paint, and construction debris.
- H. Maintain conductor phase relationship originating at service entrance throughout motor control center. Group and strap all conductors installed in starter and wiring gutters with nylon straps. Install only one conductor under each terminal. Connect extra conductors via terminal strips. Form and train conductors neatly in enclosures parallel and at right angles to sides of box. Un-insulated conductors shall not extend more than 1/8" from terminal lug.
- I. Do not splice conductors in enclosure, other than on terminal strips provided for this purpose. Lugs shall identify wiring terminated thereon.
- J. Conductors not terminating in starter shall not extend through or enter starter enclosure. Utilize wiring gutters and troughs.

- K. Provide a four (4) inch high concrete housekeeping pad exceeding motor control center footprint by four (4) inches on all sides, with wire fabric (6 x 6") reinforcement, pegged to structural concrete floor. Radius all edges with one (1) inch chamfer.

3.02 CONTROL WIRING

- A. Control wiring is defined as the wiring which provides connections between control circuit elements and does not provide the power circuit.
- B. Generally, control wiring is specified in Division 23; however, where a control device such as a push-button, thermostat, firestat, etc. is to be installed in the power circuit, these devices shall be received, stored and installed as part of the work of this Division.
- C. Control wiring and conduit for control wiring shown on the electrical drawings shall be provided regardless of its function.

3.03 MOUNTING AND SUPPORT

- A. Locate motor starters to provide working clearance and fully accessible as required by the NEC. Do not mount starters directly to or on any mechanical equipment.
- B. Enclosure shall be secured to structure by a minimum of four (4) fastening devices. A fender washer (minimum 1 1/4" OD) shall be used between head of screw and enclosure.
- C. Install equipment with operating handle at 5'-0" AFF, unless otherwise noted.
- D. Where enclosure is not indicated on a wall or structure, construct a metal channel (power strut) free standing frame secured to floor, pad, or building structure. In exterior applications, all support structure shall be galvanized.

3.04 MOTOR PROTECTION

- A. Final overload relay calibration shall be determined after the exact motor to be installed has been determined.
- B. The Contractor shall submit final calibration values to the Project Engineer for approval. Submittal shall include a list of all motors and starters complete with nameplate information from the motor and recommended overload rating.
- C. Adjust motor circuit protector settings in accordance with the manufacturer's recommendations to sustain motor current.

3.05 TESTING

- A. Demonstrate to the Project Engineer that each overload relay control circuit is properly wired and functioning correctly by manually tripping each overload relay individually, one at a time. This inspection procedure shall not involve removing of any wiring or disconnecting any current carrying parts.
- B. Inspect operating mechanisms, including reset function, for malfunctioning and adjust units for free mechanical movement.
- C. Coordinate with control contractor to insure that correct automatic operation of all equipment is obtained per specification requirements. Adjust equipment provisions (I.E. contacts, timers, wiring, et al) as required.

3.06 STORAGE

- A. If the motor starters cannot be placed into service reasonably soon after its receipt, store in a clean, dry, and ventilated building free from temperature extremes.

END OF SECTION

SECTION 26 50 00 LIGHTING

PART 1 -GENERAL

1.01 DESCRIPTION

- A. All work in this Section shall comply with the provisions of Section 26 05 10.
- B. The equipment and materials specified in this Section shall contain no asbestos or PCB.
- C. The work of this Section shall include the careful examination of the Architect/Structural and Mechanical drawings so as to become acquainted with the structural features of the building and the location of pipe and ductwork which would alter the location and spacing of outlets for fixtures. Where conflicts develop, same shall be referred to the A/E for a decision as to the proper location. The work of the Section shall also include responsibility for the proper reinforcement of any ductwork necessary to carry the added weight of lighting fixtures where same must be supported by such ductwork.

1.02 JOB CONDITIONS

- A. Verify the compatibility of recessed lighting fixtures with the ceiling in which each fixture is to be located.

1.03 PRODUCT HANDLING

- A. Deliver fixtures sufficiently in advance of installation to prevent delay of work.
- B. Store all materials in a closed building, in original packaging, and protect from damage and the elements.

1.04 SUBMITTALS

- A. Shop Drawings: Show fixture locations and support details. Materials shall not be purchased until approved. Include copy of ballast warranty for each type of ballast required.
- B. Product Data:
 1. Provide lighting fixture submittals in a single, bound and indexed assembly for all lighting fixtures. Incomplete submittals will be returned without processing. Fixture submittals shall contain manufacturer's name and catalog illustration and number, dimensions and details, ballast and diffuser information, metal gauges, pre-treatment and paint data, UL-ETL approval, and connection details. Provide photometric data for fixture with lamp and ballast specified. Provide information on adjustable fixtures if such type fixture is required. Provide fuse type and size when specified.
 2. Provide complete ballast submittals of the exact ballast to be used for each fixture. Provide sound rating of ballast.
 3. Provide complete lamp submittals of the exact lamp to be used including color temperature, color rendering index and rated lamp life.

PART 2-PRODUCTS

2.01 LIGHTING FIXTURES

- A. Fixtures shall bear U.L. and manufacturer's label. Furnish and install lighting fixtures as indicated and specified, complete with lamps, required ballasts and accessories.
- B. All recessed incandescent fixtures shall comply with Article 410-65,(C) of the N.E.C.
- C. Each lighting fixture shall have been tested and certified for proper operation by the fixture manufacturer for the type mounting and ceiling on/in which it is installed.
- D. Confirm exact locations of all lighting fixtures by coordination with the Architect/Engineer's Reflected Ceiling Plans and mechanical equipment above or on the ceiling. Confirm all ceiling types before ordering lighting fixtures. Each recessed lighting fixture shall have a trim to match the type of ceiling (plaster, exposed grid, concealed spline, exposed panel, etc.) in which it is being installed, regardless of catalog number given. Each lighting fixture recessed in a plastered ceiling of any type shall have a plaster frame.
- E. Most lighting outlets are lettered or groups of outlets are indicated by a letter. The lighting fixtures that are indicated by the letters shall be as indicated on the Lighting Fixture Schedule.
- F. Each fixture shall be supplied with the necessary straps, supports, hangers, or other miscellaneous materials and devices to install them in a satisfactory manner and to conform to the Architect/Engineer's treatment in the areas in which they are to be installed. The Electrical Contractor shall consult all Architect/Engineer's plans in order that he may familiarize himself with all the necessary details for the various units to be installed throughout the building. Failure to do this will not relieve him of the responsibility of furnishing all necessary materials, to perform the function intended for the lighting system shown on the drawings.
- G. Unless specified otherwise, all prismatic diffusers for fluorescent lighting fixtures shall be prismatic acrylic KSH K12 with a thickness of 0.125", measured from the back side to the peak of the prism. All wraparound lenses shall be virgin acrylic, one-piece and injection molded.
- H. Fixtures with highly polished reflective surfaces shall not be handled with bare hands, but with clean, grease-free cotton gloves. Surfaces found with finger prints shall be cleaned or replaced with new fixtures.
- I. Fixtures shall be furnished with special anodized finishes and colors as indicated in the Lighting Fixture Schedule. Fixtures with special factory applied baked enamel finish must conform to a color sample supplied by the Architect/Engineer. Full-size finished samples of each fixture with special finish and/or color shall be delivered to the Architect/Engineer for written approval when requested.
- J. Prior to the application of any finish, all metal parts of all fixtures shall be protected by a rust-inhibiting process. the rust-inhibiting process shall be chemical. No type of sprayed, painted, or dipped primer may be used as the basic rust inhibitor. Any fixtures and /or parts of any fixtures which shall have begun to show signs of rusting or corroding at the time of completion of the job shall be removed and replaced by properly protected metal parts.
- K. Fixtures shall be constructed to provide continuous operation when installed in air plenums, or when surrounded with restrictive enclosures. Where space above ceiling is used as an air plenum changer for either supply or return air, the fixture shall be factory wired in accordance with Article 300-22 of the NEC.

- L. The exit lighting fixtures shall be U.L. listed, meet the requirements of Federal, State and Local codes for handicapped occupants and coordinated with the building fire safety systems.

2.02 LAMPS

A. General:

- 1. The type lamps shall be as specified for each lighting fixture in the Lighting Fixture Schedule.
- 2. The lamp catalog number is the catalog number for General Electric and is given as a standard of the quality and performance required. Equal lamps by Sylvania, Philips or Westinghouse will be acceptable. When a lamp manufacturer's name is used along with the catalog number in the Lighting Fixture Schedule, it is considered unequalled by any other lamp and shall not be substituted. The lamp performance with energy conserving ballasts furnished under this Section shall be certified by a nationally recognized independent testing laboratory.
- 3. Contractor shall replace any lamps damaged during shipping or installation with lamps of like manufacturer to those installed in the fixture. Lamps used during construction shall be replaced with new lamps prior to final inspection.

- B. Fluorescent Lamps shall be as specified in the Lighting Fixture Schedule.

C. Incandescent Lamps:

- 1. "A" type lamps shall be inside frosted, except where specified to be clear.
- 2. "R" and "PAR" type lamps shall have the beam type (spot or flood) as specified in the Lighting Fixture Schedule.
- 3. Quartz tubes shall be frosted.
- 4. All incandescent lamps, except quartz tubes, shall be rated for 130 volt operation.
- 5. All MR-16 lamps shall be by the same manufacturer and shall have the same lot code or number stamped on the lamp.
- 6. Handle all quartz lamps with clean cotton gloves.

- D. High Intensity Discharge (HID) lamps shall be the voltage and type specified in the Lighting Fixture Schedule.

2.03 BALLASTS

- A. Provide ballasts of the proper voltage rating to match the circuit voltage from which the units are supplied. All ballast shall bear the UL label.
- B. Fluorescent ballasts shall be the high frequency (20KHZ or greater) electronic type with a minimum power factor of 95 percent and a total harmonic distortion rating of no greater than 20 percent. Ballast shall be U.L. listed, non-PCB, have a class "A" sound rating and shall meet the requirements of the Federal Communications Commission Rules and Regulations, Part 18, Class "A". Fluorescent ballasts shall have an automatic resetting thermostat to provide class "P" protection.
- C. Provide low temperature starting ballasts of required type for outdoor fixtures and in unheated areas. Starting temperature shall be 0 degrees Fahrenheit.
- D. Ballasts for Metal Halide lamps and High-Pressure Sodium lamps shall be properly selected for lamp characteristics, operating temperatures and lamp position, where critical. Ballasts shall be HPF type.

- E. Noisy ballasts shall be replaced at no additional cost to Architect/Engineer. Ballasts for indoor application shall be enclosed in a housing which provides necessary wiring compartments and provisions for required electrical connectors or devices. Ballast components shall be surrounded with a thermosetting fill to ensure adequate heat dissipation and quiet operation below local ambient noise level. Ballast shall be provided with necessary mounting hardware and vibration dampers.
- F. Ballasts for outdoor use shall be enclosed in weather-tight enclosures with proper outdoor type wiring devices.
- G. All ballasts shall be by Advance, Motorola, Magnetek or Energy Savings.
- H. Electronic fluorescent dimming ballasts shall be by Lutron or Advance with dimming range as specified in the Lighting Fixture Schedule. Light output shall be flicker-free and continuous over entire dimming range.
- I. Fixture fusing shall be provided as follows:
 - 1. All 277V and 480V high intensity discharge fixtures.
 - 2. All exterior lighting for all voltages. Fuses shall be in accessible locations, approved equal to Buss and of proper style. Exterior fixture fuses shall be Buss "TRON," or approved equal, in water-resistant enclosure where fixtures may come in contact with moisture or water.

PART 3-EXECUTION

3.01 SUPPORT OF LIGHTING FIXTURES

- A. All lighting shall be supported from the building structure. The fixtures shall be supported in a manner that will ensure the fixture's weight being equally distributed from each support and the fixture remaining in a level position.
- B. Fluorescent fixtures installed recessed in a suspended ceiling system shall be supported from the building structure with two (2) 12-gauge wires on diagonal corners of the fixture. In addition, the fixture shall be clipped to members of the ceiling suspension system.
- C. Fluorescent fixtures installed in or on any ceiling other than a suspended ceiling system specifically mentioned above shall be supported with concealed steel rods or jack chain. Rods shall be 1/4" diameter minimum, and shall be located where recommended by the fixture manufacturer. Provide a minimum of two (2) supports for each 4' or 8' fixture chassis. Supports shall be maximum of 48" centers. For incandescent fixtures, steel hanging wire may be used by attaching the wire to the fixture mounting frame.
- D. Pendant-mounted incandescent fixtures shall be stem supported by a fixture stud mounted in the outlet box. Suspended fluorescent fixtures shall be supported as detailed on the drawings.

END OF SECTION

SECTION 27 51 14 SPECIAL SYSTEMS CABLING

PART 1 - GENERAL

1.01 SUMMARY

- A. This specification shall include all fiber optic cabling, data cabling and voice cabling as well as termination hardware for these systems. All work specified in this Section shall comply with the provisions of Electrical Section 26 05 10.

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

- A. All cables shall be UL listed
- B. N.E.C. article 770
- C. BICSI Telecommunications Distribution Methods Manual
- D. EIA/TIA 568
- E. ETL

1.03 SUBMITTALS

- A. Refer to Division 01, Submittals, for general requirements.
- B. Contractor shall provide submittals indicating the following:
 - 1. Cable description, including manufacturer's published specifications.
 - 2. Use of cable
 - 3. Testing and qualification data
 - 4. Cable labeling scheme

1.04 WARRANTY

- A. All cables, materials, hardware, components and terminations shall be warranted for a period of not less than 5 years. Any defects in material or workmanship shall be remedied in a timely manner by the contractor.

PART 2 - PRODUCTS

2.01 FIBER OPTIC CABLE

- A. All cables shall be 2-strand, 62.5/125 micron, multi-mode, FDDI grade, 900 micron, tight buffer construction with an overall Plenum (FT6) rated jacket.
- B. Cable shall be routed between media retrieval control terminal panels and the cabinet mounted fiber distribution unit located in the Hub Room.
- C. Acceptable products are as listed below:
 - 1. Siecor P/N 002K72-31141-00
 - 2. AT&T Comcode # 106524390
 - 3. CommScope P/N P-002-DU-6F-00
 - 4. Optical Cable Corporation P/N AO2-030S-W3SB/IUC/900

- D. Terminations shall be Bayonet Style (ST), hot melt, connectors. For termination of individual fiber strands of the control terminals/panels and the FDU. Acceptable terminations are:

- 1. 3M P/N 6100

2.03 CABINET MOUNTED, TERMINATION HOUSING:

- A. Provide 7 inches H by 17 inches W by 12 inches D, metal housing, FDU with built in cable management (front and rear). Housing shall accept “snap in” coupler panels and blank filler panels. Housing shall be as manufactured by the following:

- 1. FDU (Housing & Mounting Hardware): 3M P/N 8425
- 2. 6-ports, ST, Multi-mode, Coupler Panel: 3M P/N 8406-TM
- 3. Single Position - Blank Panel: 3M P/N 8499
- 4. Four Position - Blank Panel: 3M P/N 8499-4W

2.04 DATA CABLE

- A. All cables shall be 4 pair, 24 gauge UTP, Category V, BICC, Plenum (FT6) rated jacket.

2.05 VOICE/DATA OUTLETS

- A. For Voice only, AT&T P/N M1AH-262, white RJ-11. For modem/fax and miscellaneous use, AT&T P/N MPS100BH one blue RJ-45 jack for voice and one orange RJ-45 jack for data, UL certified Category 5. Flush-mounted outlets to use AT&T P/N M14A or NORDEX faceplates. Systems furniture outlets to use AT&T P/N M104SMB or NORDEX surface-mount box, or AT&T P/N M14C. Wiremold and flush-floor outlets to use AT&T P/N M106FR4 or NORDEX, Modular Mounting Frame, mounted behind Wiremold or appropriate A/C covers. Outlet jack colors to be white-voice, blue-miscellaneous and orange-data. Check with electrician to determine faceplate color used on each job.

PART 3 - EXECUTION

3.01 INSTALLATION-GENERAL

- A. All connecting hardware, connectors, and faceplates shall be installed per manufacturer’s instructions and recommendations. All fiber optic and data cabling shall be routed to maintain at least 12 inches separation from any power wiring. Where it is necessary to cross power wiring, all crossings shall be done with the fiber optic or data cabling perpendicular to the power wiring.
- B. Fiber optic cable shall be installed inside the building using the following guidelines:
 - 1. Do not exceed maximum pulling tension.
 - 2. Do not exceed minimum installed and long term bend radius.
 - 3. Avoid sharp bends and corners.
 - 4. Provide additional crush/mechanical protection in high risk environments.
 - 5. Do not exceed maximum vertical rise specification unless intermediate tension relief is used.
 - 6. Observe all governing building and fire codes (either by using a property listed cable or suitable raceway).
 - 7. Secure the fiber optic cable to existing supports or large cables wherever possible.
 - 8. Do not deform the cable jacket, specifically when using cable fasteners or ties.

- C. When installing fiber optic cable in cable trays or cable rack trays, the following special guidelines should be observed:
 - 1. Install fiber optic cable so as to minimize potential damage when additional cables are installed or retrieved.
 - 2. Secure the cable every 24 to 36 inches to the cable tray or rack.
 - 3. Maintain minimum bend radius around corners.
 - 4. Provide miscellaneous distribution rings to secure cable where necessary.

3.02 VERTICAL RUNS

- A. When installing fiber optic cable in vertical runs, the following special guidelines should be observed:
 - 1. Work from the top down, when possible.
 - 2. Install intermediate spit wire mesh grip(s) wherever the maximum vertical rise is exceeded.
 - 3. Secure the cable in the riser wiring closets with cable ties or straps as needed to prevent accidental damage to cable.

3.05 TERMINATION POINTS

- A. When installing fiber optic cable, the following guidelines should be observed at termination points:
 - 1. The amount of cable slack at termination points should allow the cable to be routed to the termination location with enough additional cable to reach a convenient location for the polishing, plus an additional 3 meters (9.75 ft.).
 - 2. Termination hardware should be located to allow convenient use, convenient termination, and facilitate routing of additional locations.
 - 3. When routing cable into an equipment rack/cabinet, the minimum bend radius should be maintained in the transition from the cable tray to the rack.
 - 4. In equipment racks, the cable should be secured to the frame with cable ties to provide accidental snagging of the cable.

3.06 INSTALLATION

- A. When pulling fiber optic cable by any mechanical device (winch etc.) a dynamometer must be used to ensure the maximum tensile strength isn't exceeded.
- B. The mechanical pulling device shall be equipped with clutches or shear pins to ensure this.
- C. The fiber cable shall be attached to the pull line via the strength member of mesh grip.
- D. At each end of a cable run approximately 10 feet of slack should be left for cable repairs, connecting and moving of equipment. Coil up and provided tie wrapping.
- E. All installation work shall be done by qualified craftspeople in a neat, high quality manner and shall conform to the most stringent of applicable local, state, and federal building codes.
- F. Cables shall be placed with sufficient bending radius so as not to kink, shear, or damage jackets, binders or cables, including where cables are coiled for future use or slack. Bending shall not exceed manufacturers' specified bend radii. Cable shall not be wrapped around the feet of systems furniture.
- G. Tie wraps shall not be pulled so tight as to kink or crimp the cable jackets.

- H. In no event shall any station cables be spliced (between closets and workstation locations).
- I. Ceiling tiles broken or defaced by the Contractor during the installation and testing process shall be replaced at the cost to the Contractor.
- J. The Contractor shall ensure that all floor and wall penetrations will be fire-stopped to the satisfaction of the Owner and as required by applicable codes. Provide fire stop immediately after all cables have been installed.
- K. Contractor shall individually and properly ground all relay racks, ladder rack, equipment cabinets and inside and outside plant cable shields, wherever the cables leave the sheaths, to Owner-supplied building grounds.
- L. Voice/Data Cables:
 - 1. Install four-pair Cat5E UTP station cables with jacks (T568B pin art) placed in faceplates,
 - 2. The cables for a typical flush mounted closed wall outlet extends from the outlet, up inside the wall conduit to the ceiling space, then run to the cable tray above ceiling to the nearest IDF or MDF and left coiled up with sufficient length to be terminated on patch panels.
 - 3. When installing cables in conduits with pull-strings, replace pull-strings used with new ones.
 - 4. All cables will run parallel or at right angles to all existing walls. Secure cables to independent ceiling supports using Caddy CAT32 j-hangers. All cables must be supported at least every 48" and within 6" of any conduit stub-up point.
- M. Labeling Scheme:
 - 1. Station cables are to be machine labeled on each end of the cables and at the workstation outlets, within 2 inches of the termination, and on the face of both the workstation outlets with:
 - a. Cable or Location number, usually Room Number
 - b. Jack Designator:

Color:	Typical Use:
White	Voice-Digital phone
Blue	Voice-analog modem/fax
Orange	Data/Computer
 - 2. The above recommended labeling scheme should be coordinated with any existing standards which may already be in use by the Owner.
 - 3. Fiber Optic cables shall be labeled in pairs at each end and at cross-connect points with building, room number, pair number, and strand (NT-301-06-F1).

3.07 "SC" TERMINATIONS

- A. Provide and install an "SC" connector, onto each strand of each end of each cable.
- B. Follow Manufacturers instructions for installing each connector.
- C. Use a 3 micron lapping film for light polishing as required.
- D. Install a polished fiber connector onto the back side port of each patch panel.
- E. Install a polished fiber connector onto the back side port of each face plate coupler module.

F. Leave a minimum of 5'-0" of slack of each strand coiled carefully in patch panel tray.

3.08 INSTALL ACCESSORIES ACCORDING TO INSTRUCTIONS PACKED WITH THEM

A. Along with above specifications, use 3M's installation product bulletins which accompany each product.

3.09 TESTING – FIBER CABLES

A. Each strand shall be tested and the following information be turned over to the owner in chart form:

1. From Point-To-Point
2. Fiber I.D. Label No.
3. RX Level
4. Attenuation Total
5. Wave Length
6. Reference Level
7. Each strand shall not exceed a level of 3.75db of attenuation.

B. All fiber optic cables shall be tested in the following manner:

1. Using an Optical Time Domain Reflectometer (OTDR), test and record, the quality of each cable while still on the reel, within 48 hours of installation, to verify that no damage has occurred during shipment. This test needs to be done in one direction only.
2. Using an optical power meter, measure end-to-end attenuation for all installed cables, including: all splices, the terminated fiber itself; all connectors, and patch panel couplings. The total loss shall be measured and reported for each cable at the appropriate operating wavelengths, for multi-mode. Optical attenuation measurements are to be done from both directions, end-to-end. The maximum permissible loss on each cable is less than 2.5 dB, plus the loss per 1,000 feet due to cable length. Losses through each panel connector shall not exceed 0.2 dB. Losses through each fusion splice, if used, shall not exceed 0.2 dB.
3. Using the OTDR, test and record the optical quality of each cable after installation. Test in one direction only. Provide all printed readings, both before and after installation, so they can be included in the as-built documentation.

3.10 TESTING – VOICE/DATA CABLES

A. All horizontal cables, outlets and terminations shall meet or exceed all performance specifications designated by ANSI, EIA/TIA 568A Annex E, or IEEE, for telephone, terminal to CPU, 10BaseT, 100BaseT, and FDDI.

B. Testing and labeling shall be completed prior to occupancy and, where possible test results presented to Owner during close-out.

C. Testing of all vertical and horizontal Voice cables and outlet jacks must include tests for the following:

1. Opens
2. Shorts
3. Grounds
4. Continuity
5. Polarity, or pair reversals
6. DC resistance

- D. Testing of all horizontal data cables and outlet jacks, must include end-to-end tests using an EIA/TIA TSB 67, Level II compliant testing device such as a Microtest PentaScanner+. The documentation must show the outlet designation, the name of the technician who actually performs the test, as well as the time and date when the test was performed. The results for each workstation outlet must show the results of the following tests:
1. Opens
 2. Shorts
 3. Grounds
 4. Continuity
 5. Polarity, or pair reversals
 6. DC resistance
 7. Impulse noise
 8. Signal attenuation @ from 200 KHz to 100 MHz in 100 KHz increments (Category 5)
 9. Insertion loss @ 200 KHz to 100 MHz in 100 KHz increments (Category 5)
 10. NEXT (near-end crosstalk) @ from 200 KHz to 100 MHz in 100 KHz increments (Category 5)
 11. Station cable length/overall loop resistance
- E. Any cables failing to meet above indicated standards must be removed and replaced, at no cost to the Owner, with cables that prove, in testing, to meet the standards. The installation will not be accepted until testing documentation has reported that all pairs in all cables meet the appropriate standards.

3.11 DOCUMENTATION

- A. Cable Records: The Contractor must provide a database of cable records, both hard copy and on floppy disk, using (*.dbf) Dbase format, for input into Owner's facilities management package. The cable records format must include at least the following information about each cable:
1. Room/Location code/Jack ID.
 2. Riser/backbone or distribution cable pair assignments
 3. Test results
 4. Station cable lengths/Overall loop resistance
- B. Project Documentation: Owner will provide sepias of Contract Communication Drawings to Contractor prior to close-out. Contractor shall transfer as-built documentation from field prints onto Contractor-produced mylar. Only mylar will be accepted as a reproducible medium. Additionally Contractor to provide four (4) sets of blue lines produced from as-built documentation. If significant discrepancies are found on the "as-built" Communication Drawings, corrections shall be made and additional reproduction costs will be borne by the Contractor. As-built Communication Drawings and close-out package shall include at least the following:
1. Locations of all technology outlets, cable location numbers, conduit, cable tray, ladder rack, sleeves and J-hooks
 2. Documentation of all backbone cable and pair routings and assignments
 3. Cut sheets showing station and backbone terminations and pair assignments
 4. Test results

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Site clearing as shown on the Drawings. Remove vegetation, improvements, concrete walks and curbs, asphalt paving, or obstructions interfering with installation of new construction. Remove such items elsewhere on the site or premises as specifically indicated or as directed by Project Engineer.

1.02 JOB CONDITIONS

- A. Provide protections necessary to prevent damage to existing improvements indicated to remain in place. Protect improvements on adjoining properties and on the Owner's property. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged, and store on the Owner's premises where indicated, unless otherwise directed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SITE CLEARING

- A. Removal includes stumps and roots. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated. Place fill material in horizontal layers not exceeding 6" loose depth, and thoroughly compact to a density equal to adjacent original ground.

3.02 TOPSOIL

- A. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches diameter, and without weeds, roots, and other objectionable material. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with the underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.
- B. Stockpile topsoil in storage piles in areas shown, or where otherwise directed. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent windblown dust.

3.03 DISPOSAL OF WASTE MATERIALS

- A. Burning is not permitted on the Owner's property.
- B. Removal from Owner's Property: Remove waste materials and unsuitable and excess topsoil from the Owner's property and dispose of legally.

END OF SECTION

SECTION 31 23 12 EXCAVATION, FILLING AND GRADING

PART 1 - GENERAL.

1.01 SECTION INCLUDES

- A. The extent of excavation, filling and grading is shown on the Drawings. Preparation of subgrade for building slabs, walks, and pavements is included as part of this Work. Backfilling of trenches within the building lines is included as part of this Work. Preparation of topsoil in grassed areas is included as part of this Work.

1.02 RELATED SECTIONS

- A. Section 01 45 29 – Testing Laboratory Services.

1.03 SUBMITTALS

- A. Notification shall be provided to Project Engineer indicating source of borrow material in advance of start of Work and certification provided that proposed soil material is satisfactory for specified use.

1.04 QUALITY ASSURANCE:

- A. Perform excavation Work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Compaction density shall be 95 percent of the maximum dry density value as determined by ASTM D 698 (Standard Proctor Test) of AASHTO T-99.
- C. Soils compaction control tests shall be performed as specified herein and under Section 01455 - Testing Laboratory Services. Stability is defined as absence of significant yielding or pumping of soils under compaction effort.
- D. Number of Tests: Make test(s) in accordance with AASHTO T-99 for each class of material. Make in-place density tests in accordance with AASHTO T-238 (Nuclear Method) for density tests, as the fill and backfill work progresses. At least one test per lift of any isolated portions and each footing.
- E. Work on Non-Tested Areas: Placing permanent construction over fill that has not been tested and approved may require removal of permanent Work, re-compacting the fill and replacing the Work at no additional cost to the Owner.

1.05 EXISTING UTILITIES

- A. Locate existing underground utilities in the areas of Work. If utilities are to remain in place, provide adequate means of protection during earthwork operations. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the 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.

- B. Do not interrupt existing utilities serving facilities occupied and used by Owner or others except when permitted in writing by Project Engineer and then only after acceptable temporary utility services have been provided. 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.

1.06 PROTECTION OF PERSONS AND PROPERTY

- A. Barricade open excavations occurring as part of this Work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.07 USE OF EXPLOSIVES

- A. The use of explosives is not permitted.

PART 2 - PRODUCTS

2.01 BACKFILL AND FILL

- A. Select fill shall be an approved select material free from trash, debris, stones larger than 3 inches, roots and other organic matter.

2.02 GRANULAR FILL

- A. Below existing natural grade line: Sandy clay with a liquid limit less than 45 and PI in range of 10 to 22, or clayey sand with PI not less than 7 and liquid limit not greater than 35.
- B. Above existing natural grade under slabs and footings: Silty or sandy clay as above or clayey-sand with LL less than 35 and PI of 3 to 15.

2.03 TOPSOIL

- A. Provide topsoil to supplement that for reuse at site. Provide clean, fertile, friable, natural loam obtained from a local, well drained source.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which excavating, filling, and grading are to be performed and notify the Contractor, in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.02 EXCAVATION

- A. Excavation consists of removal and disposal of material encountered when establishing required grade elevations.

- B. Earth excavation includes removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, material of any classification indicated in data on subsurface conditions, and other materials encountered that are not classified as rock excavation or unauthorized excavation.
- C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Project Engineer. Unauthorized excavation, as well as remedial Work directed by the Project Engineer, shall be at the Contractor's expense. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Project Engineer.
- D. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by the Project Engineer.
- E. Additional Excavation: When excavation has reached required subgrade elevations, notify the Project Engineer / Architect who will make an inspection of conditions. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Project Engineer / Architect. Removal of unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in work.
- F. 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. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- G. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross braces, in good serviceable condition. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
- H. Dewatering: Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area. 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 subgrade and foundations.
 - 1. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
 - 2. Convey water removed from excavations and rainwater to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

3.03 MATERIAL STORAGE

- A. Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations. Dispose of excess soil material and waste materials as herein specified.

3.04 EXCAVATION FOR STRUCTURES

- A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, 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. 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 concrete.

3.05 EXCAVATION FOR PAVEMENTS

- A. Cut surface under pavements to comply with cross-sections, elevations and grades as shown.

3.06 EXCAVATION FOR TRENCHES

- A. Dig trenches to the uniform width required for the particular item to be installed, sufficiently wide to provide ample working room. Excavate trenches to the depth indicated or required. Carry the depth of trenches for piping to establish the indicated flow lines and invert elevations. Beyond the building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.
- B. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for the entire body of the pipe. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place concrete to the level of the bottom of adjacent footings.
- C. Do not backfill trenches until tests and inspections have been made and backfilling authorized by the Project Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

3.07 COLD WEATHER PROTECTION

- A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.08 COMPACTION

- A. Control soil compaction during construction providing minimum percentage of density specified for each area classification. Compact soil to not less than the following percentages of maximum dry density.
- B. Building Slabs and Steps: Compact top 12 inches of subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
- C. Lawn or Unpaved Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material at 90 percent maximum dry density.
- D. Walkways and Pavements Compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent maximum dry density.

3.09 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 subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

3.10 BACKFILL AND FILL

- A. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
- B. In excavations and under grassed areas by Owner; use satisfactory excavated or borrow material. Under grassed areas by Owner, loosen subgrade to depth of 4 inches, and spread topsoil to depth of 4 inches. Till surface to a level, fine texture.
- C. Under buildings, walks and pavements, use sub-base material, or satisfactory excavated or borrow material, or combination of both. Backfill excavations as promptly as work permits, but not until completion of the following:
 - 1. Acceptance by Project Engineer of construction below finish grade including, where applicable, dampproofing, waterproofing, and soil treatment.
 - 2. Inspection, testing, approval, and recording locations of underground utilities.
 - 2. Removal of concrete formwork, shoring and bracing, and backfilling of voids with satisfactory materials.
 - 4. Removal of trash and debris.

3.11 GROUND SURFACE PREPARATION

- A. When existing ground surface has a density less than that specified under "Compaction" for the particular area classification, break up the ground surface, pulverize, moisture condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

3.12 PLACEMENT AND COMPACTION

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage of maximum 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, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.

3.13 GRADING

- A. 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 shown, 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. 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 feet above or below the required subgrade elevations.
 - 2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 feet above or below the required subgrade elevation.
 - 2. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2 inch above or below the required subgrade elevation.
 - 4. 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 inch when tested with a 10-foot straightedge.

3.14 COMPACTION

- A. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.15 MAINTENANCE

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where subsequent construction operations or adverse weather disturbs completed compacted areas, scarify surface, re-shape, and compact to required density prior to further construction.

3.16 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it off the Owner's property.

END OF SECTION

SECTION 905 - PROPOSAL

Date _____

Mississippi Transportation Commission
Jackson, Mississippi

Sirs: The following proposal is made on behalf of _____
_____ of _____

for constructing the following designated project(s) within the time(s) hereinafter specified.

The plans are composed of drawings and blue prints on file in the offices of the Mississippi Department of Transportation, Jackson, Mississippi.

The Specifications are the current Standard Specifications of the Mississippi Department of Transportation approved by the Federal Highway Administration, except where superseded or amended by the plans, Special Provisions and Notice(s) to Bidders attached hereto and made a part thereof.

I (We) certify that I (we) possess a copy of said Standard and any Supplemental Specifications.

Evidence of my (our) authority to submit the Proposal is hereby furnished. The proposal is made without collusion on the part of any person, firm or corporation. I (We) certify that I (we) have carefully examined the Plans, the Specifications, including the Special Provisions and Notice(s) to Bidders, herein, and have personally examined the site of the work. On the basis of the Specifications, Special Provisions, Notice(s) to Bidders, and Plans, I (we) propose to furnish all necessary machinery, tools, apparatus and other means of construction and do all the work and furnish all the materials in the manner specified. I (We) understand that the quantities mentioned herein are approximate only and are subject to either increase or decrease, and hereby propose to perform any increased or decreased quantities of work at the unit prices bid, in accordance with the above.

Attached hereto is a certified check, cashier's check or Proposal Guaranty Bond in the amount as required in the Advertisement (or, by law).

INSTRUCTION TO BIDDERS: Alternate and Optional Items on Bid Schedule.

1. Two or more items entered opposite a single unit quantity WITHOUT DEFINITE DESIGNATION AS "ALTERNATE ITEMS" are considered as "OPTIONAL ITEMS". Bidders may or may not indicate on bids the Optional Item proposed to be furnished or performed WITHOUT PREJUDICE IN REGARD TO IRREGULARITY OF BIDS.
2. Items classified on the bid schedule as "ALTERNATE ITEMS" and/or "ALTERNATE TYPES OF CONSTRUCTION" must be preselected and indicated on bids. However, "Alternate Types of Construction" may include Optional Items to be treated as set out in Paragraph 1, above.
3. Optional items not preselected and indicated on the bid schedule MUST be designated in accordance with Subsection 102.06 prior to or at the time of execution of the contract.
4. Optional and Alternate items designated must be used throughout the project.

I (We) further propose to perform all "force account or extra work" that may be required of me (us) on the basis provided in the Specifications and to give such work my (our) personal attention in order to see that it is economically performed.

SECTION 905 -- PROPOSAL (CONTINUED)

I (We) further propose to execute the attached contract agreement (Section 902) as soon as the work is awarded to me (us), and to begin and complete the work within the time limit(s) provided for in the Specifications and Advertisement. I (We) also propose to execute the attached contract bond (Section 903) in an amount not less than one hundred (100) percent of the total of my (our) part, but also to guarantee the excellence of both workmanship and materials until the work is finally accepted.

I (We) enclose a certified check, cashier's check or bid bond for **five percent (5%) of total bid** and hereby agree that in case of my (our) failure to execute the contract and furnish bond within Ten (10) days after notice of award, the amount of this check (bid bond) will be forfeited to the State of Mississippi as liquidated damages arising out of my (our) failure to execute the contract as proposed. It is understood that in case I am (we are) not awarded the work, the check will be returned as provided in the Specifications.

Respectfully Submitted,

DATE _____

Contractor

BY _____
Signature

TITLE _____

ADDRESS _____

CITY, STATE, ZIP _____

PHONE _____

FAX _____

E-MAIL _____

(To be filled in if a corporation)

Our corporation is chartered under the Laws of the State of _____ and the names, titles and business addresses of the executives are as follows:

President Address

Secretary Address

Treasurer Address

The following is my (our) itemized proposal.

A single Contract for construction necessary to renovate the Rest Area Buildings on I-55 Northbound near Hernando, known as State Project No. BWO-2198-17(003) / 502016301, in the County of Desoto, State of Mississippi.

I (We) agree to complete the entire project within the specified contract time.

***** SPECIAL NOTICE TO BIDDERS *****

**BIDS WILL NOT BE CONSIDERED UNLESS BOTH UNIT PRICES AND ITEM TOTALS ARE ENTERED.
 BIDS WILL NOT BE CONSIDERED UNLESS THE BID CERTIFICATION LOCATED AT THE END OF THE BID SHEETS IS SIGNED**

*****BID SCHEDULE*****

Line No.	Item Code	Adj Code	Quantity	Units	Description	Unit Price		Item Amount	
						Dollar	Ct	Dollar	Ct
Building Items									
0010	1500-A001		1	Lump Sum	Construction of Renovate Rest Area Building	XXXXXXXX	XXX		

*** BID CERTIFICATION ***

TOTAL BID.....\$_____

*** SIGNATURE STATEMENT ***

BIDDER ACKNOWLEDGES THAT HE/SHE HAS CHECKED ALL ITEMS IN THIS PROPOSAL FOR ACCURACY AND CERTIFIED THAT THE FIGURES SHOWN THEREIN CONSTITUTE THEIR OFFICIAL BID.

BIDDER'S SIGNATURE

BIDDER'S COMPANY

BIDDER'S FEDERAL TAX ID NUMBER

CONDITIONS FOR COMBINATION BID

If a bidder elects to submit a combined bid for two or more of the contracts listed for this month's letting, the bidder must complete and execute these sheets of the proposal in each of the individual proposals to constitute a combination bid. In addition to this requirement, each individual contract shall be completed, executed and submitted in the usual specified manner.

Failure to execute this Combination Bid Proposal in each of the contracts combined will be just cause for each proposal to be received and evaluated as a separate bid.

COMBINATION BID PROPOSAL

I. This proposal is tendered as one part of a Combination Bid Proposal utilizing option ___* of Subsection 102.11 on the following contracts:

* Option to be shown as either (a), (b), or (c).

<u>Project No.</u>	<u>County</u>	<u>Project No.</u>	<u>County</u>
1. _____	_____	6. _____	_____
2. _____	_____	7. _____	_____
3. _____	_____	8. _____	_____
4. _____	_____	9. _____	_____
5. _____	_____	10. _____	_____

A. If option (a) has been selected, then go to II, and sign Combination Bid Proposal.

B. If option (b) has been selected, then complete the following, go to II, and sign Combination Bid Proposal.

SECTION 905 - COMBINATION BID PROPOSAL (Continued)

Project Number	Pay Item Number	Unit	Unit Price Reduction	Total Item Reduction	Total Contract Reduction
1. _____	_____ _____	_____ _____	_____ _____	_____ _____	
2. _____	_____ _____	_____ _____	_____ _____	_____ _____	
3. _____	_____ _____	_____ _____	_____ _____	_____ _____	
4. _____	_____ _____	_____ _____	_____ _____	_____ _____	
5. _____	_____ _____	_____ _____	_____ _____	_____ _____	
6. _____	_____ _____	_____ _____	_____ _____	_____ _____	
7. _____	_____ _____	_____ _____	_____ _____	_____ _____	
8. _____	_____ _____	_____ _____	_____ _____	_____ _____	

SECTION 905 - COMBINATION BID PROPOSAL (Continued)

Project Number	Pay Item Number	Unit	Unit Price Reduction	Total Item Reduction	Total Contract Reduction
9. _____	_____ _____	_____ _____	_____ _____	_____ _____	
10. _____	_____ _____	_____ _____	_____ _____	_____ _____	

C. If option (c) has been selected, then initial and complete one of the following, go to II. and sign Combination Bid Proposal.

_____ I (We) desire to be awarded work not to exceed a total monetary value of \$ _____.

_____ I (We) desire to be awarded work not to exceed _____ number of contracts.

II. It is understood that the Mississippi Transportation Commission not only reserves the right to reject any and all proposals, but also the right to award contracts upon the basis of lowest separate bids or combination bids most advantageous to the State.

It is further understood and agreed that the Combination Bid Proposal is for comparison of bids only and that each contract shall operate in every respect as a separate contract in accordance with its proposal and contract documents.

I (We), the undersigned, agree to complete each contract on or before its specified completion date.

SIGNED _____

TO: EXECUTIVE DIRECTOR, MISSISSIPPI DEPARTMENT OF TRANSPORTATION
JACKSON, MISSISSIPPI

CERTIFICATE

If awarded this contract, I (we) contemplate that portions of the contract will be sublet. I (we) certify that those subcontracts which are equal to or in excess of fifty thousand dollars (\$50,000.00) will be in accordance with regulations promulgated and adopted by the Mississippi State Board of Contractors on January 13, 1999.

I (we) agree that this notification of intent DOES NOT constitute APPROVAL of the subcontracts.

NOTE: Insert name and address of subcontractors. (Subcontracts equal to or in excess of fifty thousand dollars (\$50,000.00) ONLY.)

_____	_____
(Individual or Firm)	(Address)
_____	_____
(Individual or Firm)	(Address)
_____	_____
(Individual or Firm)	(Address)
_____	_____
(Individual or Firm)	(Address)

NOTE: Failure to complete the above DOES NOT preclude subsequent subcontracts. Subsequent subcontracts, if any, equal to or in excess of fifty thousand dollars (\$50,000.00) will be in accordance with regulations promulgated and adopted by the Mississippi State Board of Contractors on January 13, 1999.

Contractor _____

By _____

Title _____

CERTIFICATE MUST BE EXECUTED

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

CERTIFICATION
(Execute in duplicate)

I, _____,
(Name of person signing certification)

individually, and in my capacity as _____ of
(Title)

_____ do hereby certify under
(Name of Firm, Partnership, or Corporation)

penalty of perjury under the laws of the United States and the State of Mississippi that
_____, Bidder
(Name of Firm, Partnership, or Corporation)

on Project No. **BWO-2198-17(003) / 502016301**,

in **Desoto** County(ies), Mississippi, has not either directly or indirectly entered into any agreement, participated in any collusion; or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its corporate officers or principal owners.

Except as noted hereafter, it is further certified that said legal entity and its corporate officers, principal owners, managers, auditors and others in a position of administering federal funds are not currently under suspension, debarment, voluntary exclusion or determination of ineligibility; nor have a debarment pending; nor been suspended, debarred, voluntarily excluded or determined ineligible within the past three years by the Mississippi Transportation Commission, the State of Mississippi, any other State or a federal agency; nor been indicted, convicted or had a civil judgment rendered by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

Initial here "_____" if exceptions are attached and made a part thereof. Any exceptions shall address to whom it applies, initiating agency and dates of such action.

Note: Exceptions will not necessarily result in denial of award but will be considered in determining bidder responsibility. Providing false information may result in criminal prosecution or administrative sanctions.

All of the foregoing and attachments (when indicated) is true and correct.

Executed on _____ Signature

(5/29/2008S)

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

CERTIFICATION
(Execute in duplicate)

I, _____,
(Name of person signing certification)

individually, and in my capacity as _____ of
(Title)

_____ do hereby certify under
(Name of Firm, Partnership, or Corporation)

penalty of perjury under the laws of the United States and the State of Mississippi that
_____, Bidder
(Name of Firm, Partnership, or Corporation)

on Project No. **BWO-2198-17(003) / 502016301**,

in Desoto County(ies), Mississippi, has not either directly or indirectly entered into any agreement, participated in any collusion; or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its corporate officers or principal owners.

Except as noted hereafter, it is further certified that said legal entity and its corporate officers, principal owners, managers, auditors and others in a position of administering federal funds are not currently under suspension, debarment, voluntary exclusion or determination of ineligibility; nor have a debarment pending; nor been suspended, debarred, voluntarily excluded or determined ineligible within the past three years by the Mississippi Transportation Commission, the State of Mississippi, any other State or a federal agency; nor been indicted, convicted or had a civil judgment rendered by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

Initial here " _____ " if exceptions are attached and made a part thereof. Any exceptions shall address to whom it applies, initiating agency and dates of such action.

Note: Exceptions will not necessarily result in denial of award but will be considered in determining bidder responsibility. Providing false information may result in criminal prosecution or administrative sanctions.

All of the foregoing and attachments (when indicated) is true and correct.

Executed on _____ Signature

(5/29/2008S)

S E C T I O N 9 0 2

CONTRACT FOR BWO-2198-17(003) / 502016301

LOCATED IN THE COUNTY(IES) OF Desoto

STATE OF MISSISSIPPI,
COUNTY OF HINDS

This contract entered into by and between the Mississippi Transportation Commission on one hand, and the undersigned contractor, on the other witnesseth;

That, in consideration of the payment by the Mississippi Transportation Commission of the prices set out in the proposal hereto attached, to the undersigned contractor, such payment to be made in the manner and at the time of times specified in the specifications and the special provisions, if any, the undersigned contractor hereby agrees to accept the prices stated in the proposal in full compensation for the furnishing of all materials and equipment and the executing of all the work contemplated in this contract.

It is understood and agreed that the advertising according to law, the Advertisement, the instructions to bidders, the proposal for the contract, the specifications, the revisions of the specifications, the special provisions, and also the plans for the work herein contemplated, said plans showing more particularly the details of the work to be done, shall be held to be, and are hereby made a part of this contract by specific reference thereto and with like effect as if each and all of said instruments had been set out fully herein in words and figures.

It is further agreed that for the same consideration the undersigned contractor shall be responsible for all loss or damage arising out of the nature of the work aforesaid; or from the action of the elements and unforeseen obstructions or difficulties which may be encountered in the prosecution of the same and for all risks of every description connected with the work, exceptions being those specifically set out in the contract; and for faithfully completing the whole work in good and workmanlike manner according to the approved Plans, Specifications, Special Provisions, Notice(s) to Bidders and requirements of the Mississippi Department of Transportation.

It is further agreed that the work shall be done under the direct supervision and to the complete satisfaction of the Executive Director of the Mississippi Department of Transportation, or his authorized representatives, and when Federal Funds are involved subject to inspection at all times and approval by the Federal Highway Administration, or its agents as the case may be, or the agents of any other Agency whose funds are involved in accordance with those Acts of the Legislature of the State of Mississippi approved by the Governor and such rules and regulations issued pursuant thereto by the Mississippi Transportation Commission and the authorized Federal Agencies.

The Contractor agrees that all labor as outlined in the Special Provisions may be secured from list furnished by

It is agreed and understood that each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and this contract shall be read and enforced as though it were included herein, and, if through mere mistake or otherwise any such provision is not inserted, then upon the application of either party hereto, the contract shall forthwith be physically amended to make such insertion.

The Contractor agrees that he has read each and every clause of this Contract, and fully understands the meaning of same and that he will comply with all the terms, covenants and agreements therein set forth.

Witness our signatures this the _____ day of _____, _____.

Contractor (s)

By _____

MISSISSIPPI TRANSPORTATION COMMISSION

Title _____

By _____

Signed and sealed in the presence of:
(names and addresses of witnesses)

Executive Director

Secretary to the Commission

Award authorized by the Mississippi Transportation Commission in session on the ____ day of _____, _____, Minute Book No. _____, Page No. _____.

S E C T I O N 9 0 3
PERFORMANCE AND PAYMENT BOND

CONTRACT BOND FOR: **BWO-2198-17(003) / 502016301**

LOCATED IN THE COUNTY(IES) OF: **Desoto**

STATE OF MISSISSIPPI,

COUNTY OF HINDS

Know all men by these presents: that we, _____
(Contractor)

_____ Principal, a _____

residing at _____ in the State of _____

and _____
(Surety)

residing at _____ in the State of _____,

authorized to do business in the State of Mississippi, under the laws thereof, as surety, are held and firmly bound unto the State of Mississippi in the sum of _____

(\$ _____) Dollars, lawful money of the United States of America, to be paid to it for which payment well and truly to be made, we bind ourselves, our heirs, administrators, successors, or assigns jointly and severally by these presents.

Signed and sealed this the _____ day of _____ A.D. _____.

The conditions of this bond are such, that whereas the said _____

principal, has (have) entered into a contract with the Mississippi Transportation Commission, bearing the date of _____ day of _____ A.D. _____ hereto annexed, for the construction of certain projects(s) in the State of Mississippi as mentioned in said contract in accordance with the Contract Documents therefor, on file in the offices of the Mississippi Department of Transportation, Jackson, Mississippi.

Now therefore, if the above bounden _____

_____ in all things shall stand to and abide by and well and truly observe, do keep and perform all and singular the terms, covenants, conditions, guarantees and agreements in said contract, contained on his (their) part to be observed, done, kept and performed and each of them, at the time and in the manner and form and furnish all of the material and equipment specified in said contract in strict accordance with the terms of said contract which said plans, specifications and special provisions are included in and form a part of said contract and shall maintain the said work contemplated until its final completion and acceptance as specified in Subsection 109.11 of the approved specifications, and save harmless said Mississippi Transportation Commission from any loss or damage arising out of or occasioned by the negligence, wrongful or criminal act, overcharge, fraud, or any other loss or damage whatsoever, on the part of said principal (s), his (their) agents, servants, or employees in

SECTION 903 - CONTINUED

the performance of said work or in any manner connected therewith, and shall be liable and responsible in a civil action instituted by the State at the instance of the Mississippi Transportation Commission or any officer of the State authorized in such cases, for double any amount in money or property, the State may lose or be overcharged or otherwise defrauded of, by reason of wrongful or criminal act, if any, of the Contractor(s), his (their) agents or employees, and shall promptly pay the said agents, servants and employees and all persons furnishing labor, material, equipment or supplies therefor, including premiums incurred, for Surety Bonds, Liability Insurance, and Workmen's Compensation Insurance; with the additional obligation that such Contractor shall promptly make payment of all taxes, licenses, assessments, contributions, damages, any liquidated damages which may arise prior to any termination of said principal's contract, any liquidated damages which may arise after termination of the said principal's contract due to default on the part of said principal, penalties and interest thereon, when and as the same may be due this state, or any county, municipality, board, department, commission or political subdivision: in the course of the performance of said work and in accordance with Sections 31-5-51 et seq. Mississippi Code of 1972, and other State statutes applicable thereto, and shall carry out to the letter and to the satisfaction of the Executive Director of the Mississippi Department of Transportation, all, each and every one of the stipulations, obligations, conditions, covenants and agreements and terms of said contract in accordance with the terms thereof and all of the expense and cost and attorney's fee that may be incurred in the enforcement of the performance of said contract, or in the enforcement of the conditions and obligations of this bond, then this obligation shall be null and void, otherwise to be and remain in full force and virtue.

Witness our signatures and seals this the _____ day of _____ A.D. _____.

_____	_____
(Contractors) Principal	Surety
By _____	By _____
	(Signature) Attorney in Fact
	Address _____

Title _____	_____
(Contractor's Seal)	(Printed) MS Agent

	(Signature) MS Agent
	Address _____

	(Surety Seal)

	Mississippi Insurance ID Number



BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____
Contractor

Address

City, State ZIP

as Principal, hereinafter called the Principal, and _____
Surety

a corporation duly organized under the laws of the state of _____

as Surety, hereinafter called the Surety, are held and firmly bound unto State of Mississippi, Jackson, Mississippi

As Obligee, hereinafter called Obligee, in the sum of **Five Per Cent (5%) of Amount Bid**
Dollars (\$ _____)

for the payment of which sum will and truly to be made, the said Principal and said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for **A single Contract for construction necessary to renovate the Rest Area Buildings on I-55 Northbound near Hernando, known as State Project No. BWO-2198-17(003) / 502016301, in the County of Desoto, State of Mississippi.**

NOW THEREFORE, the condition of this obligation is such that if the aforesaid Principal shall be awarded the contract, the said Principal will, within the time required, enter into a formal contract and give a good and sufficient bond to secure the performance of the terms and conditions of the contract, then this obligation to be void; otherwise the Principal and Surety will pay unto the Obligee the difference in money between the amount of the bid of the said Principal and the amount for which the Obligee legally contracts with another party to perform the work if the latter amount be in excess of the former, but in no event shall liability hereunder exceed the penal sum hereof.

Signed and sealed this _____ day of _____, 20__

(Principal) (Seal)

(Witness)

By: _____
(Name) (Title)

(Surety) (Seal)

(Witness)

By: _____
(Attorney-in-Fact)

MS Agent

Mississippi Insurance ID Number