



**TECHNICAL
SPECIFICATIONS**

FOR

**RUDY MORAN PARK
PAVILION PROJECT**



FEBRUARY 2026

Prepared for



In partnership with.



925 Tommy Munro Drive, Suite G, Biloxi, MS 39532 (228) 385-2350
Email: se@seymouren.com Website: www.seymouren.com

ENGINEERING ♦ SURVEYING ♦ ENVIRONMENTAL

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ADVERTISEMENT FOR BIDS

Notice is hereby given that the City of D'Iberville, Mississippi will receive sealed bids at City Hall, City of D'Iberville, 10383 Automall Pkwy, D'Iberville, Mississippi 39540 until 10:00 a.m. (CDT) on March 26, 2026, and then sealed bids will be publicly opened and read aloud at 11:00 a.m. for the following:

RUDY MORAN PARK PAVILION PROJECT D'IBERVILLE, MISSISSIPPI

Bids are invited for the construction of an open air pavilion. Location of said work is the CITY OF D'IBERVILLE, HARRISION COUNTY, MISSISSIPPI.

A Pre-Bid meeting will be held at 10:00 a.m. on March 17, 2026, at City Hall, City of D'Iberville, 10383 Automall Pkwy, D'Iberville, Mississippi 39540. It is strongly suggested that all prospective Bidders attend this meeting.

All Bids must be accompanied by a certified check or bank draft payable to the order of The City of D'Iberville, Mississippi, negotiable U.S. Government bonds (at par value), or a satisfactory Bid bond executed by the Bidder and an acceptable surety, must be submitted in an amount equal to five percent (5%) of the total bid.

All Bids submitted in excess of \$50,000.00 by a prime or subcontractor to do any erection, building, construction, repair, maintenance or related work, must comply with Section 31-3-21, Mississippi Code of 1972, by having a current Certificate of Responsibility from the State Board of Public Contractors. The scope of work for this project shall require a Contractor to be classified in the following major classification: Building Construction or Metal Building Construction.

Bid documents are being made available via paper copy or digital copy (CD). All Prospective Bidders and Plan Holders are required to register for an account and log-in at www.SeymourEngPlans.com. At this site, plans can be viewed at no charge or physically purchased. All Prospective Bidders and Plan Holders must have a valid email address for registration. Purchased bid documents are non-refundable and must be purchased through the website. A view only copy of the plans, specifications, and proposal documents are also available at the office of Seymour Engineering, 925 Tommy Munro Drive, Suite G, Biloxi, Mississippi and may be examined during regular business hours (8:00 a.m. – 5:00 p.m., Monday – Friday). The Seymour Engineering Project Manager is Jody Spires. and can be contacted at the listed address or jspires@seymouren.com regarding the project.

Bids may be submitted via envelope or electronically at www.SeymourEngPlans.com until the time specified. Bids received after the specified time will be returned unopened. Bids submitted by envelope must be addressed to JODI WEISE, CITY CLERK, City of D'Iberville, City Hall, 10383 Automall Pkwy, D'Iberville, Mississippi 39540 and designated as Bid for:

**RUDY MORAN PARK PAVILION PROJECT
D'IBERVILLE, MISSISSIPPI**

The current Certificate of Responsibility Number shall be indicated on the exterior of the sealed bid envelope in order to be opened. All Bids submitted for \$50,000 or less shall be so marked on the exterior of the sealed bid envelope.

The City of D'Iberville reserves the right to reject any and all bids received and to award said bid in the best interest of the City. Bids may be held for a period not to exceed sixty (60) days from the date of the opening of bids for the purpose of reviewing the bids and investigating the qualifications of Bidders, prior to awarding of the Contract.

GIVEN UNDER MY HAND AND OFFICIAL SEAL OF OFFICE, THIS THE 4TH DAY OF
NOVEMBER____, 2025.

JODI WEISE, CITY CLERK
CITY OF D'IBERVILLE
10383 AUTOMALL PKWY
D'IBERVILLE, MS 39540

Run 2 times - 2/20/2026
- 2/27/2026
Open - 3/26/2026

INFORMATION FOR BIDDERS

1. RECEIPT AND OPENING OF BIDS

The City of D'Iberville, Mississippi (herein called "Owner"), invites bids at City Hall, City of D'Iberville, 10383 Automall Pkwy, D'Iberville, Mississippi 39540 until 10:00 a.m. (CDT) on March 26, 2026, and then sealed bids will be publicly opened and read aloud at 11:00 a.m. for the following:

RUDY MORAN PARK PAVILION PROJECT D'IBERVILLE, MISSISSIPPI

Bids will be received electronically **OR** by sealed envelope until the time specified. All bids will be publicly opened and read aloud in the Council Chambers located at D'Iberville City Hall, 10383 Automall Pkwy, D'Iberville, MS 39540. The Owner will consider null and void any bid not prepared and submitted in accordance with the provisions hereof and such bid will be rejected. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 60 days after the actual date of the opening thereof.

2. METHOD OF BIDDING

The Owner invites the following bid(s):

Unit Price Contract according to the enclosed Bid Schedule.

Prospective Bidders are required to have a valid email address and register an account at SeymourEngPlans.com. Bidders intending to submit an electronic bid may do so through this website and must adhere to all requirements contained herein as part of the bidding process. Likewise, Bidders intending to submit bids via sealed envelope may do so by submission to the aforementioned address and must adhere to all requirements contained herein as part of the bidding process.

3. TIME OF COMPLETION AND LIQUIDATED DAMAGES

Bidder must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within **120** calendar days thereafter. Bidder must agree also to pay as liquidated damages, the sum of **\$500.00** for each consecutive calendar day thereafter as hereinafter provided in the General Conditions. Any extension of construction time must be requested through and approved by the Engineer.

4. INDEPENDENT CONTRACTOR

The bidder shall be working as an independent contractor and shall indemnify and hold harmless Owner, City of D'Iberville, Mississippi and Seymour Engineering from any and

all claim of any kind and nature (including, but not limited to, attorney's fees, court cost and litigation expenses) filed by any person arising out of or related directly or indirectly from Contractor's work being performed under this contract.

5. PREPARATION OF BID

Each bid must be submitted on the prescribed form, fully completed and executed by principals of bidder. All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures. The Contractor's classification should include the ability to perform work in regard to Municipal and Public Works.

For envelope bid submissions, each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his address, Certificate of Responsibility Number, and the name of the project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified in the bid form.

For electronic bid submissions, each bid must be uploaded to the SeymourEngPlans.com website. All bids must be submitted as a single PDF file with the first page bearing the name of the bidder, his address, Certificate of Responsibility Number, and the name of the project for which the bid is submitted. If the successful bidder submits a bid via electronic means, the Owner reserves the right to request a hard copy of the bid package to be provided by the bidder within five (5) days from when the documents are requested.

6. SUBCONTRACTS

The bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this contract.

- (a) Must be acceptable to the Owner, and

Although the Bidder is not required to attach such Certifications by proposed subcontractors to his bid, the bidder is here advised of this requirement so that appropriate action can be taken to prevent subsequent delay in subcontract award.

7. QUALIFICATION OF BIDDER

Bidder must be qualified under Mississippi Law and have a current Certificate of Responsibility from the Mississippi State Board of Contractors establishing his Classification as to the value and type of construction on which they are authorized to bid. **The scope of work for this project shall require a Contractor to be classified in the following category: Building Construction or Metal Building Construction.** A copy of Bidder's State of Mississippi Board of Contractors license shall be attached with Bid Proposal.

Each bidder shall submit a Statement of Bidder's Qualifications, his experience record in constructing the type of improvements proposed, his organization and equipment available

for the work contemplated. Contractor shall provide references. When specifically requested by the Owner, a detailed financial statement. The Owner shall have the right to take such steps as it deems necessary to determine the ability of the bidder to perform his obligations under his contract and bidder shall furnish such information and data for this purpose as may be requested. The right is reserved to reject any bid where an investigation of the available evidence or information does not satisfy the Owner that the bidder is qualified to conduct properly the terms of the Contract.

8. BID SECURITY

Each bid must be accompanied by cash, certified check of the bidder, or a bid bond prepared on the form of bid bond attached hereto, duly executed by the bidder as principal and having as surety hereon a surety company approved by the Owner, in the amount of five percent (5%) of the bid. Such cash, checks or bid bonds will be returned to all except the three lowest bidders within three days after the opening of bids, and the remaining cash, checks or bid bonds will be returned promptly after the Owner and the accepted bidder have executed the contract, or, if no award has been made within 60 days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as he has not been notified of the acceptance of his bid.

9. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

The successful bidder, upon his failure or refusal to execute and deliver the contract and bonds required within 10 days after he has received notice of the acceptance of his bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid.

10. CONDITIONS OF WORK

Each bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of his obligations to furnish all material and labor necessary to conduct the provisions of his contract. Insofar as possible, the Contractor, in conducting his work, must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.

11. ADDENDA AND INTERPRETATIONS

No interpretation of the meaning of the plans, specifications or other pre bid documents will be made to any bidder orally.

Every request for such interpretation should be in writing addressed to Seymour Engineering, 925 Tommy Munro Drive, Suite G, Biloxi, Mississippi 39532, and to be given consideration must be received at least ten days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications, which, if issued, will be mailed by certified mail

with return receipt requested to all prospective bidders (at the respective addresses furnished for such purposes), not later than five days prior to the date fixed for the opening of bids. Likewise, any addenda issued will be uploaded to the SeymourEngPlans.com website and will notify the bidders via the email address provided during registration. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under this bid as submitted. All addenda so issued shall become part of the Contract Documents.

12. SECURITY FOR FAITHFUL PERFORMANCE

Simultaneously with his delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with his contract, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.

13. POWER OF ATTORNEY

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

14. LAWS AND REGULATIONS

The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

15. METHOD OF AWARD - LOWEST QUALIFIED BIDDER

If at the time this contract is to be awarded, the lowest base bid submitted by a responsible bidder does not exceed the amount of funds then estimated by the Owner as available to finance the contract, the contract will be awarded.

16. OBLIGATION OF BIDDER

At the time of the opening of bids each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the plans and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument or documents shall in no way relieve any bidder from any obligation in respect of his bid.

17. LIABILITY INSURANCE REQUIREMENT

Any person entering into a formal contract which exceeds Five Thousand Dollars (\$5,000.00) with the state or any county, city or political subdivision thereof, or other public authority for the construction, alteration, or repair of any public building or public work, before entering in to such contract, shall furnish to the public body proof of general liability insurance in an amount not less than One Million Dollars (\$1,000,000.00) for bodily injury and property damage.

18. NON-RESIDENT BIDDER

When a non-resident Bidder (a Contractor whose principal place of business is outside the State of Mississippi) submits a bid for a Mississippi project, one of the following is required and shall be submitted with the Proposal Form:

- A. **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.
- B. **Statement:** If the state has no such law then a statement BY AN OFFICER OF THE COURT indicating *the State of (Name of State) has no resident Contractor preference law* shall be submitted with the Bid Form. Failure by a non-resident bidder to submit either the information in A. or B. herein shall disqualify Contractor's bid and same will not be considered.

19. COMPENSATION FOR ALTERED QUANTITIES 109.03

Certain pay items may have their quantities altered. Payment for these altered items will be in accordance with Subsection 109.03 of the Mississippi Standard Specifications for Road and Bridge Work, latest edition. The Engineer must be notified in writing, and give approval, prior to commencing work where a pay item exceeds the original contract amount. Contractor's will not be permitted to proceed with such work until formally notified in writing from the Engineer.

20. ELIMINATED ITEMS

Any item found unnecessary for the proper completion of the Work may upon written order of the Engineer be eliminated and in no way invalidate the Contract. When the Contractor is notified of the elimination of an item, the Contractor will be reimbursed for the actual work and the all costs including mobilization of materials prior to the notification as provided in Subsection 104.02 of the Mississippi Standard Specifications for Road and Bridge Work, latest edition. Where the word "Commission" is used, it shall mean "The City of D'Iberville, Mississippi." Where the words "Executive Director" appears is shall mean the City Manager of the City of D'Iberville, Mississippi.

21. BID SUBMITTAL CHECK LIST

Bidders should check that the following are completed before submission of bid:

- 21.1 Sealed Envelope with outside containing Project Name, Contractor's Name, Contractor's Address, Contractor's Certificate of Responsibility Number, and a Statement Confirming the Bid is Under \$50,000 if applicable.
- 21.2 Acknowledgement of any addenda.
- 21.3 Completed Bid Proposal, which includes acknowledge of receipt of addenda, if any.
- 21.4 Completed Request for Permission to Subcontract (1 page).
- 21.5 Certified Check or Bid Bond payable to The City of D'Iberville been included?
- 21.6 Non-Resident requirements as applicable.
- 21.7 Mississippi State Board of Contractors license attached.
- 21.8 Past Project History of Building Construction projects.

This list is intended for information purposes only and does not alleviate Bidders providing all submittals required by the Contract Documents. All documents required for submission by the contract documents must be executed in its entirety. Failure to complete all the applicable requirements may be cause for the proposal to be considered irregular.

REQUEST FOR PERMISSION TO SUBCONTRACT

Gentlemen:

I (We) (the prime contractor) (a subcontractor) propose to subcontract the attached items to _____, named in accordance with Special Provisions providing for subcontracting including in our contract. In the event of your disapproval of this subcontractor or your disapproval of performance of such subcontractor at any time, I (we) agree to perform such items of work with my (our) own organization in full compliance with all applicable terms of our contract. I (We) agree that this procedure will not relieve us of any of the responsibilities under our contract.

It is agreed and understood that the owner has the right to approve subcontractors. It is agreed and understood that the approval or disapproval of the subcontractor and approval or disapproval of the performance of subcontractor does not create or impute any liability or contractual obligation by and between the subcontractor and the County.

I (We) the prime contractor agree that this procedure will not relieve us of any of the responsibilities and obligations of our contract and I (we) shall indemnify and save harmless the County from all claims, demands, suits, damages, costs, and expenses and loss (including attorney's fees) arising or resulting from this subcontract.

I (We) certify that said party is particularly experienced and equipped for such work and that the subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract and that all pertinent conditions and requirements of our contract with the County covering this project have been explained to the proposed subcontractor, and that when applicable federally required contract provisions are physically incorporated into the agreement furnished to the subcontractor.

I (We) agree to furnish you with certified copies of such subcontract evidence in writing upon request.

Contractor's Signature

Date

Engineer

Date

BID PROPOSAL

Place: _____

Date: _____

Proposal of _____ hereinafter called "Bidder"), organized and existing under the laws of the State of _____, doing business as _____*.

The City of D'Iberville, (hereinafter called "Owner).

Gentlemen:

The Bidder, in compliance with your invitation for bids for:

**RUDY MORAN PARK PAVILION PROJECT
CITY OF D'IBERVILLE**

having examined the specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies, and to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part.

Bidder hereby agrees to commence work under this contract on or before a date to be specified in written "Notice to Proceed" of the Owner and to fully complete the project within **120** calendar days thereafter as stated hereafter in this proposal. Bidder further agrees to pay as liquidated damages, the sum of **\$500.00** for each consecutive calendar day thereafter as hereinafter provided in Article 4.03 of the Agreement Between Owner and Contractor.

Bidder acknowledges receipt of the following addendum:

*Insert corporation, partnership or individual as applies.

Bidder agrees to perform all the work described in the specifications and shown on the plans, for the following Bid Schedule:

**RUDY MORAN PARK PAVILION PROJECT
D'IBERVILLE, MISSISSIPPI
BID SCHEDULE**

Bidder certifies that he has thoroughly examined and reviewed the plans and specifications, and agrees that all unit prices listed below include all work associated with the contract documents.

BASE BID - Performing work as specified in the Contract Documents for Item No. 1 through 22.

<u>ITEM NO.</u>	<u>BASE BID DESCRIPTION</u>	<u>QUANTITY</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>EXTENSION</u>
1	MOBILIZATION	1	LS	\$ -	\$ -
2	CLEARING & GRUBBING	1	LS	\$ -	\$ -
3	UNCLASSIFIED EXCAVATION	75	CY(PM)	\$ -	\$ -
4	REMOVAL OF CONCRETE CURB	30	LF	\$ -	\$ -
5	CONCRETE CURB	36	LF	\$ -	\$ -
6	SELECT FOUNDATION MATERIAL	35	CY(PM)	\$ -	\$ -
7	REINFORCED CONCRETE PAVEMENT (6" THICK)	45	CY(PM)	\$ -	\$ -
8	NON-REINFORCED CONCRETE PAVEMENT (4" THICK)	11	CY(PM)	\$ -	\$ -
9	METAL BUILDING - FRAME AND ROOF	1	LS	\$ -	\$ -
10	SOFFIT PANELS	1	LS	\$ -	\$ -
11	LOUVERS	1	LS	\$ -	\$ -
12	BRICK	1	LS	\$ -	\$ -
13	CMU	1	LS	\$ -	\$ -
14	FRAMING, SHEATHING, INSULATION	1	LS	\$ -	\$ -
15	DOWNSPOUTS/GUTTERS	1	LS	\$ -	\$ -
16	CORRUGATED METAL SIDING	1	LS	\$ -	\$ -
17	PAINT	1	LS	\$ -	\$ -
18	RR FIXTURES	1	LS	\$ -	\$ -
19	HVAC	1	LS	\$ -	\$ -
20	PLUMBING	1	LS	\$ -	\$ -
21	LIGHTING	1	LS	\$ -	\$ -
22	CONDUIT/WIRING	1	LS	\$ -	\$ -
23	ELEC PANEL	1	LS	\$ -	\$ -
24	EQUIPMENT CONNECTIONS	1	LS	\$ -	\$ -
25	SILT FENCE	300	LF	\$ -	\$ -
26	PLANT ESTABLISHMENT	300	SY	\$ -	\$ -
TOTAL BASE BID					

TOTAL BASE BID _____

(Total Base Bid amount is to be in both words and figures. In case of discrepancy the amount shown in words will govern.)

Bidder understands that the Owner reserves the right to reject any or all bids.

Respectfully Submitted:

By: _____

Title: _____

(SEAL if by Corporation)

Address:

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____
_____ as principal, and
_____ as Surety, are hereby
held and firmly bound unto _____ as Owner
in the penal sum of _____
for the payment of which, well and truly to be made, we hereby jointly and severally bind
ourselves, our heirs, executors, administrators, successors and assigns.

Signed, this _____ day of _____, 20 _____.

The Condition of the above obligations is such that whereas the Principal has submitted to
_____ a certain Bid,

attached hereto and hereby made a part hereof to enter into a contract in writing, for the

NOW, THEREFORE,

- (a) If said Bid shall be rejected, or in the alternate,
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulated and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal (L.S.)

Surety

By: _____

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification.

SUGGESTED FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By



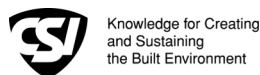
PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN COUNCIL OF ENGINEERING COMPANIES

AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

The Associated General Contractors of America



**EJCDC
SUGGESTED FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR
CONSTRUCTION CONTRACT (STIPULATED PRICE)**

THIS AGREEMENT is by and between CITY OF D'IBERVILLE

(Owner) and _____

(Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

**RUDY MORAN PARK PAVILION PROJECT
D'IBERVILLE, MISSISSIPPI**

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

The work shall consist of furnishing all labor, materials, tools, equipment, and layout to complete all work in accordance with the plans and specifications pertaining to installation of an open air pavilion with restrooms.

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by

Seymour Engineering
925 Tommy Munro Drive, Suite G
Biloxi, MS 39532

(Engineer), who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment

A. The Work will be substantially completed within **120** calendar days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within **120** calendar days after the date when the Contract Times commence to run.

ONE HUNDRED TWENTY (120) CONSECUTIVE CALENDAR DAYS FOLLOWING THE "NOTICE TO PROCEED"

4.03 Liquidated Damages - "LIQUIDATED DAMAGES IN THE SUM OF **\$500.00** FOR EACH CONSECUTIVE CALENDAR DAY THEREAFTER SHALL BE ASSESSED."

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner **\$500.00** for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner **\$500.00** for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, 5.01.B, and 5.01.C below:

~~A. For all Work other than Unit Price Work, a Lump Sum of:~~

_____ **N/A** _____ (\$ _____)
(words) (numerals)

~~All specific cash allowances are included in the above price and have been computed in accordance with paragraph 11.02 of the General Conditions.~~

B. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.B:

Estimated quantities in the Bid Documents are not guaranteed. It is the Contractor's sole responsibility to perform the necessary field investigation and evaluation for determining the actual site conditions and projection of quantities as per details outlined within the plans and specifications. Additionally, there will be no increase in price or bid given to the Contractor due to ANY variation from the estimated quantities and actual quantities to complete the required work.

As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

UNIT PRICE WORK					
<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Estimated</u>
	(SEE ATTACHED BID SCHEDULE)				
TOTAL OF ALL ESTIMATED PRICES:					
(words)					(numerals)

C. For all Work, at the prices stated in Contractor’s Bid, attached hereto as an exhibit.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Provided that an Application for Payment is received by the Engineer not later than the 20th day of a month, the Owner shall make payment to the Contractor not later than 45 days. If an application for Payment is received by the Engineer after the application date fixed above, payment shall be made by the Owner not later than 60 days after the Engineer receives the Application for Payment. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

a. 90% percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage; and

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95% percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less 100% percent of Engineer’s estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 - INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 0 percent per annum.

ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work. Additionally, Contractor has performed their own field investigation to verify existing conditions, channel depths, proposed cross section and assessed their anticipated dredge quantities to complete the required work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.

E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

K. The Contractor will name **Seymour Engineering and the City of D’Iberville, MS** as additional insureds on all general liability insurance provided by this Contractor to complete the scope of work in this Agreement. Contractor shall provide a Waiver of Subrogation to **Seymour Engineering and the City of D’Iberville** in respect to workers compensation.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents

- A. The Contract Documents consist of the following:
1. This Agreement (pages 1 to 8, inclusive).
 2. Performance bond (pages 1 to 3, inclusive).
 3. Payment bond (pages 1 to 3, inclusive).
 4. Other bonds (pages _____ to _____, inclusive).
 - a. _____ (pages _____ to _____, inclusive).
 - b. _____ (pages _____ to _____, inclusive).
 - c. _____ (pages _____ to _____, inclusive).
 5. General Conditions (pages 1 to 43, inclusive).
 6. Specifications as listed in the table of contents of the Project Manual.
 7. Drawings consisting of 20 sheets with each sheet bearing the following general title: RUDY MORAN PARK PAVILION PROJECT D'IBERVILLE, MISSISSIPPI [or] the Drawings listed on attached sheet index.
 8. Addenda (numbers _____ to _____, inclusive).
 9. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages _____ to _____, inclusive).
 - b. Documentation submitted by Contractor prior to Notice of Award (pages _____ to _____, inclusive).
 - c. _____.
 10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed (pages _____ to _____, inclusive).
 - b. Work Change Directives.
 - c. Change Order(s).
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Other Provisions

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in duplicate. One counterpart each has been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____ (which is the Effective Date of the Agreement).

OWNER:

CONTRACTOR:

CITY OF D'IBERVILLE

By: _____

By: _____

Title: **CITY MANAGER**

Title: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

CITY OF D'IBERVILLE

10383 AUTOMALL PARKWAY

D'IBERVILLE, MS 39540

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement.)

License No.: _____
(Where applicable)

Agent for service or process: _____

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter call Principal, and
(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called Owner, in the penal sum of _____

_____ Dollars, \$(_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the Owner, dated the _____ day of _____, 20____, a copy of which is hereto attached and made part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the

undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in six (6) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20_____.

ATTEST:

(Principal) Secretary

Principal

By _____ (S)

(SEAL)

(Witness as to Principal)

(Address)

(Address)

Surety

ATTEST:

(Surety) Secretary

(SEAL)

Witness as to Surety

By _____
Attorney-in-Fact

(Address)

(Address)

NOTE: Date of Bond must not be prior to date of Contract.
If Contractor is Partnership, all partners should execute bond.

IMPORTANT NOTICE: Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter call Principal, and
(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called Owner, in the penal sum of _____

_____ Dollars, \$(_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the Owner, dated the ____ day of _____, 20____, a copy of which is hereto attached and made part hereof for the construction of:

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms,

subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in six (6) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20____.

ATTEST:

Principal

(Principal) Secretary

By _____(S)

(SEAL)

(Witness as to Principal)

(Address)

(Address)

Surety

ATTEST:

(Surety) Secretary

(SEAL)

Witness as to Surety

By _____
Attorney-in-Fact

(Address)

(Address)

NOTE: Date of Bond must not be prior to date of Contract.
If Contractor is Partnership, all partners should execute bond.

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

NOTICE TO PROCEED

TO: _____

DATE: _____
PROJECT: _____ City of D'Iberville

RUDY MORAN PARK

PAVILION PROJECT

You are hereby notified to commence WORK in accordance with the Agreement dated _____, on or before _____, and you are to complete the WORK within approximately 120 consecutive calendar days thereafter. The date of completion of all WORK is therefore _____.

ENGINEER

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED

is hereby acknowledged by _____

this the _____ day of _____, 20__.

BY _____

TITLE _____

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By



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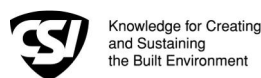
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The Associated General Contractors of America



Construction Specifications Institute

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American Council of Engineering Companies
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American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*--The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*--The individual or entity named as such in the Agreement.

20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site*--Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain

administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *Work*--The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times

but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. Intent of Certain Terms or Adjectives

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. Day

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. Defective

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

- a. does not conform to the Contract Documents, or
- b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or
- c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to “two” (2) printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement

or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a

Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained

or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice*: If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

- a. reviewing and checking all such information and data,
- b. locating all Underground Facilities shown or indicated in the Contract Documents,
- c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
- d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will

promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings*: Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to

entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified

in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection

from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any

deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order .

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract

Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or

received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. Engineer's Evaluation: Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, installed, or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an equal. Engineer will advise Contractor in writing of any negative determination.

D. Special Guarantee: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. Engineer's Cost Reimbursement: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract

Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. Contractor's Expense: Contractor shall provide all data in support of any proposed substitute or equal at Contractor's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual

or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Draw-

ings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples*: Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals , any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents

with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. Engineer's Review

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 Continuing the Work

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or

disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 Contractor's General Warranty and Guarantee

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 Indemnification

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed 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 Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and
2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and

properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep

Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show

partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall

promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive

bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph

5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. Costs Excluded: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. Contractor's Fee: When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. Cash Allowances

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work

times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee*: The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all

costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and

reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications .

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the

Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's

observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, , Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral

satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer's Review of Application and Acceptance

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and, will be paid by Owner to Contractor.

14.08 Final Completion Delayed

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, 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 to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 Waiver of Claims

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 Owner May Suspend Work

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 Owner May Terminate for Cause

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or
2. agrees with the other party to submit the Claim to another dispute resolution process, or
3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SECTION 1

SUMMARY OF WORK

1.0 PROJECT SCOPE

1.1 The work shall consist of furnishing all labor, supervision, materials, plant, tools, equipment, and layout to construct an open air pavilion, including foundation, restrooms, mechanical and electrical components, and a metal roof in the City of D'Iberville. Also, decorative panels on the underside of the roof will be an alternate bid item. All work shall be completed in accordance with the Plans (Drawings) and Specifications.

2.0 PRINCIPAL FEATURES

2.1 Principal features of the Base Bid Work consist of the following:

2.1.1 **Rudy Moran Park:**

The scope of work for this site consists of the following: construct a metal open air pavilion with a metal roof, including foundation, restrooms, mechanical and electrical rooms and all associated components in accordance with the plans and specifications.

2.2 Principal features of Alternate 1 Bid Work consist of the following:

2.2.1 **Rudy Moran Park:**

The scope of work for this site consists of the following: install decorative metal panels on the underside of the roof in accordance with the plans and specifications.

3.0 GENERAL NOTES

3.1 Contractor shall be solely responsible for the means, methods, techniques, sequence, and procedures employed to comply with the project as outlined within the plans, technical specifications and contract documents.

3.2 Contractor shall be responsible for submitting all material submittals to be used for the project to Engineer for review and approval.

3.3 Contractor shall be required to perform all required testing as identified within the project plans and specifications.

3.4 The Contractor shall limit the use of the construction area for work and for storage of material and equipment.

3.5 If necessary, Contractor shall coordinate and receive approval from adjacent property owners to utilize their property for access and or temporary facilities to store material and equipment. Any damages sustained on properties shall be promptly remediated by Contractor at no additional expense.

3.6 The Contractor shall assume full responsibility for the protection, security and safekeeping of the project site, equipment and material needed for this project.

- 3.7 It is the intent of the Engineer that all work shall be completed in compliance with the plans and technical specifications which are to be made a part of the Contract for this project. Work not specified in either the plans or in the technical specifications but involved in carrying out their intent or in complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically described at the Contractor's expense.
- 3.8 Any existing material and or equipment deemed acceptable by the City of D'Iberville, which is to be removed from the project site, may be deemed salvageable by the Owner, and if so, shall be removed and delivered to the Owner.
- 3.9 Contractor shall be responsible for the relocating of structures, including, but not limited to, light poles, sign poles, fences, piping conduit, and drains that interfere with the proposed work. The cost for such relocation shall be included with bid.
- 3.10 Contractor shall be responsible for providing temporary sanitary facilities on each project site throughout the duration of the project.

END OF SECTION

SECTION 2

COORDINATION

1.0 PROTECTION OF EXISTING FACILITIES

- 1.1 Any damage to an area by Contractor, including damage to existing utilities shall be repaired in an approved manner at no cost to the Owner.

2.0 SITE VISITATION

- 2.1 The Contractor is responsible to visit the project site, verify existing conditions, actual sizes, and other requirements outlined in the other sections of the specifications so that bids are firm and comprehensive.

3.0 COORDINATION

- 3.1 The contractor shall obtain all necessary local building permits. The contractor shall coordinate with all utility service companies for relocation of existing service where interferences occur, and shall further contact the following utility services to confirm, mark and/or relocate existing overhead and underground facilities within the project site area:

- | | |
|--|--|
| 1. Mississippi Power Company
245 Oak Street
Biloxi, MS 39530
(800) 532-1502 | 2. City of D'Iberville Public Works
10383 Auto Mall Pkwy
D'Iberville, MS 39540
(228) 392-9734 |
| 3. AT&T
16031 Kenwood Dr
Gulfport, MS 39503
(228) 832-9628 | 4. Coast Electric Power Association
14082 U.S. Hwy 49
Gulfport, MS 39503
(228) 832-1761 |
| 5. Sparklight
786 Dr. Martin Luther King Jr. Blvd
Biloxi, MS 39530
(228) 374 – 5900 | 6. Delta Utilities
26 Mason Street
Laurel, MS 39440
(800) 371-5417 |
| 7. Mississippi One Call
800-227-6477 | |

END OF SECTION

SECTION 3

MOBILIZATION

1.0 SCOPE OF WORK

1.1 This work shall consist of preparatory operations, including, but not limited to, those necessary to the movement of personnel, equipment, supplies and incidentals to the project site, and for all other work operations which must be performed or costs included prior to beginning work on the various items on the project site.

2.0 MATERIALS

2.1 None

3.0 CONSTRUCTION REQUIREMENTS

3.1 None

4.0 METHOD OF MEASUREMENT

4.1 Partial payments will be made as the work progresses in accordance with the following schedule:

4.1.1 When 5 percent of the original contract amount is earned from other bid items, 50 percent of the amount bid for mobilization, or 2.5 percent of the original contract amount, whichever is lesser, will be paid.

4.1.2 When 10 percent of the original contract amount is earned from other bid items, 100 percent of the amount bid for mobilization, or 5 percent of the original contract amount, whichever is lesser, will be paid.

4.1.3 Upon completion of all work on the project, payment of any amount bid for mobilization in excess of 5 percent of the original contract amount, will be paid.

4.1.4 The total sum of all payments shall not exceed the original contract amount bid for mobilization, regardless of the fact that Contractor may have, for any reason, shut down his work on the project or moved equipment away from the project and then back again.

5.0 PAYMENT

5.1 Payment shall be made on a lump sum basis based on the terms described above.

END OF SECTION

SECTION 4

TEMPORARY EROSION CONTROL

1.0 SCOPE

- 1.1 This work shall consist of all labor, equipment, materials, tools and supplies necessary to control erosion during the course of this project as shown on the drawings and as specified herein, including but not limited to sodding, silt traps, sediment barriers, earthen berms, diversion ditches and the placement of hay bales, wattles and other devices necessary to prevent sediment from leaving the project site.
- 1.2 All erosion and sedimentation control measures must be maintained at all times and adhere to the standards and specifications of the Mississippi "Planning and Design Manual for the Control of Erosion, Sediment, & Stormwater."
- 1.3 The Small Construction Notice of Intent (SCNOI) Form is attached at the end of this section. This form shall be used when submitting weekly inspection reports as described in section 3.3 below.

2.0 PRODUCTS

- 2.1 Filter cloth for temporary silt fences and rip-rap bedding shall be a pervious sheet of synthetic polymer-nonwoven 4-ounce fabric and shall be the type specified on the drawings or an approved equal.
- 2.2 Solid sod shall conform to the material requirements of Section 216, Mississippi Standard Specifications for Road and Bridge Construction, latest edition.
- 2.3 Posts and stakes for silt fencing shall be as designated on the plans.
- 2.4 All other erosion control measures shall conform to the Mississippi Standard Specifications for Road and Bridge Construction, latest edition.
- 2.5 Erosion Control Mat shall be excelsior blanket with biodegradable net, as specified in Section S-715.09.2 of MDOT Specifications or an approved equivalent.

3.0 EXECUTION

- 3.1 Erosion control and storm water pollution prevention measures should be established prior to any activities involving the transportation of soil or clearing and grubbing. These measures shall be maintained until such time as a substantial completion of project is reached, as defined in the General Conditions, or until the permanent improvements are effective in controlling erosions, whichever is the later.
- 3.2 The Contractor shall submit an Erosion Control Plan (ECP) identifying Best Management Practices (BMPs) to the Engineer for approval prior to commencing any work. The plan should entail how the Contractor will provide erosion control and

manage the storm water that is discharged from the project site. The Engineer will have the authority to suspend all work for failure by the Contractor to properly maintain the BMPs that are in place.

- 3.3 The Contractor shall make daily inspections of the ECP and execute the SMALL CONSTRUCTION NOTICE OF INTENT (SCNOI) form and shall furnish the Engineer the SCNOI form of each weekly inspection as soon as possible following the date of inspection. The Contractor and Engineer shall jointly review and discuss the results of the inspections so that corrective action can be taken. The Engineer shall retain copies of the inspection reports.
- 3.4 Sodding shall be required at openings of flared-end sections and at curb cuts as shown in the drawings and shall adhere to Section 6 – Plant Establishment.
- 3.5 All temporary erosion control measures shall be fully removed, and areas restored when permanent erosion control is effective, as determined by Engineer.
- 3.6 Construction entrances, as designated on the plans, shall be maintained during the work until street improvements are substantially in place.

4.0 MEASUREMENT AND PAYMENT

- 4.1 Stormwater Pollution Prevention Plan Inspection Reports shall be an incidental item. Payment for Temporary Erosion Control items described herein will not be considered unless the inspections are performed and the reports are provided at the required frequency
- 4.2 Construction Entrance shall be paid as each (EA) once installed.
- 4.3 Silt Fencing will be measured and paid for according to the linear footage (LF) installed.
- 4.4 Silt Fence Outlet Protection will be measured and paid for according to the linear footage (LF) installed.
- 4.5 Wattles will be measured and paid according to the linear footage (LF) installed.
- 4.6 Erosion Control Blanket will be measured and paid according to the square yardage (SY) installed. Erosion Control Mat, including staples, completely in place and accepted, will be measured by the square yard of finished surface. No allowance will be made for overlap.

END OF SECTION

SECTION 5

EXCAVATING, GRADING, AND FILLING

1.0 SCOPE OF WORK

- 1.1 This work shall consist of excavation and embankment required for building construction and includes the preparation of subgrade and foundations, the furnishing of borrow materials, the construction of embankments, other utilization or disposal of materials excavated, and the compaction and dressing of excavated areas and embankments.
- 1.2 Reference Section 4 Temporary Erosion Control for information regarding the Stormwater Pollution Prevention Plan (SWPPP).

1.3 DEFINITIONS

- 1.3.1 Excess excavation will consist of the excavation, removal, and disposal of all soils that are determined by Project Engineer to be unsatisfactory foundation material, to a point beyond the excavation limits shown on the plans. Contractor shall provide, at his own expense, the location for excess excavation disposal.

Note: These materials may be discarded at a location specified by the Owner, at the Owner's discretion.

- 1.3.2 Borrow material will consist of approved material required for fill and the construction of embankments, and/or the replacement of unsuitable material which has been removed. Contractor shall make arrangements for obtaining borrow material and shall pay all costs involved.
- 1.3.3 Stripping excavation shall consist of the excavation, removal, and stockpiling of the upper six (6) inches of organic material within the project limits, which material will later be processed by Contractor, without additional compensation, as plating for embankments.
- 1.3.4 Unclassified excavation shall consist of all excavation and processing, stockpiling, or disposal of all materials of whatever character encountered on the work, except for those for which additional pay items are provided. Processing shall include haul, drying if required, placing, and compacting of suitable excavated materials to areas requiring backfill material. Stockpiling, if allowed, shall consist of the hauling and spreading of all suitable surplus unclassified excavation as shown on the plans. Disposal shall include haul for proper disposal of all unclassified excavation unsuitable for backfill material, as deemed by Project Engineer. Contractor

shall provide, at his own expense, the location for the disposal of unsuitable material.

1.4 SPECIFIED ELSEWHERE. SECTION 4 – Temporary Erosion Control

2.0 MATERIALS

2.1 BORROW MATERIAL – TYPE A AND B. Granular material meeting the Class 9, Group C, requirements of the MDOT Specifications (Group symbols SM or SC as classified by the AASHTO unified soil classification system).

2.2 BORROW MATERIAL – TYPE C. Clean sand with less than ten percent (10%) passing the No. 200 sieve (Group symbol SC as classified by the AASHTO unified soil classification system).

3.0 DISPOSITION OF UTILITIES

3.1 Rules and regulations of the Local Government along with private utility companies governing the respective utilities shall be observed in executing all work under this heading. The Contractor shall be responsible for securing necessary data from the local utility companies relative to removal or abandonment of existing utilities.

3.2 Active utilities shown on the drawings shall be adequately protected from damage and removed or relocated only as indicated or specified.

3.3 Active utilities not shown on the drawings, but uncovered during construction, shall be protected or relocated in accordance with written instructions of the Owner, and the Contract Price will be adjusted for such additional work.

3.4 Inactive and abandoned utilities encountered on the project site shall be removed, plugged, or capped as shown on the plans or as directed by the Engineer. The Contractor shall notify the appropriate utility owner, if known, prior to any of the above described work being done.

4.0 CONSTRUCTION REQUIREMENTS

4.1 GENERAL. Excavation and embankment operations may be started by Contractor at the location and in sequence approved by Engineer when:

- (1) sufficient clearing and grubbing has been completed and accepted;
- (2) the work has been cross sectioned and slope staked;
- (3) installation of required pipes, culverts, and approved backfills are complete;

- (4) the site has been prepared in accordance with these specifications;
 - (5) Contractor has informed himself as to the proper haul and disposal of material.
- 4.1.1 Where plating is contemplated, either in cut or fill sections, appropriate adjustment shall be made by Contractor in the graded section during construction so that the finished section after plating will conform within reasonable tolerances to the typical sections shown on the plans.
 - 4.1.2 Contractor shall not excavate beyond the dimensions and elevations established or approved and shall not move any material prior to the staking out and cross sectioning of the site.
 - 4.1.3 When Contractor's excavation operations encounter remains of prehistoric dwelling sites or other artifacts of historical or archeological significance, the operations shall be temporarily discontinued. Project Engineer will contact the appropriate City authorities to determine the disposition of the remains thereof. When directed by City Engineer, Contractor shall excavate the site in a manner so as to preserve the artifacts encountered and if required, shall remove them for delivery to the custody of the proper state authorities. Such excavation will be considered and paid for as extra work.
 - 4.1.4 Where excavation to grade results in foundation, subgrade, or slope of unsuitable soil, Project Engineer may require Contractor to remove unsuitable materials and backfill to the required grade with approved material. Slides or other soil failures shall be removed by Contractor unless their removal is waived by Project Engineer. Contractor shall conduct his operations in such a way that Project Engineer can take the necessary cross sections before backfill is placed.
 - 4.1.5 Engineer may designate as unsuitable those soils that cannot be properly compacted under satisfactory conditions. All unsuitable material shall be disposed of by Contractor as specified or directed.
 - 4.1.6 When the contract requires excavation to be handled more than one (1) time prior to final placement (such as stripping excavation that is to be stockpiled and reserved for later use), the cost of this second handling will be included in the contract unit price for the class excavation involved.
- 4.2 TOPSOIL. Where the salvaging and stockpiling of topsoil or plating material is specified, such operation shall be completed by Contractor before beginning excavation of the underlying material.
- 4.3 EXCAVATION OPERATIONS. Contractor shall so conduct excavation operations as to minimize the loosening of materials outside the required slopes or below the

indicated grade. No payment will be made for the removal, disposal, or replacement of material determined to be loosened or undercut through carelessness or negligence on the part of Contractor. Neither will payment be made for excavation which is used for purposes other than designated by Project Engineer.

- 4.3.1 When practicable, excavation and disposal of the material shall be conducted by Contractor in such a manner that the most suitable material will be placed in the top courses of embankments. Adequate drainage which will conform to the finished drainage system shall be maintained.
- 4.3.2 Preparation of Subgrade: Spongy and unsuitable material shall be removed and replaced with select fill material, as directed by the Engineer. Every precaution shall be taken to obtain a subgrade of uniform bearing strength through compaction by means, as will provide a firm base and insure against future settlement or superimposed construction. After removal of all loose material from the subgrade, it shall be tested with template or straightedge, before depositing surfacing material thereon. All subgrades shall be maintained in satisfactory condition, protected against traffic and properly drained until surfacing is placed.
- 4.3.3 Settlement or Shrinkage of Fill or Fill of Embankment: Any area where settlement occurs shall be filled to required finished grade. All such areas shall be compacted to the required densities as hereinbefore specified.

4.4 DISPOSAL OF EXCESS EXCAVATION.

- 4.4.1 All material encountered in excavation within the project that is unsuitable for use in the work shall be removed and disposed of by Contractor as specified in the contract or as directed. Unsuitable material shall be understood to be any material, which at the proper moisture content, cannot be processed to the required density and stability. Contractor shall provide at his own expense the location for the disposal of excess excavation.

4.5 COMPACTED EARTH FILL

- 4.5.1 Compacted earth fill consist of acquiring, transporting, spreading, grading, and compaction of selected earth material to meet the required embankment or fills shown on the grading and topographic plan. The embankments or fills shall be placed and compacted under the provisions of Paragraph "5.2" of these specifications. Compactions of earth fill against, or around walls, footings, inlets, etc., or any part of a structure that cannot be made with conventional rolling equipment must be made with hand operated compaction equipment approved by the Engineer. Where directed by the Engineer, areas shall be compacted to not less than 90% "Modified AASHTO".

- 4.5.2 The term "Earth Fill" shall be classified as the natural material found in this area, and can be sand, sand-silt, clayey sand or various other natural mixes. However, the Engineer must approve any and all fill material used, and the Engineer retains the right to reject any material that is deemed unsuitable for the specific purposes that are called for in each particular fill area, if any.

4.6 EMBANKMENT CONSTRUCTION

- 4.6.1 General. Embankment construction shall consist of the following: constructing embankments; dikes; placing and compacting of approved material where unsuitable material has been removed; backfilling of structures where not otherwise provided for; and placing and compacting embankment material in holes, pits, or other depressions. This work shall also consist of preparation of the areas upon which embankments are to be constructed. Only approved materials excavated as provided in the contract shall be placed in embankments and backfills; unsuitable or perishable materials such as rubbish, sod, brush, roots, loose stumps, logs, heavy vegetation, sawdust, rocks, broken concrete, or other solid material shall not be placed in embankment areas.

4.6.2 Preparation of Embankment Areas

4.6.2.1 Contractor shall remove all sod, vegetable matter, and unsuitable soil from the surface upon which the embankment is to be constructed. The cleared surface shall be completely broken up by plowing, scarifying, or disk-harrowing to a depth of at least six (6) inches. Contractor shall then compact the loosened material to the density specified (SV) for the foundation soils. No direct payment will be made for plowing, scarifying, or disk-harrowing under this type of preparation.

4.6.2.2 Where an embankment is to be constructed on hillsides or against existing slopes, slopes which are steeper than 4:1 shall be continuously benched by Contractor as the new work is brought up against the slope. Benching shall be of sufficient width to permit operation of placing and compacting equipment. Each horizontal cut shall begin at the intersection of the original ground or slope and the vertical side of the previous cut. Material thus cut out shall be recompacted along with the new embankment material and will not be measured for payment.

- 4.6.3 Embankment Formation. After the area has been prepared as specified, Contractor shall construct the embankment in full-width layers parallel to the finished grade.

- 4.6.3.1 Except as herein provided, each layer shall not exceed eight (8) inches (loose) in thickness; shall be spread, shaped, and compacted so that the completed embankment will conform to the required density, stability, line, grade, and cross-section; and shall be finished to reasonably smooth and uniform surfaces.
- 4.6.3.2 The required stability in embankment construction shall be that which City Engineer determines can be reasonably obtained at the proper moisture content for the material being placed. Sponginess, shoving, or other displacement under heavy equipment will be considered prima facie evidence of lack of stability under this requirement.
- 4.6.3.3 Direct casting or similar methods will not be permitted unless authorized in writing by Engineer. Should direct casting be authorized, Contractor shall ensure that all cast material is moved from the point where it is deposited, spread, and compacted in uniform layers as specified herein.
- 4.6.3.4 In low, swampy ground which will not support the weight of hauling equipment, Project Engineer may permit the bottom portion of the embankment to be constructed in a uniformly distributed layer of sufficient thickness to support equipment placing subsequent layers.
- 4.6.3.5 In areas where the embankment material is of a highly varying character, construction shall be performed by Contractor in a manner so as to eliminate pockets or strata of varying materials. Each layer shall be disk-harrowed and heavily bladed for its full depth; moved from its position of deposit by motor grader, bulldozer, or other equipment; or processed by other means to the extent necessary to eliminate pockets or strata of material of varying character. The layer shall then be shaped and compacted in accordance with these specifications.

4.6.4 Backfill and Embankment Formation Adjacent to Structures

- 4.6.4.1 Backfilling around structures shall not start until Contractor has properly cured the structure. The backfill material shall then be deposited in uniform, parallel layers on the sides of box bridges or culverts or other structures. Each layer shall be disk-harrowed and bladed for its full depth or processed by other approved means to the extent necessary to provide a layer of material reasonably uniform in character and shall be so placed and compacted by Contractor that drainage of the layer will be away from both the longitudinal and the transverse axes of the structure. In addition, the backfill for abutments, retaining walls, wing walls, or other structures or

sections thereof shall be built in layers with each layer being constructed for the full length of the unit and special precaution shall be taken to prevent any wedging action against the structure. The material for each layer shall be uniformly compacted, preferably by approved mechanical equipment, including self-powered mechanical tampers, to not less than the density required in the adjacent embankment. The work shall be conducted in a manner so that Engineer can make the necessary tests for compaction as the work progresses.

4.6.4.2 Contractor shall repair, restore with new work, or make good without extra compensation, all damage done to the structure as a result of backfilling operations.

4.6.5 Compaction of Embankments. All embankment material shall be at the moisture content determined to be proper for the particular material being placed so that the resulting work will be both dense and stable. It shall be Contractor's responsibility to maintain the proper moisture content during compaction operations, and Project Engineer may require moistening or drying as necessary, without additional compensation to Contractor. The material shall be compacted until the required density, determined in accordance with S-700.03 and S-700.04, MDOT Specifications has been attained and the embankment is stable. The specified value (SV) for density of foundation soils is ninety-four percent (94%), and the specified value (SV) for density of embankments is ninety-six percent (96%). The unit of deviation (UD) will be one (1) percentage point. Contractor shall make allowance for shrinkage and compaction in the construction of embankment. Contractor may be required to provide proof of tests before moving on to the next lift or phase of work.

4.6.6 Maintenance of Earthwork. Contractor shall satisfactorily maintain all portions of the work until the completion and acceptance of the contract.

5.0 FINAL GRADING

Before final acceptance, the project area shall be graded by mechanical means to a final finished contour as shown on the drawings. The area shall be free of any weeds and scattered debris, spoil, or waste. Any area showing wash or erosion shall be scarified, backfilled, regraded and recompacted to the required density or densities.

6.0 METHOD OF MEASUREMENT

6.1 Items listed in the proposal will be measured by one of the following methods:

6.1.1 Plan Measurement (PM). Whenever this method of measurement is used to determine the quantity of borrow material used for embankment

construction, it shall be computed by the average end areas of the cross sections, elevations, and measurements shown on the plans. If the embankment work can be completed according to the grades, slopes, and sections shown on the original plans, then the quantity computed as set out above and shown on the original plans will be the measurement for final payment. If during construction, however, the grades, slopes and/or sections are changed by Project Engineer for any reason, cross section templates reflecting the revised grades, slopes, and sections will be superimposed onto the original plan cross sections. The embankment volume delineated by these revised sections will then be computed by the method of average end areas, and the revised quantities so computed and reflecting any increased or decreased volume will be measured for final payment.

6.1.2 Loose Vehicle Measurement (LVM). Whenever this method of measurement is specified, the excavation will be measured in the hauling vehicle at the point of deposit.

6.2 Excess excavation will be measured by the cubic yard, loose vehicle measurement.

6.3 Stripping excavation will be measured by the cubic yard, plan measurement.

6.4 Borrow material will be measured by the cubic yard, plan measurement or loose vehicular measurement as specified herein or on the plans.

7.0 PAYMENT

Payment will be made according to the following:

Grading will be an absorbed item unless otherwise stated.

Borrow Material, Type A and Type B will be paid by the Cubic Yard (PM).

Borrow Material, Type C will be paid by the Cubic Yard (PM).

Stripping Excavation will be paid by the Cubic Yard (PM).

Excess Excavation of Unsuitable Materials will be paid by the Cubic Yard (PM)

Unclassified Excavation will be paid by the Cubic Yard (PM)

Top soil imported from off site, not previously paid by Unclassified Excavation, will be paid by the Cubic Yard (CY)

(END OF SECTION)

SECTION 6

GRASS ESTABLISHMENT

1.0 SCOPE OF WORK

1.1 This work shall consist of ground preparation, fertilizing, seeding, and planting of sod to establish a permanent ground cover of grass on all areas where the natural vegetative cover has been removed by construction activities and the covering of steeply sloping seeded areas with an erosion control mat.

2.0 MATERIALS

2.1 Seed

2.1.1 All seeds shall comply with the seed laws of the State and the current regulations duly promulgated there under.

2.1.2 Seeding mixtures shall be used at the following rates:

Planting Between March 1 and October 15:

Common Bermuda Grass 55 lbs./acre

Brown Top Millet 30 lbs./acre

Planting Between October 15 and March 1:

Common Bermuda Grass 55 lbs./acre

Rye Grass 30 lbs./acre

2.2 Fertilizer

2.2.1 All fertilizers shall comply with the fertilizer laws of the State.

2.2.2 Fertilizer shall be commercial combination, 30-30-30 (Nitrogen, Phosphorous, and Potash) and shall be distributed at a rate of 1000 lbs./acre.

2.3 NOT USED

2.4 Solid Sod

2.4.1 Solid sod shall be in accordance with Section 216 of the Mississippi Department of Transportation Standards for Road and Bridge Construction, latest edition, or as specified on the plans and shall be live, fresh, growing grass with at least one and one-half inches (1½") of soil adhering firmly to the roots when placed. The sod shall be reasonably free from noxious weeds or other grasses and shall not contain any matter deleterious to its growth or which might affect its subsistence or hardiness when transplanted. The sod shall be in blocks at least eight inches by

eight inches (8" x 8") and reasonably free from ragged edges. All solid sod materials shall be approved by Engineer prior to transplanting.

2.5 Mulch

2.5.1 Mulch shall be wood or paper cellulose fiber containing no germination inhibiting or growth inhibiting agents. Characteristics shall be as follows:

- a. Moisture Content 10% (" 2%)
- b. Organic Matter 99.4% (" 0.2%)
- c. Ash 0.6% (" 0.2%)
- d. pH 4.8 (" 0.5%)
- e. Water Holding Capacity 1050 grams water / 100 grams of fiber

2.5.2 Tackifier used in the hydro-seeding process shall be a liquid concentrate diluted with water, forming a transparent three-dimensional film-like crust permeable to water and air and containing no agents toxic to seed germination. TERR-MULCH TACKING AGENT IIII or an approved equivalent shall be used.

2.6 Straw mulch shall be clean out or wheat straw, well-seasoned before bailing and free from manure, seed bearing stalks, or roots of prohibited or noxious weeds.

3.0 CONSTRUCTION REQUIREMENTS

3.1 Grass Establishment (Seeding)

3.1.1 Ground preparation shall consist of plowing and pulverizing the soil within the area to be planted or seeded. Unless otherwise stipulated, the soil shall be prepared to a depth of not less than four (4) inches. The soil area shall be thoroughly disked and harrowed until well pulverized to the full depth, and the area shall present a smooth, uniform, loose appearance with all large clods, earth balls, boulders, stumps, large roots, or other particles which will interfere with the work removed.

3.1.2 If wetting of the soil is necessary for proper ground preparation, Contractor shall supply sufficient water therefore. Full advantage shall be taken of weather and soil conditions, and no attempt shall be made to prepare the soil while it is wet or in an otherwise non-tillable condition.

3.1.3 In any case, the soil shall be so pulverized and cultivated as to provide a suitable bed for planting or seeding operations, and the area shall be true to the lines and grades as established.

3.1.4 The amounts and types of fertilizers shall be applied uniformly on the areas to be planted or seeded and uniformly incorporated into the soil.

- 3.1.5 All fertilizer shall be incorporated within twenty-four (24) hours following spreading, unless otherwise directed.
 - 3.1.6 The recommended quantity for the specified fertilizer shall be 500 pounds/acre.
 - 3.1.7 Seeding shall not be done during windy weather or when the ground is frozen, extremely wet, or in an untillable condition.
 - 3.1.8 All seeds shall be covered lightly with soil by raking, rolling, or other approved methods, and the area compacted with a cultipacker.
 - 3.1.9 Erosion Control Mat shall be installed on all steeply sloping areas after seeding in accordance with Sections S-227.03 and S-227.04, MDOT Specifications.
 - 3.1.10 Growth or coverage shall be considered acceptable when a satisfactory stand and growth of in-season plantings have sufficiently covered the area seeded to provide ample erosion protection. It shall be the responsibility of the Contractor that the seeds planted have produced a living and growing vegetative cover at the time of acceptance.
 - 3.1.11 Grass establishment and maintenance shall consist of the necessary protection of the seeded or top seeded areas and other operations of maintenance, including watering, weeding, mowing, repairing, and reseeded of all areas damaged or eroded as a result of Contractor's operations, negligence, or by normal rains or storms.
- 3.2 Solid Sod
- 3.2.1 Care shall be exercised at all times to retain the native soil on the roots of the sod during the process of excavating, hauling, and planting.
 - 3.2.2 The sod shall be transplanted within twenty-four (24) hours after arriving on the project. All sod in stacks shall be kept moist and protected from exposure to the wind and sun and from freezing. In no event shall more than three (3) days elapse between the cutting and planting of the sod without approval of the Engineer.
 - 3.2.3 Prior to ground preparation for solid sodding, all excavating, shaping, and dressing shall have been completed in such a manner that the foundation for the sod has the proper cross section, line, and grade, and so that the sod after placement will be flush with or slightly below the adjacent final ground line.
 - 3.2.4 Ground preparation and fertilizing may then proceed in the same manner prescribed for seeding.
 - 3.2.5 The sod shall be placed on the prepared surface with edges in close contact and starting at the lowest point and working upward. Cracks between the blocks of

sod shall be filled with small pieces of fresh sod, and all cracks too small for sod shall be filled by a light dressing of approved soil. The entire sodded area shall then be compacted and watered to the satisfaction of the Engineer. Light rollers, hand tamps, or other approved equipment shall be used for compacting.

3.2.6 Solid sodding shall be performed only when weather and soil conditions are suitable for proper placement.

3.2.7 Grass establishment shall consist of preserving, protecting, replacing, watering, mowing, and other work necessary to keep the sod in a satisfactory condition at all times until final acceptance.

3.2.8 A satisfactory growth of solid sodding shall be understood to mean a healthy, living, and growing grass turf which has been planted on an approved foundation and has been maintained in accordance with the requirements of these specifications.

3.3 Grass Establishment by Hydro-Seeding

3.3.1 A mixture of seed, fertilizer, mulch, and tackifier in water slurry shall be applied using hydraulic mulching equipment in the following minimum quantities:

Fertilizer 500 lbs./acre

Mulch 1200 lbs./acre

Seed (as specified in this section)

Tackifier 30 lbs./acre (60 lbs./acre in ditches)

3.3.2 In addition, for areas having a slope greater than 4H:1V, straw mulch shall be placed on areas that have been hydro-seeded within twenty-four (24) hours of seeding.

3.3.3 Straw mulch shall be placed in a continuous blanket at a rate of two and one-half (2½) tons per acre or two (2) fifty (50)-pound bales per 1,000 square feet of area.

3.3.4 Straw mulch shall be crimped into the soil by mechanical means. Anchor straw mulch with tackifier at a rate of 30 lbs./acre.

3.3.5 Contractor shall protect buildings, paving, plantings, and all non-seeded areas from tackifier overspray.

4.0 METHOD OF MEASUREMENT

4.1 Grass Establishment (Seeding), complete with satisfactory growth and coverage, will be measured by the square yard.

4.2 NOT USED

- 4.3 Solid Sod will be measured by the square yard.
- 4.4 Ground preparation, fertilizer, and seedings by the hydro-seeding method with all necessary mulching, tackifiers, and other items with satisfactory growth and coverage will be measured for payment by the acre. A certification tag stating the products' ratio of components will need to be provided that states the product meets or exceeds the MS Department of Transportation Standards for plant mixture in order for payment to be considered.

5.0 PAYMENT

- 5.1 Payment for Grass Establishment (Seeding) and Grass Establishment (Hydro-Seeding) shall be made in accordance with the "per acre" bid price. A payment of 50% of the bid price will be made when the initial work is complete. An inspection will be made sixty (60) days after seeding to determine if reseeding of some areas will be required. Payment of the remaining 50% of the bid price will not be made until after a satisfactory growth and coverage of grass, as determined by the Engineer, is in place.
- 5.2 Payment for Grass Establishment (Solid Sod) shall be made in accordance with the per square yard bid price. A payment of 70% of the bid price will be made when the planting is complete. An inspection will be made sixty (60) days after planting to determine if replanting of some areas will be required. Payment of the remaining 30% of the bid price will not be made until after a satisfactory growth of solid sodding as described in Section 3.2.8 of this specification is in place.
- 5.3 Payment shall be made in accordance with Pay Item:

Grass Establishment (Hydro-Seeding)	\$ per square yard
Topsoil	\$ per cubic yard
Solid Sod	\$ per square yard

SECTION 7

CAST-IN-PLACE CONCRETE

1.0 SCOPE

- 1.1 This Section includes, in general, all concrete work in connection with Site Improvements including, but not limited to: Equipment, tools, materials, methods of mixing, testing, placing and curing; except as otherwise specified under other appropriate Sections of these Specifications.
- 1.2 Items of payment not included herein shall be paid for under appropriate Sections of concrete work.
- 1.3 Related items not included under this Section but specified elsewhere in these Specifications are Manholes.

2.0 CONCRETE MATERIALS

- 2.1 Portland Cement: All cement shall be Portland and shall conform to the latest revision or amendment of the following specifications:
 - 2.1.1 American Society for Testing Materials Standards:
C150-68 Standard Specifications for Portland Cement, Type I, II, or III
 - 2.1.2 American Association of State Highway Officials Standards:
M85-60 Standard Specification for Portland, Type I, II, or III
- 2.2 Water shall be clear and free from injurious amounts of oils, acids, alkalies, organic materials or other deleterious substances and shall not be salty or brackish.
- 2.3 Steel Reinforcing Bars shall be deformed bars conforming to the latest revision of one of the following ASTM Specifications: A615-68, Grade 40 or A616-68, Grade 40. Reinforcement shall be free from rust, scale or coating which will affect the bond to the concrete.
- 2.4 Welded Steel Wire Fabric for concrete reinforcement shall conform to the latest revision of ASTM Specification A-185-69 or AASHTO Standard Specification M55-37.
- 2.5 Premolded Expansion Joint Filler shall be non-extruding, resilient, bituminous type conforming to ASTM Specification.
- 2.6 Poured Joint Filler shall conform to the latest revision of AASHTO Specification M-18, Type as specified or approved by Owner.

- 2.6.1 ASTM Specification for "Sheet Materials for Curing Concrete", C 171-69, Type as specified or approved by Owner.
- 2.6.2 ASTM Specification for "Liquid Membrane-Forming Compounds for Curing concrete", C 309-58, Type as specified or approved by Owner.
- 2.6.3 U.S. Corps of Engineers Standard CRD-C 300-68, "Pigmented Membrane-Forming Compounds for Curing Concrete", Type as specified or approved by Owner.

3.0 COARSE AGGREGATE

- 3.1 Coarse Aggregate for Portland cement concrete shall consist of clean, tough, durable fragments of crushed limestone or dolomite, or crushed or uncrushed gravel free from an excess of flat, elongated, thinly laminated, soft or disintegrated pieces and free from fragments coated with dirt, stone dust or other objectionable matter.

4.0 FINE AGGREGATE

- 4.1 Fine aggregate for Portland cement concrete shall consist of native clean sand or, subject to approval, other inert materials with similar characteristics, or combination thereof, having hard, strong, durable particles and shall conform to the requirements of these Specifications. Fine aggregate shall be well graded from coarse to fine, and material from any one source shall be reasonable uniform and not subject to extreme changes in graduation.
 - 4.1.1 All fine aggregate for Portland cement concrete shall be thoroughly washed to remove coatings, excess fines and other objectionable material.
 - 4.1.2 Fine aggregate composed of limestone or dolomite when approved for use on the project shall be processed from material which has been scalped to remove quarry fines. It shall be manufactured from stone having a percentage of Los Angeles wear of not more than 40.
- 4.2 Mortar-Making Properties: When subjected to the test for mortar-making properties, the fine aggregate shall develop a compressive strength, at 7 and 28 days, of not less than 95 percent of the strength developed by a mortar prepared in the same manner with the same cement and graded Ottawa sand having a fineness modulus of 2.40 plus or minus 10%.

5.0 STORAGE OF CONCRETE MATERIALS

- 5.1 Cement: Suitable means for storing and protecting the cement against dampness shall be provided by the Contractor. Bags of cement which have become partially set or which contain lumps of caked cement, unless otherwise directed by the Owner, shall not be used.
- 5.2 Aggregates shall be stockpiled so as to prevent segregation of component sizes and intrusion of foreign matter. Aggregates of different grading shall be stored separately.

- 5.3 Admixtures shall be stored in such a manner as to avoid contamination, evaporation or damage. For those used in the form of suspensions or nonstable solutions, provide suitable agitating equipment to assure uniform distribution of ingredients. Protect liquid admixtures from freezing and other temperature changes which would adversely affect their characteristics.

6.0 MIXING CONCRETE

- 6.1 Job-Mixed Concrete shall be mixed in a suitable approved mechanical batch mixer provided with adequate facilities for accurate measurements and control of each material entering the mixer, for changing the proportions to conform to various conditions and for inspection of operations at all times. Mixing time shall not be less than on (1) minute after all materials are in the drum. If an air-entraining agent is specified or approved, additional mixing time shall be such as to provide the required air content.
- 6.2 Ready-Mixed concrete shall be mixed and transported in accordance with ASTM Specification C-94. Certificates shall be furnished from the mixing plant or strengths in pounds per square inch, when tested in accordance with methods described in the latest revision of the ASTM Standard C-39-69 and C-192-69. No change shall be made in materials or the established mix without prior approval of the Owner. Ready mixed concrete shall be transported to the site in transit-mix or agitator trucks having water tight drums loaded not in excess of rated capacities. The concrete shall be delivered and discharged within one hour after the cement is in the mixer. Concrete delivered which is not plastic and workable will be rejected.
- 6.3 Retempering of Concrete that has been partially hardened, that is, remixed with or without additional cement, aggregate or water, unless otherwise directed by the Owner, will not be permitted.

7.0 FORMS

- 7.1 Forms shall be strong enough to resist pressure of the concrete without springing, and tight enough to prevent leakage of mortar. Forms shall be staked, braced or tied together to maintain their position and shape when concrete is compacted in place. Forms for slabs on ground shall be set and maintained to line and exact finished grade. Forms shall be clean and those for permanently exposed surfaces shall provide a smooth, even finish without fin or board marks. Temporary openings shall be provided at the base of wall forms to facilitate cleaning before depositing concrete.

8.0 PLACING CONCRETE

- 8.1 Concrete shall be deposited so as to require as little rehandling as practicable. Placing shall be continuous between transverse joints or in individual sections of work. Concrete shall be spaded thoroughly along forms and expansion joints, and worked carefully into corners and around reinforcement. Tamp and screed to dense mass. Vibrators may be used provided they are operated under experienced

supervision and forms are constructed to withstand their action. Concrete shall be deposited on a moist subgrade to the satisfaction of the Owner and under no condition shall be placed on a muddy or frozen subgrade.

- 8.2 Reinforcing Bars shall be accurately placed and securely supported and fastened to prevent movement during placement of concrete. Wire fabric shall have a minimum side and end lap as described under Paragraph 2.4.
- 8.3 Utility Structures: The location, elevations, and position of all manhole covers, valve boxes and similar structures, located within areas to be paved or surfaced, shall be checked prior to concreting or surfacing and any necessary adjustments shall be made.
- 8.4 Finishing: Concrete shall be finished for the various surfaces as specified under other Sections of Concrete Work elsewhere in the Specifications.

9.0 COLD WEATHER CONCRETING

- 9.1 General: During cold weather, concrete may be placed when the air temperature in the shade and away from artificial heat is thirty-five (35) degrees F., and rising.
 - 9.1.1 If concrete is placed under the above conditions and by noon the temperature has not gone above forty (40) degrees F., then the placing of concrete shall stop and the work protected as specified hereinafter. Accelerating or Antifreeze Admixtures shall not be used except with the permission of the Owner. In the event such admixtures are permitted, no change in the methods described in this Section shall be made, unless otherwise approved by the Owner.
- 9.2 Calcium Chloride: When permitted by the Owner, calcium chloride shall conform to ASTM D-98. It shall be delivered in moisture proof bags or drums and stored in a dry place. The amount used shall not exceed 2 pounds per sack of cement. The calcium chloride shall be included in the mixing water solution made by dissolving one pound per quart of water. The solution shall not be added in excess of 2 quarts per sack of cement.

10.0 CURING AND PROTECTION

- 10.1 General: Protect freshly deposited concrete from premature drying and excessively hot or cold temperatures and maintain it with minimal moisture loss at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete.
- 10.2 Curing methods: Except as otherwise specified or required, all concrete shall be cured by covering surface with burlap or cotton mats, hay, sand or other approved material, and keeping such covering wet at least five (5) days after concrete is placed, thirty-six (36) hours when high early strength cement is used. If liquid membrane curing material conforming to ASTM C309-53T, Type II, or impervious

membrane conforming to C.E. Spec. CRD-C300 is used, they shall remain on the surface for not less than five (5) days.

10.3 Protection: Protect concrete during the curing period from damaging mechanical disturbances, heavy shock and excessive vibration. Protect finished concrete surfaces from damage caused by construction equipment, material and by rain or running water.

10.3.1 Provide necessary barricades as required to protect concrete surfaces from pedestrian and vehicular traffic for the length of time directed by the Owner and/or as specified under other sections of the various types of concrete work included in the project.

10.3.2 No forms shall be removed, except face forms, for at least twenty-four (24) hours after placing concrete.

11.0 MINIMUM STRENGTH

11.1 Unless specified otherwise in Specification Documents or Plans, all concrete shall have a minimum 28 day compressive strength of 3,500 pounds per square inch when tested in accordance with methods described in the latest revision of the ASTM Standard C-39-69 and C-192-69.

12.0 MISCELLANEOUS CONCRETE (3,000 PSI)

12.1 This item consist of furnishing miscellaneous concrete mixed in accordance with the applicable Section of these Specifications, in connection with sealing abandoned sanitary sewer or storm drain lines, construct temporary aprons to the new inlets and any other miscellaneous concrete payment shall constitute full compensation for all labor, supplies, equipment, tools, materials, forms, transportation and incidental items necessary to complete the work.

13.0 MEASUREMENT AND PAYMENT

13.1 Structural Concrete shall be paid for at the contract price of cubic yards (CY).

13.2 Reinforcing Steel shall be paid for at the contract price of tons (TON).

END OF SECTION

SECTION 8

GRANULAR BASE COURSE (LIMESTONE)

1.0 SCOPE OF WORK

- 1.1 The work covered by this Section consists of the furnishing of granular materials and the construction of one or more courses of base on a prepared foundation in reasonably close conformity with the lines, grades, and cross sections shown on the plans.

2.0 MATERIALS

- 2.1 The granular material shall be dense-graded crushed domestic limestone, plant mixed to conform to Size No. 610 or 825A, MDOT Specifications.

3.0 CONSTRUCTION REQUIREMENTS

- 3.1 Preparation of Grade: The foundation on which granular material will be laid shall be prepared by the Contractor to the lines and grades established in the plans and compacted 95% standard density.
- 3.2 Moisture Content: All materials shall contain moisture content sufficient to ensure that the design density requirements will be obtained when the materials are compacted.
- 3.3 Shaping, Compacting, and Finishing:
 - 3.3.1 The Contractor shall ensure that each course or layer of material is shaped to the required section, watered or aerated as necessary to produce the required moisture content, and compacted. Throughout the compaction operation, the shape of the course or layer shall be maintained by blading and rolling so that the aggregates are uniformly distributed and firmly keyed.
 - 3.3.2 Shaping and compaction shall be carried out by the Contractor in such a manner that will prevent lamination and shall continue until the entire depth and width of the course or layer has reached the required density. Surface compaction and finishing shall be performed so as to produce a smooth, closely knit surface that is free from lamination, cracks, ridges, or loose material. The finished surface shall conform (within allowable tolerances) to the required section at established lines and grades.
 - 3.3.3 Prior to subsequent construction or final acceptance, all irregularities, depressions, soft spots, and other deficiencies found by Engineer shall be

corrected by the Contractor to meet the requirements of these specifications, without additional compensation to the Contractor.

- 3.3.4 After compaction and finishing, the Contractor shall make at least one complete coverage with a steel wheel tandem roller. The resulting surface shall then be sprinkled as necessary to maintain the required moisture content and shall be thoroughly compacted and sealed with a pneumatic roller.
- 3.3.5 The Contractor shall be responsible for constructing and maintaining a course which will remain firm and stable under construction equipment and other traffic to which the course will be subjected.
- 3.3.6 The Contractor shall perform a subgrade proof roll test on all proposed areas prior to pavement or base application in the presence of the Engineer or his duly authorized representative. This test must be coordinated at least 24 hours prior to the proof roll inspection.
- 3.3.7 The specified density shall be 95% standard density.
- 3.3.8 Unless pavement is to follow immediately after preparation of base course, the surface shall be primed in conformity with Section 408, MDOT Specifications.

4.0 METHOD OF MEASUREMENT

- 4.1 Accepted quantities of granular base course (limestone) will be measured by the cubic yard (CY) installed. Truck tickets shall be supplied to verify quantities.

END OF SECTION

Rudy Moran Pavillion

SECTION 000103
PROJECT DIRECTORY

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END OF SECTION

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SECTION 000110
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END OF SECTION

SECTION 031500
UNDER SLAB VAPOR RETARDER

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Vapor Retarder and installation accessories for installation under concrete slabs.

1.02 RELATED SECTIONS

- A. Section 031000 Concrete Formwork
- B. Section 032000 Concrete Reinforcing
- C. Section 033000 Cast-In-Place Concrete

1.03 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Stego Wrap Class A Vapor Retarder by Stego Industries LLC., (877) 464-7834 www.stegoindustries.com.
- B. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 MATERIALS

- A. Vapor Retarder shall have all of the following qualities:
 - 1. Maintain permeance of less than 0.03 Perms [grains/(ft² · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
 - 2. 10 mils minimum thickness
 - 3. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1

2.03 ACCESSORIES

- A. Seams
 - 1. Stego Tape by Stego Industries, LLC
 - A) Pressure-sensitive adhesive for sealing seams and penetrations.
- B. Sealing Penetrations of Vapor Retarder
 - 1. Stego Mastic by Stego Industries, LLC

- A) A liquid vapor retardant membrane for sealing utility and pipe penetrations
- 2. Stego Tape by Stego Industries, LLC
 - A) Pressure-sensitive adhesive for sealing seams and penetrations.
- C. Perimeter/Edge Seal
 - 1. Stego Crete Claw by Stego Industries, LLC
 - A) A multi-layered tape/detail strip that will mechanically seal Stego Wrap to concrete.
 - 2. Stego Term Bar by Stego Industries, LLC
 - 3. StegoTack Tape (double-sided sealant tape) by Stego Industries LLC.
 - A) Double-sided adhesive strip to bond and seal Stego Wrap to concrete, masonry, wood, metal, and other surfaces.
- D. Penetration Prevention
 - 1. Beast Foot by Stego Industries, LLC
 - 2. Beast Form Stake by Stego Industries, LLC
- E. Vapor Barrier-Safe Screed System
 - 1. Beast Screed by Stego Industries, LLC
 - A) Beast Screed is a fixed-elevation, point-to-point guide screed system that allows you to maintain floor levelness during the screeding operation
 - 2. Beast Hook by Stego Industries, LLC

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 PREPARATION

- A. Ensure that subsoil is approved by Geotechnical Engineer.
 - 1. Level and compact base material.

3.03 INSTALLATION

- A. Install Vapor Retarder in accordance ASTM E1643.
 - 1. Unroll Vapor Retarder with the longest dimension parallel with the

direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.

2. Extend Vapor Retarder to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise, one of the following:
 - A) At a point acceptable to the Architect.
 - B) Where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the Vapor Retarder. At the point of termination, seal Vapor Retarder to the foundation wall, grade beam or slab itself.
 - C) Seal Vapor Retarder to the entire slab perimeter using Stego Crete Claw, per manufacturer's instructions.
3. Overlap joints 6 inches and seal with manufacturer's seam tape.
4. Apply seam tape/Crete Claw to a clean and dry Vapor Retarder.
5. Seal all penetrations per manufacturer's instructions.
6. For interior forming applications, avoid the use of non-permanent stakes driven through vapor barrier. Use Beast Form Stake and Beast Foot as a vapor barrier-safe forming system. Ensure Beast Foot's peel-and-stick adhesive base is fully adhered to the Vapor Retarder.
7. If non-permanent stakes must be driven through Vapor Retarder, repair as recommended by Vapor Retarder manufacturer.
8. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the Vapor Retarder.
9. Repair damaged areas with Vapor Retarder material of similar (or better) permeance, puncture and tensile.
10. For vapor barrier-safe concrete screeding applications, install Beast Scream (vapor barrier-safe screed system) per manufacturer's instructions prior to placing concrete.

3.04 PROTECTION

- A. Protect Vapor Retarder from rips and punctures as reinforcing is placed.

END OF SECTION

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SECTION 033500
POLISHED CONCRETE FINISHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Polished concrete

1.02 RELATED SECTIONS

- A. Section 012500 Substitution Procedures
- B. Section 013300 Submittal Procedures
- C. Section 033000 Cast-in-Place Concrete

1.03 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm with a minimum 5 years of experience in manufacturing components like or exceeding requirements of project.
 - 1. Capable of providing field service representation during construction and approving application method
- B. Installer shall be experienced in performing work of this Section with a minimum of 5-years experience in performing work like that required for this project.
 - 1. Current Certification from the CPAA stating that the technicians are trained craftsmen.
- C. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching, and leveling compounds.

1.04 SUBMITTALS

- A. Submit according to requirements of Section 013300 Submittal Procedures.
- B. Indicate information on Shop Drawings as follows:
 - 1. Typical layout including dimensions and floor grinding schedule.
 - 2. Plan view of floor and joint pattern layout
 - 3. Hardener, sealer, and densifier, identified in notes.
- C. Submit product data, including manufacturer's product sheet, for specified products.
 - 1. Material Safety Data Sheets (MSDS)
 - 2. Preparation and concrete grinding procedures
 - 3. Certified test reports showing compliance with specified performance characteristics and physical properties as cited in Performance Requirements

4. Certificates:
 - a. Product certificates signed by manufacturer certifying that materials comply with specified performance characteristics, criteria, and physical requirements.
 - b. Letter of certification from the National Floor Safety Institute confirming the system has been tested and passed phase Two Level of certification when tested by Method 101-A. ANSI B-101.1 2009 non-slip properties.
 - c. Current contractor's certificate signed by manufacturer declaring Contractor as an approved installer of polishing system.
5. Manufacturer's installation instructions
- D. Submit warranty documents specified.
- E. Submit operation and maintenance data for installed products.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Product Delivery, Storage, and Handling.

1.06 PRE-INSTALLATION MEETING

- A. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations, and manufacturer's warranty requirements.
- B. Review the following:
 1. Environmental requirements
 2. Scheduling and phasing of work
 - a. Comply with manufacturer's written recommendations for sequencing construction operations.
 3. Coordinate with other work and personnel. Remind all trades that they are working on a surface that will become a finished surface.
 4. Protection of adjacent surfaces
 5. Surface preparation
 6. Repair of defects and defective work prior to installation
 7. Cleaning
 8. Installation of polished floor finishes
 9. Application of liquid hardener and densifier
 10. Protection of finished surfaces after installation
 11. Do not place materials on the concrete surface that may cause staining, etching, or scratching.

1.07 MOCK-UPS

- A. Install one full-sized mock-up of the specified components for evaluating the quality of workmanship.

- B. Install a 100 sf (9.3 m²) sample panel at location directed, under conditions like those which will exist during actual placement.
- C. Obtain Owner's and Architect's acceptance of the pattern, finish, color, texture, and workmanship standard.
- D. Maintain mock-up during construction for workmanship comparison.
- E. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, and shine.
- F. Allow 24 hours for inspection of mock-up before proceeding with work.
- G. Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense. Mock-Up shall demonstrate required level of cut and finish.
- H. Approved mock-up may remain as part of the finished work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Specification is based on LATICRETE products by L&M Construction Chemicals.
- B. Or approved equal
- C. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 MATERIALS

- A. Concrete cleaner: LATICRETE Citrex
- B. Hardener, Sealer, Densifier: FGS Hardener Plus
- C. Joint Filler: Joint Tite 750
- D. Oil Repellent Sealer: Petrotex
- E. Cleaning Solution: FGS Concrete Conditioner
- F. Stain Guard Sealer: Permaguard SP
 - 1. Topical sealer consisting of low molecular emulsified cross-linking, coupling polymers that effectively protects concrete floor surfaces from the damaging effects of staining, defacing, and deterioration due to contaminant penetration.

2.03 SYSTEM DESCRIPTION

- A. Polished flooring that has been designed, manufactured, and installed to achieve the following:
 - 1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008-inch (0.20 mm) wear in 30 minutes
 - 2. Reflectivity: Increase of 35% as determined by standard gloss meter

3. Waterproof Properties: Rilem Test Method 11.4, 70% or greater reduction in absorption
 4. High Traction Rating: NFSI 101-A, ANSI B-101.1 2009 non-slip properties
- B. Design Requirements:
1. Hardened Concrete Properties:
 - a. Minimum Concrete Compressive Strength: 3500 psi (24 MPa)
 - b. Normal Weight Concrete: No lightweight aggregate
 - c. Non-air entrained
 2. Placement Properties:
 - a. Natural concrete slump of 4-1/2 inches to 5 inches (114 to 127 mm). Admixtures may be used.
 3. Hard-Steel Troweled (3 passes) Concrete: No burnishing marks. Finish to ACI 302.1R, Class 5 floor.
 4. Curing Options:
 - a. Membrane forming curing compounds (ASTM C309, Type 1, Class B, all resin, dissipating cure)
 - b. Acrylic curing and sealing compounds not recommended.
 - c. Sheet membrane (ASTM C171); polyethylene film not recommended.
 - d. Damp Curing: Seven-day cure.

2.04 FINISH

- A. Level 2 - Salt/Pepper Finish: Expose the fine aggregate such as sand and small aggregate with the concrete. The depth of grind will depend greatly on the placement and finishing procedures. Generally, this level of cut can be achieved within 1/16" of the surface.

2.05 SHEEN

- A. Sheen Level A: Sheen (glossy) as determined by a gloss reading of 45 - 60. Standard High gloss (HG-1), 1500 grit.
- B. Gloss readings may be obtained using any topical protective coating enhancers or the result of resin transfer from resin bond

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.
- B. Verify that concrete substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.
- C. Do not begin installation until substrates have been properly prepared.
- D. Verify Concrete Slab Performance Requirements:

1. Verify concrete is cured to 28-day duration and has achieved design strength.
 2. Verify concrete surfaces have received a hard steel-trowel finish (3 passes) during placement.
- E. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.
- F. Examine surface to determine soundness of concrete for polishing.

3.02 PREPARATION

- A. Fill joints flush to surface prior to the start of polishing operations.

3.03 INSTALLATION

- A. Comply with manufacturer's written data, including product technical bulletins and installation instructions.
- B. Floor Surface Polishing and Treatment:
1. Provide polished concrete floor treatment in entirety of slab indicated by Drawings. Provide consistent finish in all contiguous areas.
 2. Apply floor finish prior to installation of cabinets, fixtures, and accessories.
 3. Diamond polish concrete floor surfaces with power disc machine.
 - a. Determine the optimum starting grit to achieve the specified aggregate exposure according to mock-up.
 - b. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level.
 - 1) Following the initial passes of metal bond diamonds, drop back a minimum of one grit level when transitioning to resin bond diamonds.
 - 2) Make separation in grit designation a minimum of 50 for each transitioning step.
 - 3) Refine each abrasive grit to its fullest potential before moving on to the next level.
 - 4) Scrub floor thoroughly between each grit pass to remove all loose material.
 - 5) Make level of sheen match that of approved mock-up.
 - c. Make all concrete surfaces as uniform in appearance as possible.
 4. Hardener and Densifier Application:
 - a. Install first coat of hardener at 250 ft²/gal (6.25 m²/L), following the 400-grit level.
 - b. Install second coat of hardener at 350 ft²/gal (8.75 m²/L), prior to the final polishing pass.

- c. Follow manufacturer's recommendations for drying time between successive coats.
- 5. Remove defects and re-polish defective areas.
- 6. Finish edges of floor finish adjoining other materials in a clean and sharp manner.

3.04 ADJUSTMENTS

- A. Re-polish those areas not meeting specified gloss levels per mock-up.

3.05 CLEANING

- A. Upon completion, remove surplus and excess materials, rubbish, tools, and equipment.

3.06 PROTECTION

- A. Protect installed product from damage during construction.

END OF SECTION

SECTION 036200
SHRINK RESISTANT GROUT

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Shrink Resistant Grout
- B. Self-leveling sealant at expansion joints and open control joints.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Non-Shrink Grout: CRD-C 588, factory pre-mixed grout. Type D - Non-Metallic
 - 1. "Masterflow 713"; Master Builders
 - 2. "SonogROUT"; Sonneborn-Contech
 - 3. "Euco-NS"; Euclid Chemical Company
 - 4. "DuragROUT"; L & M Cost. Chemical Co.
- B. Sealant at Expansion Joints and Open Control Joints:
 - 1. Sonolastic Paving Joint Sealant (SL-1) by Sonneborn

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that existing conditions are satisfactory and ready to receive grout or sealant.
- B. Take special care to ensure that joints are clean and free of foreign matter.

3.02 INSTALLATION

- A. Fill in holes and openings left in structures for passage of work by other trades.
- B. Install sealant in strict accordance with manufacturer's written instructions.

3.03 COORDINATIONS

- A. Refer to Mechanical and Electrical plans and specifications for coordination of chase sizes.

END OF SECTION

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SECTION 040513
MORTAR

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Mortar and grout for masonry.

1.02 RELATED SECTIONS

- A. Section 040519 Masonry Reinforcement and Accessories
- B. Section 042113 Brick Masonry Units
- C. Section 042200 Concrete Masonry Units
- D. Section 081113 Hollow Metal Doors and Frames

1.03 REFERENCES

- A. ASTM C5 – Quicklime for Structural Purposes.
- B. ASTM C91 – Masonry Cement.
- C. ASTM C94 – Ready-Mixed Concrete.
- D. ASTM C144 – Aggregate for Masonry Mortar.
- E. ASTM C150 – Portland Cement.
- F. ASTM C207 – Hydrated Lime for Masonry Purposes.
- G. ASTM C270 – Mortar for Unit Masonry.
- H. ASTM C780 – Test Methods

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 50 degrees F. prior to, during, and 48 hours after completion of masonry work.
- B. Comply with the International Masonry All Weather Council, Recommended Practices and Guide Specifications for cold weather masonry construction.

1.05 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this Section who has specialized in installation of work like that required for this project.
- C. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.

1.06 SUBMITTALS

- A. Submit according to requirements of Section 013300 Submittal Procedures.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.

1.08 MOCK-UPS

- A. For evaluating the quality of workmanship, install one full-sized mock-up of the specified components.
- B. Obtain Owner's and Architect's acceptance of the pattern, finish, color, texture, and workmanship standard.
- C. Provide a 4'-0" wide x full height sample of complete wall system using all materials for Architect's approval on site.
- D. Include at least one joint between dissimilar materials.
- E. Maintain mock-up during construction for workmanship comparison.
- F. Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
- G. The mock-up may be incorporated into final construction upon Owner's approval.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Premix Mortar: ASTM C387, using gray cement, normal strength.
- B. Grout Aggregate: ASTM C404.
- C. Water: Clean and potable.

2.02 MORTAR MIXES

- A. Mortar for Load Bearing Walls and Reinforced Masonry, Non-Load Bearing Walls, Veneers, and Partitions: ASTM C270, Type S using Property Method.
- B. Mortar for Below Grade: ASTM C270, Type M, using Property Method.

2.03 MORTAR MIXING

- A. In accordance with ASTM C270, thoroughly mix mortar ingredients as needed for immediate use.
- B. Add color and admixtures in accordance with manufacturer's specifications.
- C. Anti-freeze additives are not allowed.

2.04 GROUT MIXES

- A. Minimum 2500 psi strength at 28 days: 8-10 inches slump; premixed type mixed in accordance with ASTM C476.
- B. Anti-freeze additives are not allowed.

2.05 FINISH

- A. Color as selected by Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 INSTALLATION

- A. Work grout into cores and cavities to eliminate voids. All joints, head, bed, and collar shall be completely filled. Exception: weep holes.
- B. Do not displace reinforcing steel when placing grout.
- C. Tool mortar joints concave at face brick when thumbprint hard.
- D. Tool mortar joints concave at exposed CMU when thumbprint hard.
- E. Slush hollow metal frames full of grout when installed in masonry walls.
- F. Keep wall cavities free of mortar droppings and bridges.

END OF SECTION

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SECTION 040519
MASONRY REINFORCEMENT AND ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Masonry reinforcement, anchors, and accessories.

1.02 RELATED SECTIONS

- A. Section 040513 Mortar
- B. Section 042113 Brick Masonry Units
- C. Section 042200 Concrete Masonry Units
- D. Section 055000 Metal Fabrications – Lintels
- E. Section 054400 Metal Stud Framing System
- F. Section 061000 Rough Carpentry

1.03 REFERENCES

- A. Brick Institute of America.
- B. National Concrete Masonry Association.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work like that required for this project.
- C. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- D. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.

1.05 SUBMITTALS

- A. Submit according to requirements of Section 013300 Submittal Procedures.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.

1.07 MOCK-UPS

- A. For evaluating the quality of workmanship, install one full-sized mock-up of the specified components.

- B. Obtain Owner's and Architect's acceptance of the pattern, finish, color, texture, and workmanship standard.
- C. Provide a 4'-0" wide x full height sample of complete wall system using all materials for Architect's approval on site.
- D. Include at least one joint between dissimilar materials.
- E. Maintain mock-up during construction for workmanship comparison.
- F. Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
- G. The mock-up may be incorporated into final construction upon Owner's approval.

PART 2 - PRODUCTS

2.01 REINFORCEMENT AND ANCHORAGE

- A. For substitutions, refer to Section 012500 Substitution Procedures.
- B. Wall ties at metal studs and brick veneer walls
 - 1. Equal to Hohmann & Barnard DW-10-X or HB-200 veneer anchor for metal stud construction.
 - a. Bend size: As required by cavity and wall construction.
 - b. Legs: Length as required to accommodate insulation/wallboard.
 - c. Hot dipped galvanized.
 - d. 3/16" diameter wire tie.
 - e. Seismiclips and continuous joint reinforcement wire, 3/16".
 - f. Self sealing 40 mil membrane tape.
 - g. 16" o.c. each way.
- C. Weld-on Ties
 - 1. Equal to Hohmann & Barnard #359F anchor straps.
 - a. 3/4" wide x 12 ga. thick x 7" long.
 - b. Hot dipped galvanized.
 - c. Weld to structural steel, prime all connection points.
 - 2. Equal to Hohmann & Barnard BYWA-TIE 3/16" with seismicclip and continuous 3/16" joint reinforcement wire for brick masonry.
 - a. Bend Size: As required by cavity wall construction.
 - b. Hot dipped galvanized.
 - c. 16" o.c.
 - 3. Equal to Hohmann & Barnard #302W column web tie for CMU
 - a. Bend Size: As required by CMU size.
 - b. Hot dipped galvanized.

- c. 16" o.c.

2.02 FLASHING

- A. Product shall be equal to AFCO 3 oz. Cop-A-Cote, 3 oz. copper sheet coated on both sides with a flexible, rubbery bituminous compound.

2.03 ACCESSORIES

- A. Weeps: Full head joints required.
- B. Provide and install "Z" Anchors at corners and intersections for lateral support. Minimum cross section shall be 1/4 inch by 1-1/2 inches with 2-inch bends. Anchor shall be at least 24 inches long and installed at a maximum spacing of 48" o.c. vertically. Hot dip galvanized at exterior walls. Plain steel at interior.
- C. Control Joints: Equal to rapid poly-joint P.V.C. Dur-O-Wal, #VS by Hohmann & Barnard, Series 600 by Greenstreak, or 9101 Regular by Southern Construction Products, Inc.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 PREPARATION

- A. Review locations where waterproofing is required.

3.03 REINFORCEMENT AND ANCHORAGE

- A. Install joint reinforcement at 16 inches o.c.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend 16 inches minimum each side of opening.
- C. Place joint reinforcement continuous in first joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches. Extend 16 inches minimum each side of opening.
- E. Place reinforcing bars supported and secured against displacement. Maintain position within 1/2 inch of true dimension.
- F. Reinforce corners and intersections with pre-formed units of reinforcement at 16" o.c.
- G. Install 2" anchor straps at corners and intersections at 48" o.c.
- H. Discontinue reinforcement and anchorage at expansion joints and control joints.

- I. Install "Z" Anchors at corners and intersections for lateral support. Minimum cross section of 1/4 inch by 1-1/2 inches with 2 inch bends. Anchor shall be at least 24 inches long and installed at a maximum spacing of 48" o.c. vertically. Hot dip galvanized at exterior walls. Plain steel at interior.

3.04 CONCRETE FILLING AND GROUT

- A. Reinforce bond beam, pilasters, cells at doors, windows, and openings.
- B. Support and secure reinforcing bars. Maintain within 1/2 inch of dimensioned position.
- C. Do not displace reinforcing. Work into cores and cavities to eliminate voids.
- D. At bearing locations, fill side cores with concrete for a minimum 12 inches each side.
- E. Fill cores where "Z" anchors are installed.
- F. Fill cores at reinforced cells at exterior walls.

3.05 FLASHING

- A. Install in strict accordance with manufacturer's recommendations. Use recommended adhesive and sealer.
- B. Install at base of all exterior walls, heads of all openings, and sills of all windows and openings.
- C. Lap ends a minimum of 8".
- D. Extend flashing all the way through brick course. Terminate at exterior with a visible drip edge.

3.06 CONTROL AND EXPANSION JOINTS

- A. Locate control joints not to exceed 20'-0" o.c. or as shown on drawings in exterior walls through both block and brick. Backer rod and sealant required.

END OF SECTION

**SECTION 042113
BRICK MASONRY UNITS**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Face brick.

1.02 RELATED SECTIONS

- A. Section 040513 Mortar
- B. Section 040519 Masonry Reinforcement and Accessories
- C. Section 042200 Concrete Masonry Units
- D. Section 054400 Metal Stud Framing System
- E. Section 055000 Metal Fabrications
- F. Section 061000 Rough Carpentry
- G. Section 079200 Joint Sealant
- H. Section 081113 Hollow Metal Doors and Frames
- I. Section 099100 Paint

1.03 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product,
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- C. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.

1.06 MOCK-UPS

- A. For evaluating the quality of workmanship, install one full-sized mock-up of the specified components completed.
- B. Obtain Owner's and Architect's acceptance of the pattern, finish, color, texture, and workmanship standard.
- C. Provide a 4'-0" wide x full height sample of complete wall system using all materials for Architect's approval on site. Include:

1. CMU
 2. Bituminous Dampproofing
 3. Thermal Insulation
- D. Include at least one joint between dissimilar materials.
 - E. Maintain mock-up during construction for workmanship comparison.
 - F. Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
 - G. Remove and legally dispose of mock-up when no longer required.
 - H. The mock-up may be incorporated into final construction upon Owner's approval.
 - I. Test panels with project CMU and face brick required for Architect's and Owner's approval.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 50 degrees Fahrenheit, prior to, during, and 48 hours after completion of masonry work. Comply with the International Masonry Industry All Weather Council, Recommended Practices and Guide Specifications for Cold Weather.

1.08 REFERENCES

- A. Brick Institute of America.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Cherokee Brick
- B. Or approved equal
- C. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 FACE BRICK

- A. Velour Classic Red
- B. <https://www.cherokeebrick.com/architectural/brick/velour-classic-red>

2.03 MORTAR

- A. Refer to Section 040513.

2.04 REINFORCING

- A. Refer to Section 040519.

2.05 LINTELS

- A. Refer to Section 055000.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 PREPARATION

- A. Verify items provided by other Sections of work are properly sized and located. Take special care to coordinate masonry work with requirements of Division 21, Division 22, and Division 26 of specifications.
- B. Establish lines, levels, and coursing. Protect from disturbance.
- C. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.
- D. Review locations where waterproofing is required.

3.03 COURSING

- A. Place masonry to lines and levels indicated.
- B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- C. Lay brick masonry units in running bond. Form tooled concave mortar joints.
- D. Review control joint locations and configurations with Architect prior to initiating the work.

3.04 PLACING AND BONDING

- A. Lay masonry in full bed of mortar, properly jointed with other work. All joints, head, bed and collar shall be completely filled. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.
- B. Since different brick lots sometimes have slight variations in color, select bricks from various bundles to mix batches and provide a more uniform variation in color.
- C. Fully bond intersections at internal and external corners.
- D. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.
- E. Remove excess mortar.
- F. Perform jobsite cutting with proper tools to provide straight, unchipped edges. Take care to prevent breaking masonry unit corners or edges.

- G. Weep holes (full head joint) required at bottom of all masonry walls, above all flashings, shelf, and angles, and lintels at 24" o.c. horizontally.

3.05 TOLERANCES

- A. Variation from unit to adjacent unit: 1/32 inch maximum.
- B. Variation from plane of wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
- C. Variation from plumb: 1/4 inch per story noncumulative.
- D. Variation from level coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet.
- E. Variation of joint thickness: 1/8 inch in 3 feet.
- F. Maximum variation from cross sectional thickness of walls: Plus or minus 1/4 inch.

3.06 REINFORCEMENT AND ANCHORAGE

- A. See Section 040519 – Masonry Reinforcement and Accessories.

3.07 CUTTING AND FITTING

- A. Cut and fit for pipes, conduit and sleeves. Cooperate with other sections of work to provide correct size, shape, and location. Take special care to coordinate work of this section with requirements of Division 21, Division 22, and Division 26 of specifications.
- B. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.08 CLEANING

- A. Clean soiled surfaces with a non-acidic solution which will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners. Consult painting contractor and manufacturer of paint, primer, and elastomeric coatings to ensure that cleaning solutions are compatible with finishes.
- B. Use non-metallic tools in cleaning operations.

3.09 PROTECTION

- A. Provide protection without damaging completed work.
- B. At day's end, cover unfinished walls to prevent moisture infiltration.
- C. Keep masonry units covered and dry to prevent moisture infiltration during storage and construction.

3.10 LINTELS

- A. Install steel lintels over openings where brick veneer is scheduled.

B. Provide a minimum of 8-inch bearing on each side of opening.

3.11 CONTROL AND EXPANSION JOINTS

A. See Section 040519 – Masonry Reinforcement and Accessories.

END OF SECTION

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SECTION 042200
CONCRETE MASONRY UNITS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Concrete masonry units

1.02 RELATED SECTIONS

- A. Section 040513 Mortar
- B. Section 040519 Masonry Reinforcement and Accessories
- C. Section 042113 Brick Masonry Units
- D. Section 055000 Metal Fabrications
- E. Section 061000 Rough Carpentry
- F. Section 071100 Bituminous Dampproofing
- G. Section 081113 Hollow Metal Doors and Frames
- H. Section 099100 Paint
- I. Section 133413 Metal Building Systems
- J. Division 22 Plumbing
- K. Division 26 Electrical

1.03 REFERENCES

- A. National Concrete Masonry Association.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work like that required for this project.
- C. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- D. Conduct a pre-installation meeting to verify project requirements, and to verify substrate conditions.

1.05 MOCK-UPS

- A. For evaluating the quality of workmanship, install one full-sized mock-up of the specified components completed.

- B. Obtain Owner's and Architect's acceptance of the pattern, finish, color, texture, and workmanship standard.
- C. Provide a 4'-0" wide x full height sample of complete wall system using all materials for Architect's approval on site. Include:
 - 1. CMU
 - 2. Bituminous Dampproofing
 - 3. Thermal Insulation
- D. Include at least one joint between dissimilar materials.
- E. Maintain mock-up during construction for workmanship comparison.
- F. Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
- G. Remove and legally dispose of mock-up when no longer required.
- H. The mock-up may be incorporated into final construction upon Owner's approval.
- I. Test panels with project CMU and face brick required for Architect's and Owner's approval.

1.06 ENVIRONMENTAL CONDITIONS

- A. Maintain materials and surrounding air temperature to minimum 50 degrees F. prior to, during, and 48 hours after completion of masonry work.
- B. Comply with the International Masonry Industry All Weather Council, Recommended Practices and Guide Specifications for Cold Weather.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete masonry units shall be in accordance with the requirements specified herein and the following applicable specifications and standards:
 - 1. ASTM C90, light weight, Type I Non-Moisture-Controlled.

2.02 LINTELS

- A. As indicated on Drawings.
- B. All lintels shall bear a minimum of 8" at each side.

2.03 CELL REINFORCEMENT

- A. Reinforce and fill cells as indicated on Drawings.

2.04 ACCESSORIES

- A. Concrete: 3,000 psi @ 28 days; 8-inch - 10-inch slump.
- B. Grout: 2,500 psi @ 28 days; 8-inch - 10-inch slump.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.
- B. Verify that structure is square, plumb, level, and parallel.
- C. Verify existing dimensions prior to installation to assure compatibility with Drawings and Specifications.
- D. Verify that items provided by other Sections of work are properly sized and located. Take special care to coordinate masonry work with requirements of Division 21, Division 22, and Division 26 of specifications.

3.02 PREPARATION

- A. Establish lines, levels, and coursing. Protect from disturbance.
- B. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.
- C. Review locations where waterproofing is required.

3.03 COURSING

- A. Place masonry to lines and levels indicated.
- B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- C. Lay concrete masonry units in running bond. Course one block unit and one mortar joint to equal 8 inches.
- D. Form tooled concave mortar joints.
- E. Review control joint and expansion joint locations and configurations with Architect prior to initiating the work.

3.04 PLACING AND BONDING

- A. Lay masonry in full bed of mortar, properly jointed with other work.
- B. All joints, head, bed, and collar shall be completely filled.
- C. Buttering corners of joints is not permitted.
- D. Deep or excessive furrowing of mortar joints is not permitted.
- E. Fully bond intersections and corners. Fill cells in CMU supporting "Z" anchors with grout.

- F. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar, and replace.
- G. Grout all Hollow Metal Door Frames and Aluminum Storefront Frames.
- H. Remove excess mortar.
- I. Perform jobsite cutting with proper tools to provide straight, unchipped edges. Take care to prevent breaking the corners or edges of masonry units.
- J. Weep holes (full head joint) required at bottom of all masonry walls, above all flashings, shelf, and angles, and lintels at 24" o.c. horizontally.

3.05 TOLERANCES

- A. Variation from unit to adjacent unit may not exceed 1/32 inch.
- B. Variation from plane of wall may not exceed 1/4 inch in 10 feet.
- C. Variation from plumb may not exceed 1/4 inch per story noncumulative.
- D. Variation from Level Coursing may not exceed 1/8 inch in 3 feet or 1/4 inch in 10 feet.
- E. Variation of joint thickness may not exceed 1/8 inch in 3 feet.
- F. Variation from cross sectional thickness of walls may not exceed 1/4 inch.

3.06 LINTELS

- A. Install concrete masonry lintels over openings where steel lintels are not required.
- B. Provide a minimum of 8-inch bearing on each side of opening.

3.07 CUTTING AND FITTING

- A. Cut and fit for pipes, conduit, and sleeves.
- B. Cooperate with other sections of work to provide correct size, shape, and location.
- C. Take special care to coordinate work of this section with requirements of Division 21, Division 22, and Division 26 of Specifications.
- D. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.08 CLEANING

- A. Clean soiled surfaces with a non-acidic solution which will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners. Consult painting contractor and manufacturer of paint, primer, and elastomeric coatings to ensure that cleaning solutions are compatible with finishes.

- B. Use non-metallic tools in cleaning operations.

3.09 PROTECTION

- A. Provide protection without damaging completed work.
- B. At day's end, cover unfinished walls to prevent moisture infiltration.
- C. Keep masonry units covered and dry to prevent moisture infiltration during storage and construction.

END OF SECTION

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SECTION 054000
METAL STUD FRAMING SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Top and bottom runners, studs, joists, internal bracing and blocking (interior and exterior).

1.02 RELATED SECTIONS

- A. Section 061000 Rough Carpentry
- B. Section 072100 Thermal Insulation
- C. Section 072129 Spray Foam Insulation
- D. Section 081113 Hollow Metal Doors and Frames
- E. Section 092900 Gypsum Board

1.03 REFERENCES

- A. ASTM C645 - non-load-bearing Steel Studs, Runners and Rigid Furring Channels.
- B. ASTM A 446-83 – Load-bearing Steel Studs.
- C. Gypsum Construction Handbook – 7th Edition.
- D. GA 203 - Installation of Screw-Type Steel Framing Members to Receive Gypsum Board.

1.04 DESIGN REQUIREMENTS

- A. Design of the following is the sole responsibility of the Contractor:
 - 1. Cold-formed exterior steel studs including tracks, bridging, and opening framing.
 - 2. Any required temporary and permanent restraint/bracing.
- B. Cold-formed exterior steel stud framing shall be designed by a Structural Engineer licensed in the Project state. Design criteria includes, but is not limited to, the following:
 - 1. Deflection of steel studs shall not exceed $L/360$.
 - 2. Wind pressure for components and cladding as indicated in the Structural Notes and wind pressure diagrams.

- C. Cold-formed steel design, fabrication and erection shall conform to AISI S100 and AISI S200.
- D. Stud depth, layout and configuration of cold-formed exterior steel studs shall be compatible with the plans, sections, and details of the Construction Documents.

1.05 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
- B. Submit Shop Drawings Including
 - 1. Plans, sections, elevations, installation details, layout, dimensions, and connection details. Show anchorage and accessory items.
 - 2. Connection details showing screw types and locations, weld lengths, or other fastener requirements.
 - 3. Bracing locations and details. Any required bracing to the primary structure that is not shown in the Construction Documents shall be specifically identified.
 - 4. Include locations and sizing of solid blocking for Mechanical, Electrical, cabinetry, grab bars, and other items that require attachment to walls.
 - 5. Shop Drawings shall be sealed by an Engineer licensed in the Project state.
 - 6. Include field-verified dimensions of spaces scheduled to receive Metal framing.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Product Delivery, Storage, and Handling.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Clark-Deitrick
- B. U.S. Gypsum Company
- C. or approved equal.

2.02 MATERIALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
- B. Interior cold-formed C studs, framing, and track equal to Clark-Dietrich ProSTUD and ProTRACK.

1. Size as shown on Drawings.
 2. G40 galvanized coating
 3. Interior framing shall be not less than 25 gage at 16" OC
 - A) Increase gage to 22 gage at door jambs and heads
 4. Interior corridor walls shall be not less than 20 gage at 16" OC
 - A) Increase gage to 18 gage at door jambs and heads
- C. Exterior cold-formed C Studs, framing, and track equal to Clark-Dietrich Structural Studs and Structural Track.
1. Size as shown on Drawings.
 2. G90 galvanized coating.
 3. Exterior framing shall be not less than 16 gage at 16" OC
 - A) Increase gage to 14 gage at door jambs and heads
- D. Studs and accessories which are 12, 14, or 16 gage shall meet the requirements of ASTM A446, grade D with a minimum yield of 50,000 psi. Studs and accessories which are 18, 20, 22, or 25 gage shall meet the requirements of ASTM A446, grade A with a minimum yield of 33,000 psi.
- E. Ceiling and soffit systems for gypsum board shall be not less than 18-gage channels or joists with 7/8" 20-gage furring channels at 16" OC
- F. Wall furring for gypsum board shall be 25 gage 1-1/2" metal hat channels at 16" OC
- G. Metal Joists: Minimum of 18 gage at 16" OC Align directly over metal studs when bearing on a wall assembly. Minimum of 16-gage joists required at floor systems.
- H. Floor and ceiling runners shall be of same materials as studs and shall be designed to secure studs in place.

2.03 ACCESSORIES

- A. Use fasteners recommended by the stud system manufacturer's current printed instructions.
- B. Vertical deflection clips required as detailed on Drawings equal to those manufactured by Signature Industries, the Steel Network: Verticlip SL, SLB, and SLS, Verticlip SLD, and Bridge Clip.
- C. Bridging: 1-1/2-inch deep by 16 gage minimum.
- D. Strap bracing: minimum of 1-1/2-inch wide by 18 gage unless noted otherwise.

- E. Tracks: deep leg type, unpunched, same gage, size, and finish as studs with minimum 18 gage thickness.
- F. Compensation tracks / slip tracks: deep leg type with a flange width of 2 ½ inches. Track shall be same nominal depth as stud/track with allowance for slip of standard deep leg track. Minimum 14 gage.
- G. Plates, gussets, clip angles: minimum 14 gage. Clip angles shall be a minimum of 2 inches x 2 inches.

2.04 ANCHORAGE DEVICES

- A. Self-drilling, self-tapping screws: hot-dip galvanized conforming to values given in the referenced SSMA document.
- B. Powder actuated fasteners shall be manufactured from AISI 1062 or AISI 1065 steel tempered to a minimum core hardness of 50-54Rc and possess the following properties:
 - 1. Tensile strength = 270,000 psi
 - 2. Shear strength = 162,000 psi
 - 3. All fasteners shall meet the requirements of ASTM 8-633-78.
 - 4. Fasteners shall be a minimum 9/64-inch diameter.
 - 5. Fasteners shall be zinc plated.
 - 6. Fastener minimum design values shall be in accordance with manufacturer's recommendations.
- C. Expansion anchors shall be stud type and shall be zinc plated in accordance with ASTM B633, Type III Fe/Zn 5. Expansion anchors shall be a minimum of 3/8-inch diameter with 2-1/2-inch embedment into concrete unless noted otherwise on the Drawings.
- D. Welding: AWS D1.3-8 Structural Welding Code-Sheet Metal (field welding of material shall not be permitted for 20 gage material or thinner).
- E. Sizes and thicknesses are minimum acceptable, regardless of load. Actual sizes shall be determined by Steel Stud manufacturer in accordance with loads given in the Structural Notes. Minimum listed size shall not be construed to be the actual designed component size.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 ERECTION

- A. Cut members squarely for attachment to perpendicular members, or as required, for angular fit against bating members.
- B. Secure top and bottom runners at 24 inches OC. Align to configuration required.
- C. Install studs vertically at 16 inches OC and not more than 2 inches from abutting construction, each side of openings and at corners.
- D. Install studs and joists square, plumb, and level.
- E. Install components in accordance with manufacturer's installation instructions and approved Shop Drawings.
- F. Fit runners under and above openings; secure intermediate studs at spacing of wall studs.
- G. Brace stud framing system and make rigid.
- H. Coordinate erection of studs with installation of service utilities. Align stud web openings.
- I. Coordinate installation of bucks, anchors, blocking, electrical, plumbing, and mechanical work to be placed in or behind stud framing.
- J. Coordinate erection of stud system with requirements of door frame supports or attachments.
- K. Secure solid wood blocking to studs as required.
- L. Where a stud directly abuts an exterior wall, place a no. 15 asphalt felt strip between stud and wall surface.

3.03 INSTALLATION

- A. Attach studs to the flanges or web of both the upper and lower tracks.
- B. Fasten components with self-drilling screws or welds. Wire tying of components shall not be permitted. Touch-up field welds and scratched or damaged finish to studs with zinc rich paint.
- C. Splices in framing components shall not be permitted other than in runner tracks.
- D. Securely anchor runner tracks to the supporting structure.
- E. Stud manufacturer shall determine stud spacing at interior and corner zones to resist component and cladding loads given in the Structural Notes. Stud spacing shall not exceed 16 inches OC regardless of design loads.

- F. Before installing stud tracks for exterior walls, apply two 1/2- inch round beads of acoustical sealant longitudinally under stud tracks to seal runner to floor.
 - G. Install multiple studs at each side of openings as required to resist design loads.
 - 1. Install multiple studs horizontally between jambs to form sills and headers as required to resist design loads.
 - 2. On top of headers and bottom of sills, install runners to receive short studs.
 - 3. Attach wood blocking to stud framing with 1/2-inch diameter galvanized bolts 12 inches OC. Coordinate attachment of opening to blocking/stud framing prior to erection of metal stud framing.
 - H. Construct corners using a minimum of three studs designed to resist the design loads.
 - I. Install framing between studs for attachment of electrical boxes, mechanical equipment, and for other items to be anchored to walls.
 - J. At abutting walls, place studs not more than 2 inches from walls.
 - K. In all multiple jamb studs and multiple headers not accessible to insulation Contractor, install insulation equal to that specified elsewhere.
- 3.04 TOLERANCES
- A. Install members to provide surface plane with maximum variation of 1/8 inch in 10 feet in any direction.

END OF SECTION

**SECTION 055000
METAL FABRICATIONS**

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Lintels
- B. Angles and braces

1.02 RELATED SECTIONS

- A. Section 042113 Brick Masonry Units
- B. Section 054000 Metal Stud Framing System
- C. Section 061000 Rough Carpentry
- D. Section 099100 Paint
- E. Section 133413 Metal Building Systems

1.03 SUBMITTALS

- A. Submit according to requirements of Section 013300 Submittal Procedures.
- B. Shop Drawings shall be stamped by a licensed engineer.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- C. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- D. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.

1.06 REFERENCES

- A. ASTM A36 – Structural Steel
- B. ASTM A53 – Hot-Dipped, Zinc-Coated Welded and Seamless Steel Pipe
- C. AWS D1.1 – Structural Welding Code
- D. FS TT-P-31 – Paint, Oil: Iron Oxide, Ready Mix, Red and Brown

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 MATERIALS

- A. Steel Sections: ASTM A36.
- B. Bolts, Nuts, and Washers: ASTM A307.
- C. Welding Materials: AWS D1.1; type required for materials being welded.
- D. Primer: FS TT-P-31, Red, for shop application and field touch-up.

2.03 METAL FABRICATIONS

- A. Lintels
 - 1. For Openings with Clear Span of 4'-0" (Maximum): 3-1/2" x 3-1/2" x 5/16".
 - 2. For Openings with Clear Span of 6'-0"(Maximum): 4" x 3-1/2" x 5/16".
 - 3. For Openings with Clear Span of 8'-0" (Maximum): 5" x 3-1/2" x 5/16".
 - 4. Larger openings, refer to Drawings.
- B. Miscellaneous angles and bracing
 - 1. As shown on Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 FABRICATION

- A. Verify dimensions on site prior to shop fabrication.
- B. Fabricate items with joints tightly fitted and secured.
- C. Fit and shop assemble in largest practical sections, for delivery to site.
- D. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.
- F. Make exposed joints butt tight, flush, and hairline.

- G. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same materials and finish as metal fabrication, except where specifically noted otherwise. Supply sleeves as required for mounting of newel posts in concrete.

3.03 INSTALLATION

- A. Install items square, plumb, level, and accurately fitted, free from distortion or defects.
- B. Install components in accordance with approved Shop Drawings.
- C. Obtain Architect's approval prior to site cutting or making adjustments not scheduled.
- D. Clean and strip site-primed steel items to bare metal where site welding is scheduled.
- E. Perform field welding in accordance with AWS D1.1.
- F. Make provisions for erection loads with temporary bracing. Keep work in alignment.
- G. Supply items required to be cased into concrete or embedded in masonry with setting templates to appropriate sections.

3.04 FINISH

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact bond with concrete or where field welding is required.
- C. After installation, use primer to touch-up field welds, scratched or damaged surfaces.

END OF SECTION

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SECTION 061000
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Wood Framing
- B. Blocking
- C. Nailers
- D. Plywood Sheathing
- E. This work includes rough carpentry work for the building and other related items necessary to complete the Project.

1.02 RELATED SECTIONS

- A. Section 042113 Brick Masonry Units
- B. Section 054400 Metal Stud Framing System
- C. Section 072100 Thermal Insulation
- D. Section 079200 Joint Sealant
- E. Section 081113 Hollow Metal Doors and Frames
- F. Section 092900 Gypsum Board
- G. Section 102813 Restroom Accessories
- H. Section 104400 Fire Extinguishers and Cabinets
- I. Division 22 Plumbing
- J. Division 23 HVAC
- K. Division 26 Electrical

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM)
- B. American Softwood Lumber Standard (ASLS) PS20
- C. National Forest Products Association (NFPA) National Design Specification for Wood Construction.
- D. American Plywood Association. (APA)
- E. Southern Pine Inspection Bureau. (SPIB)
- F. American Wood Preservers Institutes. (AWPI)
- G. American Wood Protection Association (AWPA), Standard U1 and T1.
- H. American Wood Preservers Bureau (AWPB) Standards for Preservative Treatment and Fire-Retardant Treatment.

1.04 QUALITY ASSURANCE

- A. Framing installer shall be experienced in performing work of this section.
- B. Conduct a pre-installation meeting to verify project requirements and substrate conditions.
- C. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.05 GRADE STAMPS

- A. Rough Carpentry Lumber must show a visible grade stamp of an agency certified by NFPA.
- B. Identify plywood by species, grade, and glue type by the stamp of the APA.
- C. Omit marking from surfaces to be exposed with transparent finish or without finish.

1.06 SUBMITTALS

- A. Submit according to requirements of Section 013300 Submittal Procedures.
- B. Submit certification that the chemicals and processes used for pressure treatment comply with applicable standards.
- C. Submit Consumer Information Sheet (CIS), to communicate safe handling and disposal instructions for all treated wood products.
- D. Submit certification from the treating plant stating that the chemicals and process used, net amount of salts retained, and the moisture content after drying following treatment are in conformance with applicable standards.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Product Delivery, Storage, and Handling.
- B. Deliver the materials to the job site and store, in a safe area, out of the way of traffic, and stored up off the ground surface.
- C. Use extreme care in off-loading of lumber to prevent damage, splitting, and breaking of materials.
- D. Identify framing lumber by grade and store each grade separately from other grades.
- E. Protect materials with adequate waterproof outer wrapping.

1.08 MOCK-UPS

- A. For evaluating the quality of workmanship, install one full-sized mock-up of the specified components.

- B. Obtain Owner's and Architect's acceptance of the pattern, finish, color, texture, and workmanship standard.
- C. Provide a 4'-0" x 4'-0" sample of complete wall system using all materials for Architect's approval on site.
- D. Include at least one joint between dissimilar materials.
- E. Maintain mock-up during construction for workmanship comparison.
- F. Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
- G. The mock-up may be incorporated into final construction upon Architect's approval.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 MATERIALS

- A. Lumber
 - 1. Nominal sizes are indicated, except as shown by detailed dimension.
 - 2. Provide dressed lumber, Surfaced Four Sides (S4S), unless otherwise shown or specified.
 - 3. Provide kiln-dried lumber with 15% maximum moisture content at time of dressing.
 - 4. Southern Yellow Pine or Douglas Fir of following species and grades:
 - a. Structural Studs, Joists, Planks, Beams, Stringers and Columns: No. 2 grade, Dense, Kiln Dried, Stress Group 1800 F.
 - b. Non-Structural Light Framing: No. 2 grade, Kiln Dried, Stress Group 1500 F.
- B. Plywood
 - 1. Sheathing, Sub-Floors and Draft-Stop Hatches: APA Rated Sheathing EXT; thickness as shown on Drawings.
 - 2. Use plywood clips as required by APA for condition.
 - 3. Specialty Plywood Panels: See Specification Section 062000 Finish Carpentry.
 - 4. Telephone or Electrical Backboard: Fire retardant treated per AWWA C27; 3/4" thick; APA A-D, Exposure 1.
 - 5. Miscellaneous Backing: APA A-D, Interior or Exposure 1; thickness to suit condition or as shown on Drawings.

- C. Wall Sheathing: 1/2" exterior plywood or 1/2" exterior gypsum board.

2.03 WOOD TREATMENT

- A. Lumber and plywood shall be pressure-preservative treated and dried after treatment in accordance with AWWPA.
- B. Each piece shall bear the mark of an independent agency or inspection service certified to inspect treated materials.
- C. Wood Preservative: Copper Azole (CA-C) or Alkaline Copper Quaternary (AC-Q).
- D. AWWPA UC3B, Kiln Dried after treatment, for above ground application, decking, railing, and fencing.
- E. AWWPA UC4B, Kiln Dried after treatment, for burial, ground contact, sill plates, or freshwater immersion.
- F. Horizontal wood members with any part placed less than 24" from finished grade or in contact with concrete or masonry shall be pressure treated.
- G. All wood nailing blocks and strips for securing flashing and roofing shall be pressure treated.
- H. Where treated lumber or plywood is cut or drilled after treatment, the treated surface shall be field treated with copper naphthenate by repeated brushing, dipping, or soaking until the wood cannot absorb more preservative.
 - 1. Concentration shall contain not less than 2-percent copper metal,

2.04 FASTENERS

- A. Provide all anchors, nails, inserts, blocking, and other carpentry items.
- B. Provide size and type to suit application or as shown on Drawings.
- C. Use plain finish for interior locations.
- D. Use hot-dipped galvanized nails and screws at exterior and at pressure treated wood.
- E. Use zinc-plated anchor bolts, toggle bolts, nuts, washers, and other anchors for anchorage to concrete and masonry.
- F. Nails, Spikes and Staples
 - 1. Federal Specification FF-N-105B; use Common nails except as otherwise indicated.
- G. Wood Screws
 - 1. Federal Specification FF-S-111D.
- H. Bolts, Nuts, Washers, Lags, Pins, and Screws
 - 1. Bolts and Studs: Federal Specification FF-B-584.
 - 2. Nuts: Federal Specification FF-N-836.
 - 3. Washers: Federal Specification FF-W-92.

4. Lag Screws/Bolts: Federal Specification FF-B-561.
 5. Machine Bolts: ASTM A307.
 6. Medium carbon steel sized to suit application.
- I. Foundation Anchorage
1. All wood sill plates shall be anchored to the foundation with minimum 1/2-inch diameter (12.7 mm) anchor bolts spaced not greater than 48-inches (1829 mm) on center or as shown on Drawings.
 2. Imbed not less than 7" deep into concrete or grouted cells of concrete masonry.
 3. Fasten nut and washer on each bolt.
 4. Not fewer than 2 bolts per plate or as shown on Drawings.
 5. Not less than 12" from end of wall or as shown on Drawings.
 6. Use expansion shields and lag bolts for anchorage to steel.
 7. Fasten interior wall plates to concrete slabs using power driven Ramset anchors at 48" o.c. maximum spacing (at least 2 anchors in each plate run).
 8. Sill Seal: Owens Corning Foam Seal or Dow Sill Seal.
- J. Special Anchors
1. Toggle bolts, expansion shields, and lag bolts, power activated of size and type to suit application.
 2. Tapcon masonry anchors are acceptable for non-load-bearing walls, if installed per manufacturer recommendations.
- K. Joist and Beam Hangers
1. Simpson Strong Tie or equal
 2. Galvanized
 3. Type to suit application.
- L. Hurricane Anchors
1. Simpson Strong Tie or equal
 2. 18 gauge
 3. Galvanized
 4. Type to suit application.
 5. See Drawings for required locations.
 6. Install to manufacturer recommendations for conditions encountered.
- M. Miscellaneous Steel Items
1. Comply with ASTM A36.
 2. Bar or Strap Anchors: ASTM A575 carbon steel bars.
 3. Use galvanized at exterior locations.
- N. Construction Adhesive

1. Liquid Nails
2. Or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.
- B. Examine the areas and conditions under which work of the Section will be performed.
 1. Correct conditions detrimental to timely and proper completion o immunity is of the Work.
 2. Do not proceed until unsatisfactory conditions are corrected.

3.02 ERECTION

- A. Carefully select the lumber members.
- B. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing and will allow proper connections.
- C. Cut out and discard defects which render a piece unable to serve its intended function.
- D. Lumber may be rejected by Architect for excessive warp, twist, bow, crook, mildew, fungus, mold, or for improper cutting and fitting.
- E. Make joints perfectly square or appropriately mitered.
- F. Produce joints which are tight, true, and well nailed with members assembled in accordance with the Drawings.
- G. Do not shim framing components.

3.03 FRAMING

- A. Install framing square, plumb, and level.
- B. Set horizontal and sloped members with crown up.
- C. Space members at 16 inches on center or as indicated on Drawings.
- D. Construct members of continuous pieces from the longest possible lengths.
- E. Remove split members and replace with members complying with the specified requirements.

3.04 BEARINGS

- A. Make bearings full unless otherwise indicated on the Drawings.
- B. Make sure that bearing surfaces provide sure and even support when structural members rest on them.
- C. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.

3.05 NAILING

- A. Use only common wire nails or spikes sized to suit conditions, except where otherwise specifically noted on the Drawings.
- B. Nail without splitting the wood.
- C. Use galvanized fasteners with treated wood and at exterior locations.
- D. Pre-bore holes as required.

3.06 BOLTING

- A. Drill holes 1/16" larger in diameter than the bolts being used.
- B. Drill straight and true from one side only.
- C. Do not bear bolt threads on wood.
- D. Use washers under head and nut where both bear on wood.
- E. Use washers under all nuts.

3.07 SCREWS

- A. For lag screws and wood screws, prepare holes the same diameter as root of threads, enlarging holes to shank diameter for length of shank.

3.08 FURRING AND STRIPPING

- A. Erect wood stripping and nailing members true to lines and levels.
- B. Do not deviate from true alignment more than 1/4 inch.

3.09 CUTTING AND FITTING

- A. Cut and fit carpentry elements accurately to achieve tight joints and alignment as indicated in the Drawings.
- B. Do not notch, cut, or bore members for pipes, ducts, conduits, or for other reasons except as shown on the Drawings or as specifically approved in advance by the Architect.
- C. Refer to Section 017300 Execution for guidelines on notching and boring of studs and joists.

3.10 WOOD BLOCKING

- A. Install solid wood blocking and backing required for the work of other trades.
- B. Install solid wood blocking for toilet compartments. Refer to Section 102117 for mounting heights of toilet compartments.
- C. Install solid wood blocking for restroom accessories. Refer to section 102813 for mounting heights.
- D. Install solid wood blocking as required for secure mounting of utility shelving, and fire extinguisher cabinets.

- E. Install solid wood blocking as required for secure mounting of the equipment of Division 21, Division 22, Division 23, Division 26, Division 27,

3.11 INSPECTION

- A. Prior to proceeding with subsequent construction activities, inspect rough carpentry work for compliance with Drawings.

3.12 PROTECTION

- A. Protect materials from damage during remainder of construction period.
- B. Protect rough carpentry from water, moisture, and other environmental factors during and after construction.
- C. Cover exposed wood surfaces with suitable waterproofing materials if construction is left unfinished for an extended period

3.13 CLEANING

- A. Remove all debris and waste materials from the site.
- B. Leave the site broom-clean at the end of each workday.

END OF SECTION

SECTION 071113
BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation
- B. Application of a solvent type liquid applied dampproofing membrane.

1.02 RELATED SECTIONS

- A. Section 033000 Cast-in-Place Concrete.
- B. Section 042113 Brick Masonry Units
- C. Section 042200 Concrete Masonry Units
- D. Section 133413 Metal Building Systems

1.03 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
- B. Submit the following:
 - 1. Manufacturer's specifications, product data, and quantities.
 - 2. Manufacturer's installation instructions.
 - 3. Material Safety Data Sheets

1.04 REFERENCES

- A. Spray-on or Brush-on dampproofing coating
 - 1. ASTM D4479-00 - Standard Specification for Asphalt Roof Coatings - Asbestos-Free.
- B. Trowel applied dampproofing coating
 - 1. ASTM D4586-00 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

1.05 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this Section who has specialized in installation of work similar to that required for this project.
- C. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- D. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Product Delivery, Storage, and Handling.
- B. Store at temperatures of 40°F (5°C) and above to facilitate handling.
- C. Do not store at temperatures above 90°F (32°C) for extended periods.
- D. Keep away from sparks and flames.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Do not apply membrane when air or surface temperatures are below 35°F (2°C).
- C. Do not apply to frozen concrete.
- D. Do not apply when rain is imminent.

1.08 MOCK-UPS

- A. For the purpose of evaluating the quality of workmanship, install one full-sized mock-up of the specified components.
- B. Provide a 4'-0" x 4'-0" sample of complete wall system using all materials.
- C. Obtain Architect's acceptance of the pattern, finish, color, texture, and workmanship standard.
- D. Maintain mock-up during construction for workmanship comparison.
- E. Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
- F. The mock-up may be incorporated into final construction upon Owner's approval.

1.09 WARRANTY

- A. Prior to acceptance of waterproofing work, furnish a written guarantee for two (2) years which ensures complete watertight condition.
- B. Guarantee that any repairs required to ensure complete watertight condition be executed at no expense to the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. W.R. Meadows, Inc.
- B. Or approved equal, including products by Sonneborn, Karnak, and Euclid.
- C. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 MATERIALS

- A. Spray applied solvent dampproofing
 - 1. An asbestos-free, non-fibred asphalt compound that meets the U.S. EPA Architectural Coatings Rule requirements for VOC content.
 - 2. Equal to Spray-Mastic by W.R. Meadows.
- B. Brush applied solvent dampproofing
 - 1. An asbestos-free, fibred, asphalt compound that meets the U.S. EPA Architectural Coatings Rule requirements for VOC content.
 - 2. Equal to Semi-Mastic by W.R. Meadows.
- C. Trowel applied solvent dampproofing
 - 1. Heavy bodied, asbestos-free fibred, asphalt compound that meets the U.S. EPA Architectural Coatings Rule requirements for VOC content.
 - 2. Equal to Trowel-Mastic by W.R. Meadows.

2.03 ACCESSORIES

- A. Waterproofing Protection Course: Protection Course.
- B. Rolled Matrix Drainage System: Mel-Drain™ Rolled Matrix Drainage System.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.
- B. Allow masonry walls to cure a minimum of seven calendar days prior to application. Walls must be dry and free of protrusions.
- C. Inspect walls to ensure that all proposed penetrations of walls have been completed prior to initializing the dampproofing work.

3.02 SURFACE PREPARATION

- A. Protect adjacent surfaces not designated to receive dampproofing.
- B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- C. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- D. Concrete surfaces must be clean, smooth and free of standing water.
- E. Patch all holes and voids and smooth out any surface misalignments.

3.03 INSTALLATION

- A. Install components in accordance with manufacturer's installation instructions.

- B. Spray, brush or trowel apply dampproofing on cured and dry substrate to a thickness of 1/16". Two coats required if utilizing spray system.
- C. Insure the dampproofing and rigid insulation are compatible.

3.04 APPLICATION

- A. Apply dampproofing in accordance with manufacturer's instructions.
- B. Ensure accessory materials are compatible with membrane and approved by membrane manufacturer.

3.05 PROTECTION

- A. Protect membrane on vertical and horizontal applications with immediate application of protection course, if no drainage system is used, or rolled matrix drainage system.
- B. Backfill within 24-48 hours using care to avoid damaging the dampproofing.

END OF SECTION

SECTION 072100
THERMAL INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Vinyl faced fiberglass batt thermal insulation above ceilings of all heated/cooled spaces.
- B. Fiberglass batt thermal insulation at all exterior stud walls.
- C. Fiberglass sound batt acoustical insulation at all new interior partition walls.
- D. Rigid insulation at all masonry veneer walls and exterior stud walls.

1.02 RELATED SECTIONS

- A. Section 042113 Brick Masonry Units
- B. Section 042200 Concrete Masonry Units
- C. Section 054000 Metal Stud Framing System
- D. Section 061000 Rough Carpentry
- E. Section 071113 Bituminous Dampproofing
- F. Section 079200 Joint Sealant
- G. Section 092226 Metal Ceiling Suspension System
- H. Section 092900 Gypsum Board

1.03 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the installation of the specified product and shall have access to all manufacturers' required specifications, technical, installation and maintenance related documents.
- B. Installer shall be experienced in performing work of this section which specializes in installation of work similar to that required for this project.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.

1.06 QUALITY ASSURANCE

- A. Insulation must be UL certified to have a flame spread of 25 or less.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Owens Corning
- B. Johns Manville
- C. Or approved equal
- D. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 MATERIALS

- A. Roof Thermal Insulation: vinyl faced fiberglass batt insulation, R-30 equal to Owens-Corning.
- B. Exterior wall Thermal Insulation: Fiberglass batt insulation, Kraft faced, R-11, equal to Owens-Corning at all 3-5/8" exterior stud walls, and R-19 at all 6" exterior stud walls.
- C. Masonry cavity wall insulation: 1" rigid foil faced polyisocyanurate R-7.2. Equal to Celotex (Thermax), Temple-Eastes (Tempo), or R-Max.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.
- B. Verify adjacent materials are dry and ready to receive insulation.
- C. Verify Mechanical and Electrical services within plenum have been installed and tested.
- D. Ensure that dampproofing and rigid insulation are compatible.

3.02 INSTALLATION

- A. Install fiberglass insulation in accordance with manufacturer's instructions.
- B. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
- C. Take special care to ensure that plane of insulation is continuous; leave no gaps or voids.

END OF SECTION

SECTION 072500
WEATHER BARRIER

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Weather barrier membrane
- B. Seam Tape
- C. Flashing
- D. Fasteners

1.02 RELATED SECTIONS

- A. Section 054400 Metal Stud Framing System
- B. Section 061000 Rough Carpentry
- C. Section 072100 Thermal Insulation
- D. Section 081113 Hollow Metal Doors and Frames

1.03 REFERENCES

- A. ASTM International
 - 1. ASTM C 920; Standard Specification for Elastomeric Joint Sealants
 - 2. ASTM C 1193; Standard Guide for Use of Joint Sealants
 - 3. ASTM D 882; Test Method for Tensile Properties of Thin Plastic Sheeting
 - 4. ASTM D 1117; Standard Guide for Evaluating Non-woven Fabrics
 - 5. ASTM E 84; Test Method for Surface Burning Characteristics of Building Materials
 - 6. ASTM E 96; Test Method for Water Vapor Transmission of Materials
 - 7. ASTM E 1677; Specification for Air Retarder Material or System for Framed Building Walls
 - 8. ASTM E2178; Test Method for Air Permeance of Building Materials
 - 9. ASTM E2357; Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this Section who has specialized in installation of work like that required for this project.
- C. Installer shall have access to all manufacturer's required specifications, technical, installation and maintenance related documents.

- D. Provide each component from a single manufacturer, including recommended tape, flashing, sealants, and fasteners.

1.05 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 016500 Product Delivery, Storage, and Handling.

1.07 MOCK-UPS

- A. For evaluating the quality of workmanship, install one full-sized mock-up of the specified components.
- B. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape, and related accessories per manufacturer's current printed instructions and recommendations.
 - 1. Mock-up Substrate: Match wall assembly construction, including window opening.
- C. Obtain Owner's and Architect's acceptance of the workmanship standard.
- D. Provide a 4'-0" wide x full height sample of complete wall system using all materials for Architect's approval on site.
- E. Include at least one joint between dissimilar materials.
- F. Maintain mock-up during construction for workmanship comparison.
- G. Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
- H. The mock-up may be incorporated into final construction upon Owner's approval.

1.08 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers, and flashings to provide a weather-tight barrier assembly.
- B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

1.09 WARRANTY

- A. Refer to Section 017836 Warranty
- B. Special Warranty
 - 1. Weather barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of purchase.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. DuPont
4417 Lancaster Pike
Chestnut Run Plaza 728
Wilmington, DE 19805
1-800-44-TYVEK (1-800-448-9835)
<http://www.construction.tyvek.com>
- B. Or approved equal
- C. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 MATERIALS

- A. Spunbonded polyolefin, non-woven, non-perforated, weather barrier
- B. Basis of Design: DuPont Tyvek Commercial Wrap and related assembly components.
- C. Performance Characteristics:
 - 1. Air Penetration: 0.001 cfm/ft² at 75 Pa when tested in accordance with ASTM E2178. Type 1 when tested in accordance with ASTM E1677. ≤ 0.04 cfm/ft @ 75 Pa when tested in accordance with ASTM E2357.
 - 2. Water Vapor Transmission: 30 perms, when tested in accordance with ASTM E96, Method B.
 - 3. Water Penetration Resistance: 235 cm when tested in accordance with AATCC Test Method 127.
 - 4. Basis Weight: 2.4 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 - 5. Air Infiltration Resistance: Air infiltration at >750 seconds, when tested in accordance with TAPPI Test Method T-460.
 - 6. Tensile Strength: 33/41 lbs/in., when tested in accordance with ASTM D822, Method A.
 - 7. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 15, Smoke Developed: 25.

2.03 ACCESSORIES

- A. Seam Tape: 3" DuPont™ Tyvek® Tape as distributed by DuPont.
- B. Fasteners
 - 1. Steel Frame Construction: DuPont Tyvek Wrap Cap Screws: 1-5/8-inch rust resistant screw with 2-inch diameter plastic cap fasteners.
 - 2. Wood Frame Construction: DuPont Tyvek Wrap Caps:
 - a. #4 nails with large 1-inch plastic cap fasteners

- b. 1-inch minimum plastic cap staple with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.
 - 3. Masonry Construction: Masonry tap-con fasteners with DuPont Tyvek Wrap Caps: 2-inch diameter plastic cap fasteners.
 - C. Sealants
 - 1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
 - 2. Products:
 - a. DuPont Commercial Sealant.
 - b. DuPont Residential Sealant
 - D. Adhesives
 - 1. Provide adhesive recommended by weather barrier manufacturer.
 - 2. Products:
 - a. Liquid Nails® LN-109
 - b. Denso Butyl Liquid
 - c. 3M High Strength 90
 - d. Adhesives recommend by the weather barrier manufacturer.
 - E. Primers
 - 1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
 - 2. Products:
 - a. 3M High Strength 90
 - b. Denso Butyl Spray
 - c. Permagrip 105
 - d. Primers recommended by the flashing manufacturer
 - F. Flashing
 - 1. DuPont FlexWrap: Flexible membrane flashing materials for window openings and penetrations.
 - 2. DuPont FlexWrap NF: Flexible membrane flashing materials for window openings and penetrations.
 - 3. DuPont StraightFlash Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.
 - 4. DuPont StraightFlash VF: Dual-sided flashing membrane materials for brick mold and non-flanged windows and doors.
 - 5. DuPont Thru-Wall Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.

6. Preformed Inside and Outside Corners and End Dams as distributed by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

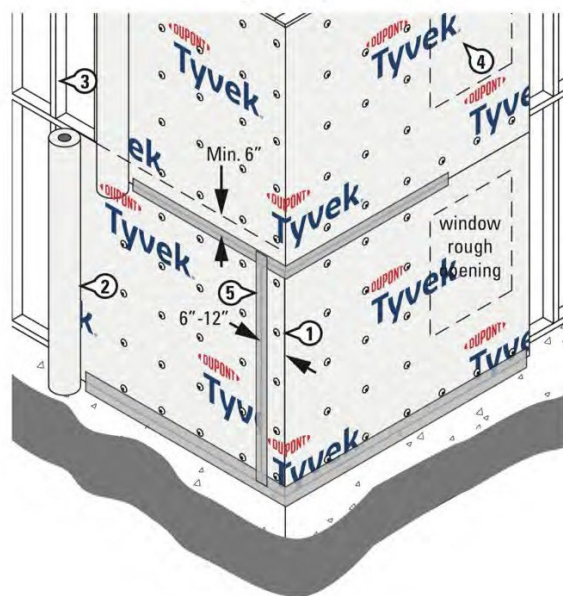
PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 INSTALLATION

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level
- E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- F. Window and Door Openings: Extend weather barrier completely over openings.
- G. Overlap weather barrier
 1. Exterior corners: minimum 12 inches.
 2. Seams: minimum 6 inches.



H. Weather Barrier Attachment:

1. (Steel or Wood Frame Construction) Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6 -18 inches vertically on center along stud line, and 24 inches on center, maximum horizontally.
2. (Masonry Construction) Attach weather barrier to masonry. Secure using weather barrier manufacturer recommend fasteners, space 6-18 inches vertically on center and 24 inches maximum horizontally. Weather barrier may be temporarily attached to masonry using recommended adhesive, placed in vertical strips spaced 24 inches on center, when coordinated on the project site.
3. Apply 4 inch by 7-inch piece of DuPont StraightFlash or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

3.03 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by weather barrier manufacturer.
- C. Refer to image below:

3.04 OPENING PREPARATION (FOR NON-FLANGED WINDOWS)

- A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

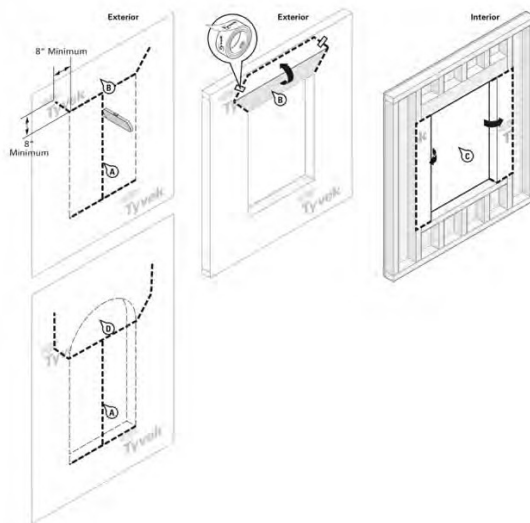
3.05 FLASHING (FOR NON-FLANGED WINDOWS)

- A. Cut 9-inch-wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanically fastening DuPont™ FlexWrap™ NF is not required.
- D. Apply 9-inch-wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start StraightFlash™ at head of opening and lap sill flashing down to the sill.
- E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.

- F. Install DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
- G. Coordinate flashing with window installation.
- H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.
 - 1. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- I. Tape top of window in accordance with manufacturer recommendations.
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.06 OPENING PREPARATION (FOR FLANGED WINDOWS)

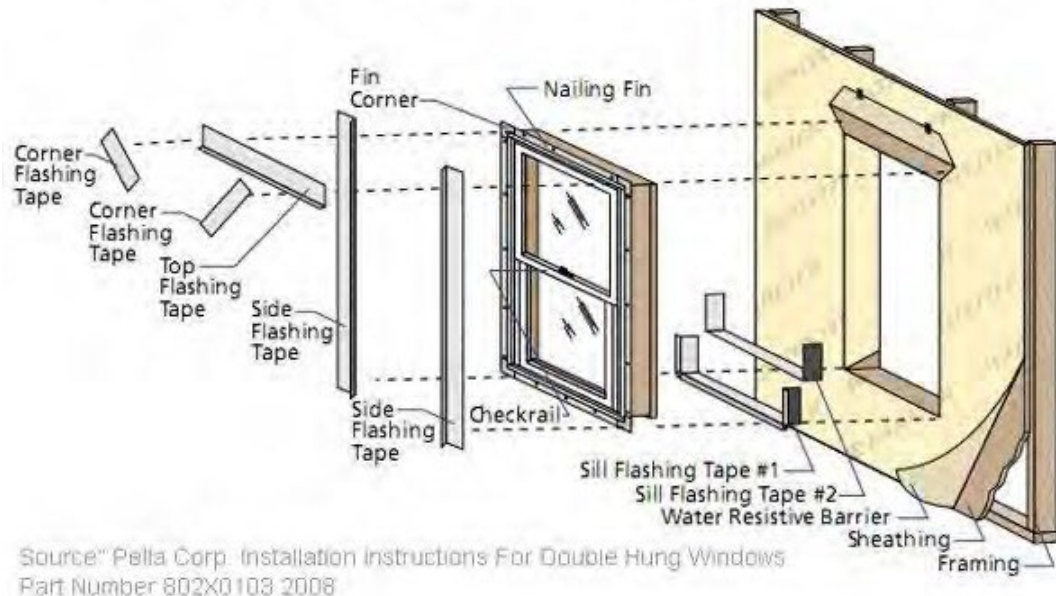
- A. Cut weather barrier in an “-cut” pattern. A modified “-cut” is also acceptable.
 - 1. Cut weather barrier horizontally along the bottom and top of window opening.
 - 2. From top center of the window opening, cut weather barrier vertically down to the sill.
 - 3. Fold side and bottom weather barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.



3.07 FLASHING (FOR FLANGED WINDOWS)

- A. Cut 9-inch-wide DuPont FlexWrap or DuPont FlexWrap NF a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont FlexWrap or DuPont FlexWrap NF edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont FlexWrap at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanically fastening is not required for DuPont FlexWrap NF.
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.

Flashing Sequence - Typical Wood Frame Construction



- E. Install window according to manufacturer's instructions.
- F. Apply 4-inch-wide strips of DuPont StraightFlash at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch-wide strip of DuPont StraightFlash as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
- H. Position weather barrier head flap across head flashing. Adhere using 4-inch-wide DuPont StraightFlash over the 45-degree seams.
- I. Tape head flap in accordance with manufacturer recommendations

- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.08 THRU-WALL FLASHING INSTALLATION

- A. Apply primer per manufacturer's written instructions.
- B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
- E. Roll flashing into place. Ensure continuous and direct contact with substrate.
- F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
- G. Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer's written instructions.
- H. Terminate membrane on vertical wall. Terminate into reglet, counterflashing or with termination bar.
- I. Apply sealant bead at each termination.

3.09 THRU-WALL FLASHING / INTERFACE AT BASE OF WALL

- A. Overlap thru-wall flashing with weather barrier by 6-inches.
- B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
- C. Seal vertical and horizontal seams with tape or sealing membrane.

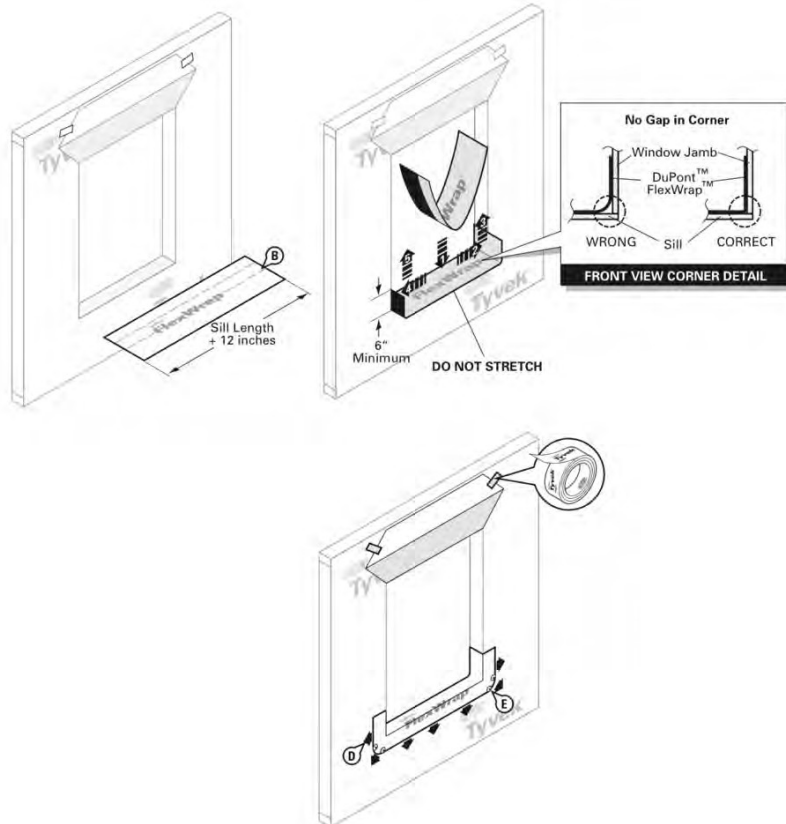
3.10 THRU-WALL FLASHING / INTERFACE AT SHELF ANGLE

- A. Seal weather barrier to bottom of shelf angle with sealing membrane.
- B. Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.
- C. Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

3.11 THRU-WALL FLASHING / INTERFACE AT WINDOW HEAD

- A. Cut flap in weather barrier at window head.
- B. Prime exposed sheathing.
- C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.

- D. Install end dams bedded in sealant.
- E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.
- F. Apply sealant along thru-wall flashing edges.
- G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
- H. Tape diagonal cuts of weather barrier.



- I. Secure weather barrier flap with fasteners.

3.12 PROTECTION

- A. Protect installed weather barrier from damage.

END OF SECTION

SECTION 074113
METAL ROOF PANELS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Exposed fastener metal roof panels, with related metal trim and accessories.
- B. Metal roof panels, panel attachments, sealants, mastics, trim, and flashings.
 - 1. Eave gutters.
 - 2. Multi-gutters and valley gutters.
 - 3. Roof curbs.
- C. Gutters, downspouts, accessories, and trim

1.02 RELATED SECTIONS

- A. Section 054400 Metal Stud Framing System
- B. Section 061000 Rough Carpentry
- C. Section 099100 Paint
- D. Section 133419 Metal Building System

1.03 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product with a minimum of 5 years experience manufacturing similar products.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work like that required for this project with a minimum of 2 years experience installing similar products.
- C. Installer shall be approved, authorized, or licensed by metal panel system manufacturer to install manufacturer's product.
- D. Installer shall have access to all manufacturer's required specifications, technical, installation and maintenance related documents.
- E. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching, and leveling compounds.
- F. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.

1.04 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.

- B. Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - 1. Product data, including certified independent test data indicating compliance with requirements.
 - 2. Samples of each component.
 - 3. Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.
 - 4. Sample warranty.
 - 5. IAS AC 472 certificate.
- C. Shop Drawings
 - 1. Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building.
 - 2. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, roof accessories, lightning arresting equipment, and special details.
 - 3. Make distinctions between factory and field assembled work.
 - 4. Indicate points of supporting structure that must coordinate with metal panel system installation.
 - 5. Include data indicating compliance with performance requirements.
- D. For each exposed product specified, provide representative color charts of manufacturer's full range of colors.
- E. Provide 12-inch (305 mm) long section of each metal panel profile.
- F. Provide a sample copy of manufacturer's standard warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.
- B. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, or deterioration of components or other damage. Protect panels and trim bundles during shipping.
- C. Deliver, unload, store, and erect metal panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
- D. Store in accordance with Manufacturer's written instructions.
- E. Provide wood collars for stacking and handling in the field.

1.06 COORDINATION

- A. Coordinate sizes, profiles, and locations of roof curbs and other roof-mounted equipment and roof penetrations, based upon sizes of actual selected equipment.

1.07 WARRANTY

- A. Furnish a twenty (20) year roofing system warranty.
 - 1. This warranty shall provide up to one full replacement of the roof, including material and labor.
 - 2. The warranty shall include all roofing components consisting of, but not limited to, roof panels, anchoring devices, insulation, metal flashing, gutters, roof penetration flashing, roof curbs, plumbing vent flashing, and all other roof items furnished by the metal roof manufacturer, starting on the date of Substantial Completion
- B. Furnish a twenty (20) year roof panel finish warranty as follows
 - 1. Will not chalk (gradual erosion of film) more than ASTM-D-659 Number 8 rating for a period of twenty 20-years from the date of Substantial Completion.
 - 2. Will not fade more than 5 NBS units when measured in accordance with the standard procedure specified in ASTM-D-2244-94 for a period of twenty (20) years.
 - 3. Will not noticeably crack, check, blister, or peel for a period of twenty 20-years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. MBCI Metal Roof and Wall Systems
- B. Or approved equal.
- C. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 PERFORMANCE REQUIREMENTS

- A. Provide metal roof and wall panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility.
- B. Allow for thermal movements from variations in both ambient and internal temperatures.
 - 1. Accommodate movement of support structure caused by thermal expansion and contraction.
 - 2. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.
- C. Radiative Property Performance:
 - 1. **Solar Reflectance Index:** Minimum 78 for roof slopes of 2:12 or less and 29 for roof slopes greater than 2:12 under medium wind conditions, per ASTM E 1980.
 - 2. **Energy Star Qualified:** Listed on USDoE ENERGY STAR Roof Products Qualified Product List.

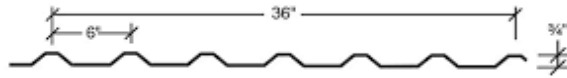
- D. Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:
 - 1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
 - 2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/120 of the span with no evidence of failure.
- E. Wind Uplift Resistance: Comply with UL 580
 - 1. Wind-uplift class UL-90

2.03 METAL PANEL MATERIALS

- A. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, structural quality, Grade 50

2.04 ROOF PANEL PROFILE

- A. Structural metal roof panel consisting of formed metal sheet with trapezoidal ribs, installed by lapping edges of adjacent panels.
- B. Equal to MBCI, PBU Panel.



- C. Coverage Width: 36 inches.
- D. Continuous Rib Spacing: 6" on center.
- E. Rib Height: 3/4".
- F. Nominal Coated Thickness:
 - 1. 24 gauge.

2.05 ACCESSORIES

- A. Provide complete metal roof panel assembly incorporating ridge, eave, rake, valley, and parapet trims, copings, fascias, gutters and downspouts, and miscellaneous flashings.

- B. Provide required fasteners, closure strips, support plates, and sealants as indicated in manufacturer's written instructions.
- C. Flashing and Trim shall match the material, thickness, and finish of metal panel face sheet.
- D. Use long life exposed fasteners with EPDM or neoprene gaskets as recommended by roof panel manufacturer.
 - 1. Heads shall match the color of metal panels by means of factory-applied coating.
- E. Use manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:
 - 1. Tape Sealers: non-curing butyl tape, AAMA 809.2.
 - 2. Concealed Joint Sealants: Non-curing butyl, AAMA 809.2.
 - 3. Exposed Joint Sealants: Urethane, single component, ASTM C 920.
- F. Meet the requirements for UL Class 90 wind uplift.

2.06 FLASHING & TRIM

- A. Match roof panel material in finish, thickness, texture, and metal composition.
- B. Trim shall be provided at eave, ridge, rake, and wherever necessary to ensure a properly constructed building.
- C. All exposed trim and flashing material shall be manufactured from galvanized or Galvalume steel strip.

2.07 GUTTERS AND DOWNSPOUTS

- A. Match roof panel material in finish, thickness, texture, and metal composition.
- B. 6" width x 8" height standard continuous gutter as indicated on Drawings.
- C. 5-inch round standard downspouts as indicated on Drawings
- D. 26-gauge prefinished metal downspout straps. Strap quantity as per manufacturer's recommendations.
- E. Color as selected by Architect.

2.08 ROOF PENETRATIONS

- A. Notify Architect prior to installation of any penetrations.
- B. Verify type and size of all roof penetrations with Divisions 22, 23, and 26.
- C. All roof penetrations shall be made and installed by The Metal Building Systems contractor.
- D. Round pipe

1. Plumbing stacks, electrical conduits, and flue pipes shall be flashed with EPDM or Neoprene compression molded rubber with 1" wide corrosion resistant flexible aluminum base.
 - a. The base flange shall be incorporated with a pleated expansion joint. Set in sealant and use non-corrosive fasteners.
2. Metal Building Systems Sub-contractor shall coordinate with other trades. Provide and install flashing for each condition encountered.
3. Install flashing in flat portion of panels. Consult with Architect if penetration size exceeds spacing of ribs.
4. Install so as not to block the flow of water.
5. Review each proposed penetration detail with Architect prior to cutting roof.
6. Flashing shall be equal to Deck-Mate by Portals Plus or Dektite.

E. Curbs

1. Attic fans, exhaust fans, and mechanical equipment shall be installed on pre-manufactured 24-gauge aluminum-zinc alloy roof curbs.
 - a. Color and finish shall match roof panels.
2. Metal Building Systems manufacturer shall coordinate with other trades to determine each condition which will be encountered.
3. Roof curbs shall be furnished by the trade which is providing and installing the equipment.
 - a. Roof curbs shall be installed by the Metal Building System contractor.
4. Install roof curbs under the roof panels on the up-slope end and over the panels at the down-slope end.
5. Provide additional sub-framing at areas receiving roof curbs. Install with triple bead tape sealer, sealant, and cinch straps.
6. Review each proposed penetration detail with Architect prior to cutting roof.
7. Roof curbs shall be equal to Custom Curbs or LM Curbs.
8. Install crickets if curbs are wider than 24".

2.09 SEALANTS

- A. Mastic for sidelaps, endlaps, and flashing shall be an isobutylene tripolymer rubber pressure sensitive tape mastic.
- B. Tape mastic for sidelaps shall be 3/32" thick by 1/2" wide
- C. Tape mastic for endlaps shall be 3/16" thick by 3/4" wide.
- D. At trim and flashing endlaps, use non-hardening elastomeric tube sealants.

2.10 CLOSURES

- A. Use closed cell polyethylene foam end closures to match the panel configuration.
- B. Provide closures at eave of all roof panels.

2.11 FINISH

- A. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- B. Panel Surface
 - 1. Smooth
- C. Exterior Finish
 - 1. Fluoropolymer Two-Coat System
 - a. 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 621.
 - b. Basis of Design: MBCI, Signature 300.
 - c. Equal to Kynar 500 or Hylar 500.
- D. Interior Finish
 - 1. 0.5 mil total dry film thickness consisting of primer coat and wash coat of manufacturer's standard light-colored acrylic or polyester backer finish.
- E. Color as selected by Architect from manufacturer's entire color line.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.
- B. Examine metal panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.
 - 1. Inspect metal panel support substrate to determine if support components are installed as indicated on approved Shop Drawings.
 - 2. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
 - 3. Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following:
 - a. 1/4 inch (6 mm) in 20 foot (6.1 m) in any direction.
 - b. 3/8 inch (9 mm) over any single roof plane.
- C. Correct out-of-tolerance work and other deficient conditions prior to proceeding with metal roof panel system installation.

3.02 PREPARATION

- A. Install sub-framing, girts, furring, and other miscellaneous panel support members according to ASTM C754 and manufacturer's written instructions.

3.03 FABRICATION

- A. Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Form panels in continuous lengths for full length of detailed runs, except where otherwise indicated on approved Shop Drawings.
- C. Fabricate flashing and trim to comply with manufacturer's written instructions, approved Shop Drawings, and Project Drawings.
 - 1. Form from materials matching metal panel substrate and finish.

3.04 INSTALLATION

- A. Install items square, plumb, and level.
- B. Install components in accordance with manufacturer's installation instructions and approved Shop Drawings.

3.05 METAL PANEL INSTALLATION

- A. Install weathertight metal panel system in accordance with manufacturer's written instructions, approved Shop Drawings, and Project Drawings.
- B. Install metal roof panels in orientation, sizes, and locations indicated, free of waves, warps, buckles, fastening stresses, and distortions.
- C. Anchor panels and other components securely in place.
- D. Provide for thermal and structural movement.
- E. Install manufacturer's recommended tape sealant at panel sidelaps and endlaps.
- F. Attach panels to supports using screws, fasteners, and sealants recommended by manufacturer and indicated on approved Shop Drawings.
- G. Fasten metal panels to supports at each location indicated on approved Shop Drawings, with spacing and fasteners recommended by manufacturer.
- H. Provide weatherproof jacks for pipe and conduit penetrating metal panels of types recommended by manufacturer.
- I. Treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

3.06 ACCESSORY INSTALLATION

- A. Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting.
- B. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
- C. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
- D. Set units true to line and level as indicated.
- E. Install work with laps, joints, and seams that will be permanently weather resistant.
- F. Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.

3.07 CLEANING

- A. Remove temporary protective films immediately in accordance with metal roof panel manufacturer's instructions.
- B. Clean finished surfaces as recommended by metal roof panel manufacturer.

3.08 PROTECTION

- A. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION

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SECTION 074213
METAL WALL PANELS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Exposed fastener metal wall panels, with related metal trim and accessories.

1.02 RELATED SECTIONS

- A. Section 054400 Metal Stud Framing System
- B. Section 061000 Rough Carpentry
- C. Section 074293 Metal Soffit Panels
- D. Section 099100 Paint
- E. Section 133419 Metal Building Systems

1.03 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product with a minimum of 5 years experience manufacturing similar products.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work like that required for this project with a minimum of 2 years experience installing similar products.
- C. Installer shall be approved, authorized, or licensed by metal panel system manufacturer to install manufacturer's product.
- D. Installer shall have access to all manufacturer's required specifications, technical, installation and maintenance related documents.
- E. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching, and leveling compounds.
- F. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.

1.04 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
- B. Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - 1. Product data, including certified independent test data indicating compliance with requirements.
 - 2. Samples of each component.

3. Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.
 4. Sample warranty.
 5. IAS AC 472 certificate.
- C. Shop Drawings
1. Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building.
 2. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, accessories, and special details.
 3. Make distinctions between factory and field assembled work.
 4. Indicate points of supporting structure that must coordinate with metal panel system installation.
- D. For each exposed product specified, provide representative color charts of manufacturer's full range of colors.
- E. Provide 12-inch (305 mm) long section of each metal panel profile.
- F. Provide a sample copy of manufacturer's standard warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.
- B. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, or deterioration of components or other damage. Protect panels and trim bundles during shipping.
- C. Deliver, unload, store, and erect metal panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
- D. Store in accordance with Manufacturer's written instructions.
- E. Provide wood collars for stacking and handling in the field.

1.06 WARRANTY

- A. Provide manufacturer's warranty against defects in material and workmanship for a period of one year beginning on Date of Substantial Completion.
- B. Special Panel Finish Warranty in which Manufacturer agrees to repair or replace metal panels that evidence deterioration of factory-applied finish within 25 years from date of Substantial Completion, including:
 1. Fluoropolymer Two-Coat System:
 - a. Failure of adhesion, peeling, checking, or cracking.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. MBCI MetalWall Systems
- B. Or approved equal.
- C. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 PERFORMANCE REQUIREMENTS

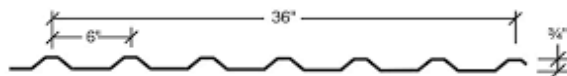
- A. Provide metal wall panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility.
- B. Allow for thermal movements from variations in both ambient and internal temperatures.
 - 1. Accommodate movement of support structure caused by thermal expansion and contraction.
 - 2. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.
- C. Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:
 - 1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
 - 2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/120 of the span with no evidence of failure.
- D. Wind Uplift Resistance: Comply with UL 580
 - 1. Wind-uplift class UL-90

2.03 METAL PANEL MATERIALS

- A. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, structural quality, Grade 50

2.04 WALL PANEL PROFILE

- A. Structural metal wall panel consisting of formed metal sheet with trapezoidal ribs, installed by lapping edges of adjacent panels.
- B. Equal to MBCI, PBU Panel.



- C. Coverage Width: 36 inches.
- D. Continuous Rib Spacing: 6" on center.
- E. Rib Height: 3/4".
- F. Nominal Coated Thickness:

2.05 ACCESSORIES

- A. Provide required fasteners, closure strips, support plates, and sealants as indicated in manufacturer's written instructions.
- B. Flashing and Trim shall match the material, thickness, and finish of metal panel face sheet.
- C. Use long life exposed fasteners with EPDM or neoprene gaskets as recommended by roof panel manufacturer.
 - 1. Heads shall match the color of metal panels by means of factory-applied coating.
- D. Use manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:
 - 1. Tape Sealers: non-curing butyl tape, AAMA 809.2.
 - 2. Concealed Joint Sealants: Non-curing butyl, AAMA 809.2.
 - 3. Exposed Joint Sealants: Urethane, single component, ASTM C 920.

2.06 FINISH

- A. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- B. Panel Surface
 - 1. Smooth
- C. Exterior Finish
 - 1. Fluoropolymer Two-Coat System
 - a. 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 621.
 - b. Basis of Design: MBCI, Signature 300.
 - c. Equal to Kynar 500 or Hylar 500.
- D. Interior Finish
 - 1. 0.5 mil total dry film thickness consisting of primer coat and wash coat of manufacturer's standard light-colored acrylic or polyester backer finish.
- E. Color as selected by Architect from manufacturer's entire color line.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

- B. Examine metal panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.
 - 1. Inspect metal panel support substrate to determine if support components are installed as indicated on approved Shop Drawings.
 - 2. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
 - 3. Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following:
 - a. 1/4 inch (6 mm) in 20 foot (6.1 m) in any direction.
 - b. 3/8 inch (9 mm) over any single roof plane.
- C. Correct out-of-tolerance work and other deficient conditions prior to proceeding with metal roof panel system installation.

3.02 PREPARATION

- A. Install sub-framing, girts, furring, and other miscellaneous panel support members according to ASTM C754 and manufacturer's written instructions.

3.03 FABRICATION

- A. Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Form panels in continuous lengths for full length of detailed runs, except where otherwise indicated on approved Shop Drawings.
- C. Fabricate flashing and trim to comply with manufacturer's written instructions, approved Shop Drawings, and Project Drawings.
 - 1. Form from materials matching metal panel substrate and finish.

3.04 INSTALLATION

- A. Install panels square, plumb, and level.
- B. Install components in accordance with manufacturer's installation instructions and approved Shop Drawings.

3.05 METAL PANEL INSTALLATION

- A. Install weathertight metal panel system in accordance with manufacturer's written instructions, approved Shop Drawings, and Project Drawings.
- B. Install metal wall panels in orientation, sizes, and locations indicated, free of waves, warps, buckles, fastening stresses, and distortions.
- C. Anchor panels and other components securely in place.
- D. Provide for thermal and structural movement.

- E. Install manufacturer's recommended tape sealant at panel side-laps and end-laps.
- F. Attach panels to supports using screws, fasteners, and sealants recommended by manufacturer and indicated on approved Shop Drawings.
- G. Fasten metal panels to supports at each location indicated on approved Shop Drawings, with spacing and fasteners recommended by manufacturer.
- H. Treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

3.06 ACCESSORY INSTALLATION

- A. Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting.
- B. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
- C. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
- D. Set accessories true to line and level as indicated.
- E. Install work with laps, joints, and seams that will be permanently weather resistant.
- F. Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.

3.07 CLEANING

- A. Remove temporary protective films immediately in accordance with metal wall panel manufacturer's instructions.
- B. Clean finished surfaces as recommended by metal wall panel manufacturer.

3.08 PROTECTION

- A. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION

SECTION 074293
METAL SOFFIT PANELS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Factory-formed metal soffit panels.

1.02 RELATED SECTIONS

- A. Section 012300 Alternates
- B. Section 042113 Brick Masonry Units
- C. Section 042200 Concrete Masonry Units
- D. Section 054400 Metal Stud Framing System
- E. Section 061000 Rough Carpentry
- F. Section 074213 Metal Wall Panels
- G. Section 079200 Joint Sealant
- H. Section 099100 Paint
- I. Section 133413 Metal Building Systems

1.03 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
 - 1. Field-verify dimensions prior to preparation of Shop Drawings.
 - 2. Shop Drawings shall include soffit panel layout, dimensions, required locations of support and blocking members, edge profiles, cutouts, and attachments.
 - 3. Submit color samples of Manufacturer's full color line for Architect's use in selecting colors/patterns.
 - 4. Include samples of accessories intended for use.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Product Delivery, Storage, and Handling.

1.06 WARRANTY

- A. Provide manufacturer's 30-year non-prorated finish warranty

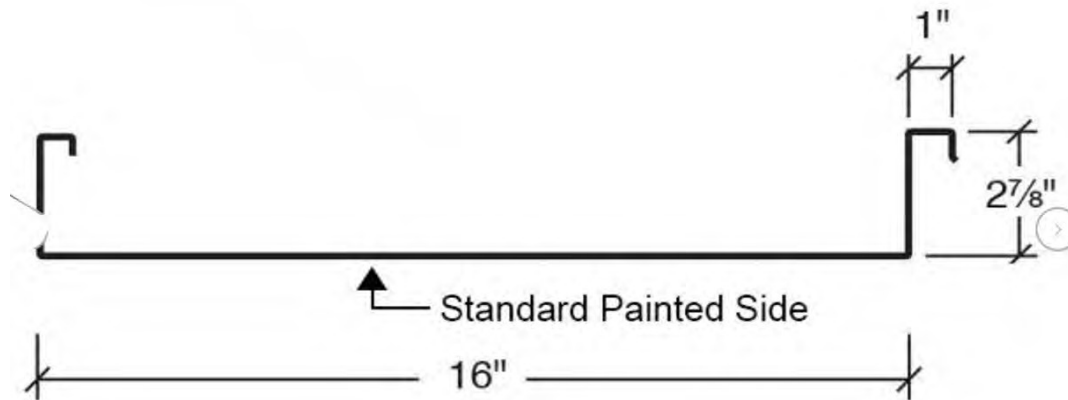
PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. MBCI
- B. Or approved equal.
- C. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 PRODUCT

- A. Classic Series



2.03 MATERIALS

- A. Roll-formed .032" aluminum soffit panels

2.04 COMPONENTS

- A. 16" wide panels
- B. Furnish in continuous lengths of up to 25'.

2.05 ACCESSORIES

- A. Soffit "J" Channel

2.06 FINISH

- A. Kynar 500

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 INSTALLATION

- A. Hang panels plumb and true, with uniform clearances on all sides.
- B. Install soffit panels in accordance with manufacturer's installation instructions and approved Shop Drawings.

- C. Caulk all joints with sealant in color to match panels.

3.03 CLEANING

- A. Remove protective coverings and remove adhesives and tape residue. Test all solvents on non-exposed surfaces prior to use.
- B. Clean surfaces after installation, according to manufacturer's written instructions. Remove dirt and excess sealants from exposed surfaces.
- C. Touch up marred or abraded surface to match original finish.

3.04 PROTECTION

- A. Protect soffit panels from damage during remainder of construction period.

END OF SECTION

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SECTION 079200
JOINT SEALANT

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Clean and prepare joint surfaces.
- B. At building exterior, install backing materials and sealant around louvers, vents, and door and window frames.
- C. Install caulking at junction of gypsum board and dissimilar materials.
- D. At control and expansion joints, install backer rod and sealant.
- E. Sealant at junction of plumbing fixtures and adjacent materials.

1.02 RELATED SECTIONS

- A. Section 042113 Brick Masonry Units
- B. Section 042200 Concrete Masonry Units
- C. Section 081113 Hollow Metal Doors and Frames
- D. Section 092226 Metal Ceiling Suspension System
- E. Section 092900 Gypsum Board
- F. Section 099100 Paint
- G. Division 22 Plumbing
- H. Division 23 HVAC
- I. Division 26 Electrical

1.03 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- C. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.

1.06 WARRANTY

- A. Provide a five-year warranty for exterior sealants.

- B. Replace sealants which fail because of loss of cohesion or adhesion, or do not cure.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Back-up Rod: Filler backing shall be polyethylene foam or polyurethane foam, rods or stops as required.
- B. Primers: as recommended by sealant manufacturer.
- C. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 SEALANT

- A. For use around exterior window and door frames, vertical expansion joints and control joints:
 - 1. One-part, low modulus, oxygen-curing polyurethane
 - 2. Equal to Permapol RCI.
 - 3. For substitutions, refer to Section 012500 Substitution Procedures.
 - 4. Color shall match adjacent materials at exterior, paintable at interior.
- B. Sealant at plumbing fixtures: Silicone to match color of fixtures.
- C. Sealant at expansion joints and open control joints:
 - 1. ASTM D 1751 or ASTM D 1752
 - 2. 1/2-inch thick, unless otherwise indicated.
 - 3. Sonolastic Paving Joint Sealant (SL-1) by Sonneborn.
- D. For substitutions, refer to Section 012500 Substitution Procedures.

2.03 CAULKING

- A. Acrylic latex to match color of adjacent materials.
- B. Caulking shall be paintable.
 - 1. Equal to:
 - a. White Lightning 3060.
 - b. DAP
 - c. Sherwin Williams
 - d. Or approved equals.
- C. For substitutions, refer to Section 012500 Substitution Procedures.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 PREPARATION

- A. Clean, prepare, and size joints in accordance with manufacturer's instructions. Remove any loose materials and other foreign matter which might impair adhesion of sealant.
- B. Verify that joint shaping materials and release tapes are compatible with sealant.
- C. Examine joint dimensions and size materials to achieve required width/depth ratios.
- D. Use joint filler to achieve required joint depths, to allow sealants to perform properly.

3.03 INSTALLATION

- A. Perform work in accordance with ASTM C804 for solvent release sealants.
- B. Install sealant in accordance with manufacturer's instructions.
- C. Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature ranges.
- D. Tool joints concave.
more than 3/4 inches deep and joints where a suitable backstop has not been provided shall be packed with rope to within 1/2 inch of surface before applying caulking.

END OF SECTION

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**SECTION 081113
HOLLOW METAL DOORS AND FRAMES**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Hollow metal doors (rated & non-rated) and glass
- B. Hollow metal frames (rated & non-rated) and glass
- C. Coordination of frames for gypsum board and/or masonry walls

1.02 RELATED SECTIONS

- A. Section 042113 Brick Masonry Units
- B. Section 042200 Concrete Masonry Units
- C. Section 054400 Metal Stud Framing System
- D. Section 061000 Rough Carpentry
- E. Section 079200 Joint Sealant
- F. Section 092900 Gypsum Board
- G. Section 096513 Resilient Base and Accessories
- H. Section 099100 Paint

1.03 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- C. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- D. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.
- E. Conform to requirements of Underwriters Laboratory for Fire rated doors and frames. See Door Schedule.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Product Delivery, Storage, and Handling.

1.06 COORDINATION

- A. Coordinate door and frame preparation with approved finish hardware schedule, wall types, door types, and alternates.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Curries or approved equal
- B. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 HOLLOW METAL DOORS

- A. Fabricate doors from 18 gage galvanized steel. Tops and bottoms of all doors shall be closed flush, filled and ground smooth. Exterior doors shall be galvanized.
- B. Exterior doors shall be insulated with rigid foam.
- C. Doors and frames shall receive hardware reinforcing at hinges, strikes and for any surface applied items.
- D. Weld vertical stiffeners to the surface sheets at 6 inches O.C.
- E. Channel stiffeners required at top and bottom of doors to insure rigidity. Insulate voids between stiffeners for sound deadening.
- F. All doors shall be thoroughly cleaned of shop oils after fabrication, treated for paint adherence and painted one coat of high grade zinc chromate primer, which shall be oven dried.
- G. Furnish and install insect screens on all full-louver exterior doors.
- H. All glass in Hollow Metal Doors shall be labeled wire glass.
- I. All glass in 3 hr. rated doors shall be equal to fire-rated and impact safety rated 5/16-inch thick Firelite Plus by Technical Glass Products.

2.03 HOLLOW METAL FRAMES

- A. Exterior Frames: 14 gage cold-rolled steel, galvanized
- B. Use welded frames at CMU walls.
- C. Use knock-down frames at stud walls.
- D. Furnish with pressure-applied rubber silencers.
- E. All frames shall have 9 gage steel hinge reinforcement plates and 14 gage strike reinforcement plates.
- F. Furnish a minimum of six anchors per opening. All frames shall have integral or welded-on sill anchor. Anchors at drywall partitions shall be "z"-clips welded to frames. Use Tee anchorage devices at masonry walls.

- G. All frames shall be thoroughly cleaned, phosphatized and finished as standard with one coat of baked-on rust inhibiting gray prime coat.
- H. All glass in interior frames shall be labeled wire glass.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 INSTALLATION

- A. Hang doors plumb and true, with uniform clearances on all sides.
- B. Install components in accordance with manufacturer's installation instructions and approved Shop Drawings.
- C. Caulk all joints with sealant in color to match framing.

3.03 ADJUSTING

- A. Adjust and balance doors to operate smoothly, easily, safely, and free from binding or malfunction throughout the entire operational range.

3.04 CLEANING

- A. Remove dirt and excess sealants from exposed surfaces.
- B. Clean surfaces after installation, according to manufacturer's written instructions.
- C. Touch up marred or abraded surface to match original finish.

3.05 PROTECTION

- A. Protect doors and frames from damage during remainder of construction period.

END OF SECTION

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SECTION 087100
DOOR HARDWARE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Hardware for all new exterior doors.
- B. Refer to finish hardware and Door and Frame Schedule on Drawings.

1.02 RELATED SECTIONS

- A. Section 081113 Hollow Metal Doors and Frames

1.03 COORDINATION

- A. Coordinate machining and preparation of hollow metal doors/frames with approved finished hardware schedule.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- C. Installer shall have access to all manufacturer's required specifications, technical, installation and maintenance related documents.
- D. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.
- E. Meet requirements and recommendations of applicable portions of standards listed.
 - 1. American Society for Testing and Materials, ASTM
 - 2. Commercial Standards, CS
 - 3. International Building Code, IBC
 - 4. Federal Specifications, FS
 - 5. Americans with Disabilities Act, Accessibility Guidelines, ADAAG
 - 6. American National Standards Institute, ANSI 117.1
- F. The supplier of finish hardware shall strictly comply with the following requirements:
 - 1. Supplier shall have been in the full-time business of selling finish hardware for a minimum of ten (10) consecutive years.
 - 2. Supplier shall employ a full-time Certified Architectural Hardware Consultant (A.H.C.)
 - 3. Supplier Shall be a member in good standing with D.H.I.
 - 4. Supplier shall be a factory-authorized dealer of approved hardware.

5. Supplier shall be approved by the Owner and Architect.
- G. Provide only hardware having same U.L. Label and fire exposure time rating as doors and frames to which applied. This provision supersedes any hardware schedule provisions to the contrary.
- H. Fire Underwriters' Labels: Provide only hardware having same U.L. Label and fire exposure time rating as doors and frames to which applied. This provision supersedes any hardware schedule provisions to the contrary.
- I. Any revisions of the hardware schedule to conform with the details shall be provided. Furnish any and all items not specifically mentioned but necessary for the completion of the work. It shall be the Contractor's responsibility to furnish hardware, in those places where specific hardware is not mentioned, of a quality equal to that of other openings used for the same general purpose. The cost of any such hardware shall be included in the original bid.

1.05 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
- B. Submit according to provisions of Section 013300 Submittal Procedures.
 1. A schedule indicating type, manufacturer's name, manufacturer's number, location, and finish of each item required.
 2. Photographic/graphic cut sheets for every item specified.
 - a. Bind cut sheets in a neat booklet.
 - b. Bind product cut sheets in the order the products are listed in Part 2 of this Section.
 - c. Clearly mark appropriate options or highlight options for Architect's selection.
- C. Submittals failing to meet the above requirements will be rejected until all requirements are met.
- D. In addition to the requirements above, the Contractor may be requested to provide additional technical literature, samples, Drawings, and/or performance data to assist in the evaluation of proposed equals.
- E. Secure Architect's approval before ordering hardware or templates.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.
- B. Provide storage and protection for finish hardware when delivered and install when ready.

PART 2 - PRODUCTS

2.01 DOOR HARDWARE

- A. Hinges: square edged, full mortise, equal to Hager BB 1279, 4-1/2" x 4-1/2".

- B. Spring hinges: square edged, full mortise, equal to Hager 1250, 4-1/2" x 4-1/2".
- C. Locksets: Equal to Best 30H commercial heavy duty mortise locks:
 - 1. Removable cores required.
 - 2. Function as per hardware schedule.
 - 3. Lever type design (ADA compliant) equal to Best #14.
 - 4. Escutcheon equal to Best Type "J".
 - 5. Complete with strike.
- D. Deadbolts: Equal to Best 82T. ADA compliant thumb turn.
- E. Occupancy Indicator Deadbolts: Equal to Falcon D 871626 with 2³/₄" backset, ADA compliant lever, and external emergency release.
- F. Closers: Equal to Sargent 1250 & 1251 Series, cast iron, standard duty (in Sargent line). Through bolt all closers.
- G. Exit Devices: Equal to Von Duprin, 33/35 Series. Through bolt all exit device hardware.
- H. Flush Bolts: Equal to Rockwood 555.
- I. Surface Bolts: Equal to Rockwood 630.
- J. Hold Open Stops: Equal to Rockwood 461.
- K. Push Plates
 - 1. Manufacturer: Rockwood, TRIMCO, or equal.
 - 2. Type: Equal to Rockwood 70F x RC, 8" x 16" push plate with rounded corners.
- L. Pull and Pull Plates
 - 1. Manufacturer: Rockwood, TRIMCO, or equal.
 - 2. Type: Equal to Rockwood 111 x 70C.
- M. Kick Plates
 - 1. Equal to Rockwood or TRIMCO 8" high x width of door minus 2".
 - 2. Thickness: 0.050 inch.
 - 3. Smooth finish.
- N. Doorstops
 - 1. Manufacturer: Rockwood, TRIMCO, or equal.
 - 2. Type: Equal to Rockwood #440 Series. Provide complete with #449 riser if required for stable installation.
- O. Thresholds and weatherstripping:
 - 1. Thresholds: PEMKO 2005AV
 - 2. Ramped Thresholds: Equal to National Guard Products 952.
 - 3. Weatherstripping: PEMKO 305CR (neoprene).
 - 4. Door Bottom: PEMKO 211AV.
- P. Peep holes: National Hardware N330-712 V805 Door Viewer

1. Two required per entry door. Mount one at 60" AFF. Mont one at 48" AFF.

Q. Silencers required at all hollow metal frames.

2.02 FINISHES

- A. Generally, shall be dull chrome (26D) unless otherwise noted in the schedule.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's installation instructions and approved Shop Drawings.
- B. Fit all hardware accurately, apply securely, and adjust properly. Leave in good working order, free of defects.
- C. Apply hardware in accordance with manufacturer's instructions, fit accurately, apply securely and adjust carefully.
- D. Properly tag, index, and file keys as directed, and deliver all keys at completion of the work.
- E. Use care not to injure other work when applying hardware.
- F. When necessary, remove and replace doors so they may have all surfaces painted or stained.
- G. The location of hardware in connection with wood doors and metal door frames shall be as follows unless otherwise shown on the Drawings:
 1. Center doorknobs and levers 36 inches above finished floor.
 2. Center door pulls 40 inches above finished floor.
 3. Center push plates 42 inches above finished floor.
 4. Center cylinder dead bolt locks 42 inches above finished floor.
 5. Center single push bars 42 inches above finished floor.
 6. Locate upper edge of top hinges 5 inches below head of frame.
 7. Locate lower edge of bottom hinges 10 inches above finished floor.
 8. Space center hinges equal distance between top and bottom hinges.

3.03 KEYING

- A. Key as directed by Owner.

3.04 ADJUSTING

- A. Adjust and balance doors and hardware to operate smoothly, easily, safely, and free from binding or malfunction throughout the entire operational range.

3.05 PROTECTION

- A. Protect materials from damage during remainder of construction period.

END OF SECTION

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**SECTION 092900
GYPSUM BOARD**

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Gypsum Board
- B. Taped and sanded joint treatment.

1.02 RELATED SECTIONS

- A. Section 054000 Metal Stud Framing System
- B. Section 061000 Rough Carpentry
- C. Section 072100 Thermal Insulation
- D. Section 079200 Joint Sealant
- E. Section 081113 Hollow Metal Doors and Frames
- F. Section 092226 Metal Ceiling Suspension System
- G. Section 099100 Paint

1.03 REFERENCES

- A. GA 216 - Recommended specifications for the application and finishing of Gypsum Board.
- B. GA 252 - Recommended specifications for the application of gypsum sheathing.
- C. USG-Gypsum Construction Handbook.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 016500 Product Delivery, Storage, and Handling.
- B. Handle materials with care to prevent damage.
- C. Store materials inside under cover, stack flat off floor.
- D. Store Gypsum board, joint compound, and adhesives in a dry area. Provide protection against freezing at all times.

PART 2 - PRODUCTS

2.01 GYPSUM BOARD

- A. Provide Gypsum board materials in accordance with recommendations of GA 216.
- B. Standard Gypsum Board: 5/8-inch-thick, Type X; maximum permissible length.

2.02 MOISTURE RESISTANT GYPSUM BOARD:

- A. 5/8 inch thick; maximum permissible length.
- B. Required at walls of all restrooms, bathrooms, kitchens, and wet locations.

2.03 GYPSUM BOARD ACCESSORIES

- A. Provide gypsum board accessories in accordance with GA 216.
- B. Reinforcing tape, joint compound, adhesive, water, fasteners: GA 216.
- C. Corner Beads: Metal.
- D. "F" molding: Gordon FD5810 or equal.
- E. "J" molding: Gordon JD-58 or equal.
- F. "R" reveal molding: Gordon RD5812 or equal.
- G. "T" molding: Gordon TD-58 or equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 INSTALLATION

- A. Install gypsum board in accordance with recommendations of GA 216.
- B. Provide and install control joints in large continuous areas to prevent cracking.
- C. Erect single layer standard gypsum board in direction most practical and economical, with ends and edges occurring over firm bearing.
- D. Erect single layer fire rated gypsum board vertically, with edges and ends occurring on firm bearing.
- E. Use screws when fastening gypsum board to metal furring or framing.
- F. In locations where gypsum board abuts a dissimilar material, apply J-mold to terminate the gypsum board and install caulking at the crack between the gypsum board and dissimilar materials.
- G. Abut gypsum board to floor for a tight joint to avoid gaps between the wall and floor surfaces.

H. Install wall and ceiling control joints at 30 feet o.c. each way.

3.03 FINISHING

- A. Place corner beads at external corners. Use longest practical lengths. Place edge trim where gypsum board abuts dissimilar materials.
 - 1. Use 90-degree corner beads.
- B. Tape, fill, and sand exposed joints, edges, corners, openings and fixings, to produce surface ready to receive surface finishes. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
- C. Remove and re-do defective work.

END OF SECTION

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SECTION 096513
RESILIENT COVE BASE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Provide and install resilient cove base (refer to Room Finish Schedule).

1.02 RELATED SECTIONS

- A. Section 042200 Concrete Masonry Units
- B. Section 081113 Hollow Metal Doors and Frames
- C. Section 092900 Gypsum Board
- D. Section 099100 Paint

1.03 SUBMITTALS

- A. Submit the following:
 - 1. Manufacturer's specifications, product data, quantities, adhesive details, and finishes.
 - 2. Manufacturer's installation instructions.
 - 3. Material Safety Data Sheets
 - 4. Color and finish samples to show range of texture and consistency of color and finish.
 - 5. Include samples of each material and color selected.
 - 6. Include samples of accessories intended for use.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver materials to the site until site conditions are adequate to receive the work.
- B. Protect items from weather while in transit.
- C. Deliver materials to the job site in sealed original labeled containers, bearing manufacturer's name, brand name, product enclosed, and color designation.
- D. Provide adequate storage facilities. Store material indoors at ambient temperature between 65-85 degrees F in a well-ventilated area with a maximum relative humidity of 55%.
- E. Store components in locations that will avoid damage from job-site traffic, moisture, stacking, or other job-site contamination.

- F. Do not store materials directly on the ground or floor. Use appropriate pallets and blocking.

1.05 QUALITY ASSURANCE

- A. Maintain room temperature between 65-85 degrees F and relative humidity no greater than 55% for at least 24 hours prior to installation, during installation, and until Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Flexco
- B. Roppe
- C. Tarkett/Johnsonite

2.02 MATERIALS

- A. Base: Conforming to FS SS-W-40, rubber, rolled, (48" pieces are allowed in special situations with Architect's approval),
- B. 4 inch high
- C. 1/8 inch thick
- D. Manufactured inside and outside corners
- E. Adhesive: As recommended by base manufacturer.

2.03 FINISHES

- A. Color as selected by Architect

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, supporting structure, and job-site conditions, to ensure that substrates have been properly prepared. Examine job-site conditions for anything that may adversely affect installation of the work. Notify the Architect in writing of conditions detrimental to the work.
- B. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Contractor and the Architect.
- C. Initiation of the work of this section indicates acceptance of substrate and existing conditions by the installer.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's installation instructions.
- B. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
- C. Miter internal corners.
- D. Use pre-molded end stops and external corners.
- E. Install base onto solid backing. Adhere tightly to wall and floor surfaces.
- F. Scribe and fit to door frames and other obstructions.
- G. Install straight and level to variation of plus or minus 1/8 inch over 10 feet.
- H. Take special care to avoid glue smears on finished walls and/or floors.

3.03 CLEANING

- A. Clean surfaces after installation, according to manufacturer's written instructions. Test all solvents on non-exposed surfaces prior to use.

END OF SECTION

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SECTION 099100

PAINT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Preparation of interior and exterior surfaces to receive paint and sealant.
- B. Prime and paint interior and exterior materials and items as shown on Drawings and as scheduled (see Room Finish Schedule).

1.02 RELATED SECTIONS

- A. Section 042113 Brick Masonry Units
- B. Section 042200 Concrete Masonry Units
- C. Section 055000 Metal Fabrications
- D. Section 079200 Joint Sealant
- E. Section 081113 Hollow Metal Doors and Frames
- F. Section 092900 Gypsum Board
- G. Section 133413 Metal Building Systems
- H. Section 321723 Pavement Markings

1.03 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
- B. Submit the following:
 - 1. Manufacturer's specifications and product data on each paint used
 - 2. Product characteristics
 - 3. Volatile Organic Compound (VOC) content
 - 4. Surface preparation instructions and recommendations
 - 5. Primer requirements and finish specification
 - 6. Storage and handling requirements and recommendations
 - 7. Application methods
 - 8. Clean-up information
 - 9. Material Safety Data Sheets
 - 10. Submit a complete set of color chips that represent the full range of manufacturer's color samples available.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Product Delivery, Storage, and Handling.
- B. Deliver materials to job site in sealed original labeled containers, bearing:
 - 1. Manufacturer's name
 - 2. Product name
 - 3. Paint composition (latex or alkyd)
 - 4. Volatile Organic Compound (VOC) content
 - 5. Color name and number
 - 6. Environmental handling
 - 7. Batch date
 - 8. Instructions for mixing and or reducing.
- C. Provide adequate storage facilities. Store material indoors at ambient temperature between 45-85 degrees F in a well ventilated area with a maximum relative humidity of 55%.
- D. Protect materials from freezing.
- E. Store materials in area of application.
- F. Store and dispose of solvent-based materials, and tools used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- G. Maintain a clean, dry storage area to prevent contamination or damage to the coatings.
- H. Take precautionary measures to prevent fire hazards and spontaneous combustions.

1.05 QUALITY ASSURANCE

- A. Maintain interior room temperature between 45-85 degrees F and relative humidity no greater than 55% for at least 24 hours prior to applying finishes, during installation, and at least 48 hours after installation.
- B. Provide adequate continuous ventilation.
- C. Outdoor temperatures for latex paints must be a minimum of 50 degrees F for exterior work.
- D. Do not apply finishes unless moisture contents of surfaces are below the following maximums:
 - 1. Plaster and gypsum wallboards: 12%
 - 2. Masonry, concrete and concrete block: 12%

3. Interior located wood: 15%
- E. Provide a minimum of 25 foot-candles of lighting on surfaces to be finished.
- F. Do not apply finish in areas where dust is being generated.
- G. Request review and approval of primer and each subsequent coat by Architect.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers
 1. Sherwin-Williams
 2. Benjamin Moore
 3. Devote
 4. Pittsburg Paint
 5. Or approved equal
 6. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 MATERIALS

- A. Paint, varnish, enamel, and fillers: Type and blend listed herein or equivalent products approved by Architect.
- B. Prime/paint schedule is based on products of Sherwin Williams.

2.03 MIXING AND TINTING

- A. Deliver all paints ready-mixed to the job site.
- B. Use ready-mixed field catalyzed coatings.
- C. Pigments shall be fully ground to maintain a soft paste consistency, capable to readily and uniformly disperse to a complete homogeneous mixture.
- D. Mix coatings to correct consistency in accordance with manufacturer's instructions before application.
 1. Reduce, thin, dilute, or add materials to coatings only as described in manufacturer's product instructions.
 2. Use jobsite mixing and tinting only when approved by the Architect.
 3. Use tinting colors recommended by manufacturer for the specific type of finish.

- 4. Mix only in mixing pails in suitable sized non-ferrous or oxide resistant metal pans.
- E. Paints must have good flowing and brushing properties and be capable of dry or curing free of streaks or sags.
- F. Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

2.04 ACCESSORIES

- A. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- B. Furnish sufficient drop-cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.
- C. Brushes, rollers, and spray equipment as necessary for proper application.

2.05 COLORS

- A. As indicated on the Room Finish Schedule or as selected by the Architect.

2.06 EXTERIOR PAINT SCHEDULE

All surfaces shall receive at least three coats.

- A. Concrete Masonry Units
 - 1. Latex Systems
 - 1st Coat: S-W ConFlex Block Filler
 - 2nd Coat: S-W A-100 Exterior Latex
 - 3rd Coat: S-W A-100 Exterior Latex
 - 2. Elastomeric System
 - 1st Coat: S-W Loxon Acrylic Block Surfacer
 - 2nd Coat: S-W ConFlex XL Elastomeric High Build Coating
 - 3rd Coat: S-W ConFlex XL Elastomeric High Build Coating
- B. Metals, (Galvanized, and Aluminum Substrates)
 - 1. Latex Systems
 - 1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer
 - 2nd Coat: S-W A-100 Exterior Latex
 - 3D Coat: S-W A-100 Exterior Latex
 - 2. Early Moisture Resistance Finish
 - 1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer

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2nd Coat: S-W Resilience Latex
3rd Coat: S-W Resilience Latex

3. Alkyd Systems

1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer
2nd Coat: S-W Emerald Urethane Trim Enamel
3rd Coat: S-W Emerald Urethane Trim Enamel

4. Wood Siding and Trim (Back-priming required)

1st Coat: S-W Exterior Latex Primer
2nd Coat: S-W A-100 Exterior Latex
3rd Coat: S-W A-100 Exterior Latex

C. Ferrous Metals

1. Latex Systems

1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer
2nd Coat: S-W Solo Acrylic
3rd Coat: S-W Solo Acrylic

2. Alkyd Systems

1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer
2nd Coat: S-W Emerald Urethane Trim Enamel
3rd Coat: S-W Emerald Urethane Trim Enamel

D. Metal Doors/Windows & Frames

1. Acrylic Latex System

1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer
2nd Coat: S-W SnapDry Door & Trim Acrylic Latex
3rd Coat: S-W SnapDry Door & Trim Acrylic Latex

2. Alkyd Systems

1st Coat: All Surface Enamel Latex Primer
2nd Coat: S-W Pro Industrial Acrylic
3rd Coat: S-W Pro Industrial Acrylic

3. Rust Inhibiting Alkyd Systems

1st Coat: Kem Kromik Metal Primer
2nd Coat: DTM Acrylic Primer/Finish
3rd Coat: Metalatex Semi-Gloss Enamel

E. Wood (Siding and Trim)

1. Latex Systems

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- 1st Coat: S-W Exterior Latex Wood Primer
- 2nd Coat: S-W A-100 Exterior Latex
- 3rd Coat: S-W A-100 Exterior Latex

F. Gypsum Board Soffits

1. Latex Systems

- 1st Coat: S-W PrepRite ProBlock Latex Primer
- 2nd Coat: S-W A-100 Exterior Latex
- 3rd Coat: S-W A-100 Exterior Latex

2.07 INTERIOR PAINT SCHEDULE:

A. Concrete Floors (Non-Vehicular)

1. Acrylic Water-based Systems

- 1st Coat: S-W Porch & Floor Enamel
- 2nd Coat: S-W Porch & Floor Enamel

B. Concrete Masonry Units and Brick Masonry Units

1. Latex Systems

- 1st Coat: S-W PrepRite Block Filler
- 2nd Coat: S-W ProMar 200 Zero VOC Latex
- 3rd Coat: S-W ProMar 200 Zero VOC Latex

2. Microbicidal Finish

- 1st Coat: S-W ConFlex Block Filler
- 2nd Coat: S-W Paint Shield Interior Latex
- 3rd Coat: S-W Paint Shield Interior Latex

3. Alkyd Systems

- 1st Coat: S-W Loxon Acrylic Block Surfacer
- 2nd Coat: S-W ProMar 200 Waterbased Acrylic-Alkyd
- 3rd Coat: S-W ProMar 200 Waterbased Acrylic-Alkyd

4. Epoxy

- 1st Coat: S-W PrepRite Block Filler
- 2nd Coat: Pro Industrial Water-Based Catalyzed Epoxy
- 3rd Coat: Pro Industrial Water-Based Catalyzed Epoxy

C. Aluminum or Galvanized Metal

1. Latex Systems

- 1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer

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2nd Coat: S-W ProMar 200 Zero VOC Latex
3rd Coat: S-W ProMar 200 Zero VOC Latex

2. Alkyd Systems

1st Coat: S-W Pro Industrial™ Pro-Cryl® Universal Primer
2nd Coat: S-W ProMar 200 Waterbased Acrylic-Alkyd
3rd Coat: S-W ProMar 200 Waterbased Acrylic-Alkyd

3. Urethane Modified Alkyd Systems

1st Coat: S-W Pro Industrial™ Pro-Cryl® Universal Primer
2nd Coat: S-W Emerald Urethane Trim Enamel
3rd Coat: S-W Emerald Urethane Trim Enamel

D. Ferrous Metal (including Hollow Metal doors & frames).

1. Latex Systems

1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer
2nd Coat: S-W ProMar 200 Zero VOC Latex
3rd Coat: S-W ProMar 200 Zero VOC Latex

2. Alkyd Systems

1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer
2nd Coat: S-W ProMar Waterbased Acrylic-Alkyd
3rd Coat: S-W ProMar Waterbased Acrylic-Alkyd

E. Dryfall

1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer
2nd Coat: S-W Pro Industrial Waterborne Acrylic Dryfall
3rd Coat: S-W Pro Industrial Waterborne Acrylic Dryfall

F. Wood (Walls, Ceilings, Doors and Trim)

1. Latex Systems

1st Coat: S-W Premium Wall & Wood Latex Primer
2nd Coat: S-W ProMar 200 Zero VOC Latex
3rd Coat: S-W ProMar 200 Zero VOC Latex

2. Alkyd Systems

1st Coat: S-W Premium Wall & Wood Latex Primer
2nd Coat: S-W ProMar 200 Waterbased Acrylic-Alkyd
3rd Coat: S-W ProMar 200 Waterbased Acrylic-Alkyd

3. Urethane Modified Alkyd Systems

1st Coat: S-W ProMar 200 Zero VOC Latex Primer

2nd Coat: S-W Emerald Urethane Trim Enamel
3rd Coat: S-W Emerald Urethane Trim Enamel

G. Gypsum Board & Plaster

1. Latex Systems

1st Coat: S-W ProMar 200 Zero VOC Latex Primer
2nd Coat: S-W ProMar 200 Zero VOC Latex
3rd Coat: S-W ProMar 200 Zero VOC Latex

2. Alkyd Systems

1st Coat: S-W ProMar 200 Zero VOC Latex Primer
2nd Coat: S-W ProMar 200 Water-based Acrylic-Alkyd
3rd Coat: S-W ProMar 200 Water-based Acrylic-Alkyd

3. Microbicidal Finishes

1st Coat: S-W ProMar 200 Zero VOC Latex Primer
2nd Coat: S-W Paint Shield Interior Latex
3rd Coat: S-W Paint Shield Interior Latex

4. Water-based Urethane Modified Alkyd

1st Coat: S-W ProMar 200 Zero VOC Latex Primer
2nd Coat: S-W Emerald Urethane Trim Enamel
3rd Coat: S-W Emerald Urethane Trim Enamel

5. Epoxy

1st Coat: S-W ProMar 200 Zero VOC Latex Primer
2nd Coat: Pro Industrial Water-Based Catalyzed
Epoxy
3rd Coat: Pro Industrial Water-Based Catalyzed
Epoxy

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.
- B. Surfaces must be inspected and approved by the Architect just prior to the application of each coat.

3.02 SCAFFOLDS, LADDERS AND PROTECTION

- A. Contractor must furnish all required ladders, stages, scaffolds, etc. and they must be in safe condition, having adequate strength to support maximum workload, and complying with all current OSHA regulations.

- B. Scaffolds and ladders must not be left where they would interfere with other workmen, when not in daily use.
- C. Contractor must not only protect his work, but also that of other trades.
- D. Contractor is responsible for removal of all paint or coating splatter, spills, etc. on floors or adjacent colors, material, glass, hardware and other finished surfaces.
- E. Contractor must leave premises clean and free from all rubbish and accumulated material left from his work.

3.03 MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Refer to mechanical and electrical sections with respect to painting and finishing requirements.
- B. Remove grilles, covers and access panels for mechanical and electrical systems from location and paint separately.
- C. Apply finish coating(s) to factory-primed equipment of the color selected.
- D. Where exposed, prime and paint insulated and bare pipes, conduits, boxes, insulated and bare duct, hangers, brackets, collars and supports, except where items are plated or covered with a pre-finished coating.
- E. Replace identification markings on mechanical or electrical equipment when painted over or splattered.
- F. Paint both sides of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

3.04 SURFACE PREPARATION

- A. Surfaces must be dry and in sound condition prior to application of paint. Do not apply paint to wet or damp surfaces.
 - 1. Test all materials for moisture content with a moisture meter.
 - 2. The pH of surfaces should be between 6 and 9, unless the products are designed to be used in extreme pH environments.
 - 3. Concrete and mortar must be cured at least 30 days at 75°F, unless the manufacturer's products are designed for application prior to the 30-day period.
 - 4. Gypsum Board and joint treatments must be clean and dry.
- B. Surfaces must be clean and free from contaminants.
 - 1. Remove all oil, grease, dust and dirt,
 - 2. Concrete surfaces must be free from concrete form release agents, moisture curing membranes, loose cement, and hardeners.

3. Wash Cement Composition Siding with an appropriate cleaner. Rinse thoroughly and allow to dry.
 4. On tilt-up and cast-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface.
 5. Remove all loose mortar and foreign material from masonry surface and surfaces adjacent to masonry.
 6. Prior to applying finish coats, prepare metal surfaces as follows:
 - a. Shop-prime all bare metal surfaces.
 - 1) For galvanized metals, use etching-type primer.
 - 2) Remove all rust mill scale, and oxide from all metal surfaces.
 - 3) Remove oil and grease.
 - 4) Use solvent to clean ferrous metal.
 - 5) Use detergent and water or a degreasing cleaner to clean galvanized metals.
 - 6) Allow the coating to dry at least one week before testing.
 - 7) If adhesion is poor, Brush Blast to remove these treatments.
 - b. Prepare ferrous metal surfaces in strict accordance with the instructions of the rust-inhibitive primer manufacturer.
 - c. Wash metal surfaces with mineral spirits to remove dirt, oil or grease prior to painting.
 - d. Sand and scrape shop-primed steel surfaces to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous.
 - e. Remove contamination from steel surfaces.
 - f. Prime bare steel surfaces.
 7. Wood must be clean and dry.
 - a. Wipe off dust and grit from miscellaneous wood items and millwork prior to priming.
 8. Pressure clean Cementitious Siding, if needed, with a minimum of 2100 psi pressure to remove all efflorescence and foreign material.
 9. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water, and allow to dry.
- C. Surfaces must be smooth and free from blemishes.
1. Fill bug holes, air pockets, and other voids with an appropriate patching compound.

2. Scrape, sand, and spot-coat knots, pitch streaks, and sappy sections with sealer before applying a full primer coat to insure a uniform appearance.
 3. Fill nail holes and imperfections with putty after prime or undercoat, then sand smooth. Putty or wood filler must match color of finish where clear coat is specified.
- D. Steel corner beads should be primed with appropriate metal primer before applying latex coatings.
- E. Damaged plaster must be repaired with an appropriate patching material.

3.05 APPLICATION

- A. Apply all coatings and materials according to the manufacturer's specifications.
- B. Apply primer and paint with suitable brushes or rollers.
1. Rate of application shall not exceed recommendation of paint manufacturer.
 2. Keep brushes, rollers, and spraying equipment clean, dry, free from contaminates and suitable for the finish required.
- C. Comply with recommendations of product manufacturer for drying time between coats.
- D. Sand and dust between each coat to remove defects visible from a distance of six feet.
- E. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- F. Finished metal surfaces shall be free of skips, voids, or pinholes.
- G. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paints, and skipped or missed areas.
- H. Leave all parts of molding and ornaments clean and true to details with no undue amount of paint in corners and depressions.
- I. Make edges of paint adjoining other material or colors clean and sharp with no over-lapping.
- J. Refinish entire wall, if necessary, where portion of finish has been damaged or is not acceptable.
- K. Backprime any exterior woodwork prior to installation.
- L. For interior wood, prime entire surface with a penetrating primer.
- M. Prime the top and bottom edges of wood and metal doors with enamel undercoat when they are scheduled to be painted.

- N. When paint or coating is roller applied, proper skill must be used to avoid all signs of lapping and excess lines from edge of roller.
- O. When cutting-in with a brush is required, these areas must be of the same texture, color, and hiding as adjacent areas to assure good appearance.
- P. Regardless of the number of coats specified, apply as many coats as necessary to obtain a uniform appearance.

3.06 CLEANING

- A. Touch-up and restore finish where damaged.
- B. Remove spilled, splashed, or splattered paint from all surfaces.
- C. Leave storage area clean. Remove from site any and all empty paint containers and debris from painting operation.
- D. Place cotton waste, cloth, and material which may constitute a fire hazard in closed metal containers and remove daily from site.

3.07 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Adequately protect other surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.
- C. Spot painting to correct soiled or damaged paint surfaces will be allowed only when touch up is blended into surrounding finish and is invisible to normal viewing. Otherwise, re-coat entire section to corners or visible stopping point.
- D. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

SECTION 101463
INTERIOR SIGNAGE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Room Identification Signage
- B. Directional Signage

1.02 RELATED SECTIONS

- A. Section 042113 Brick Masonry Units
- B. Section 092900 Gypsum Board
- C. Section 099100 Paint

1.03 REFERENCES

- A. ADA – Americans with Disabilities Act - Accessibility Guidelines
- B. IBC – Chapter 11
- C. ANSI 117.1A

1.04 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Installer shall be experienced in performing work of this section who has specialized in installation of work like that required for this project.
- C. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- D. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.

1.05 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
- B. Submit manufacturer's product data and installation instructions.
- C. Submit schedule of signage for approval by Architect.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. InPro Corporation
- B. Touch Graphics, Inc., RP 100
- C. Mohawk Sign Systems, 200A-Type D
- D. ASI Sign Systems, Intouch
- E. Or approved equal
- F. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 ROOM IDENTIFICATION SIGNAGE

- A. Engraved name and number plates are required at all spaces.
- B. Minimum size: 6" x 6"
- C. Letters and numbers on signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.
- D. Include ADA compliant Braille.
- E. Material: Plastic laminate or acrylic.
- F. Characters, symbols, and pictograms
 1. Characters shall contrast with their background-either light characters on a dark background or dark characters on a light background.
 2. Characters must be eggshell, matte, or non-glare finish.
 3. Characters may be upper case, lower case, or both.
 4. Letters, numbers, symbols, and pictographs on signs shall be raised 1/32" (0.8mm) minimum
 5. Text shall be 5/8" minimum and 2" maximum.
 6. Text shall be sans serif characters. Characters may not be italic, oblique, or script.
 7. Raised characters or symbols shall be at least 5/8 inch (16mm) high, but no higher than 2 in. (50mm).
 8. Indented characters or symbols shall have a stroke width of at least 1/4 in. (6mm).
 9. Pictographs shall be no less than 6" tall.
 10. Pictographs may not share a field with Braille or other raised elements.
 11. Grade II Braille required.
 12. Braille must be located immediately below the equivalent text and 3/8" apart from any other raised letters or border.
- G. Provide changeable message capability as scheduled.
- H. Accessible facilities shall use the international symbols of accessibility.



**FIG. 703.6.3.1
INTERNATIONAL SYMBOL OF ACCESSIBILITY**

2.03 OVERHEAD AND WALL-MOUNTED DIRECTIONAL SIGNAGE

- A. Characters shall contrast with their background-either light characters on a dark background or dark characters on a light background.
- B. Characters must be eggshell, matte, or non-glare finish.
- C. 5/8" minimum character height if sign is 40"-70" above finished floor.
- D. 2" minimum character height if sign is 70"-120" above finished floor.
- E. 3" minimum character height if sign is 10' or more above finished floor. Increase character height by 1/8" per foot above 21'
- F. Braille is not required.
- G. Overhead signs must have 80" clear to the bottom of the sign.

TABLE 703.2.4—VISUAL CHARACTER HEIGHT

Height above Floor to Baseline of Character	Horizontal Viewing Distance	Minimum Character Height
40 inches (1015 mm) to less than or equal to 70 inches (1780 mm)	Less than 6 feet (1830 mm)	5/8 inch (16 mm)
	6 feet (1830 mm) and greater	5/8 inch (16 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 6 feet (1830 mm)
Greater than 70 inches (1780 mm) to less than or equal to 120 inches (3050 mm)	Less than 15 feet (4570 mm)	2 inches (51 mm)
	15 feet (4570 mm) and greater	2 inches (51 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 15 feet (4570 mm)
Greater than 120 inches (3050 mm)	Less than 21 feet (6400 mm)	3 inches (75 mm)
	21 feet (6400 mm) and greater	3 inches (75 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 21 feet (6400 mm)

2.04 FINISH

- A. Color as selected by Architect from manufacturer's entire color line.

2.05 SIGNAGE SCHEDULE

- A. Refer to Door Schedule.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 INSTALLATION

- A. Install signage square, plumb, and level.
- B. Interior signage shall be located alongside the door on the latch side.

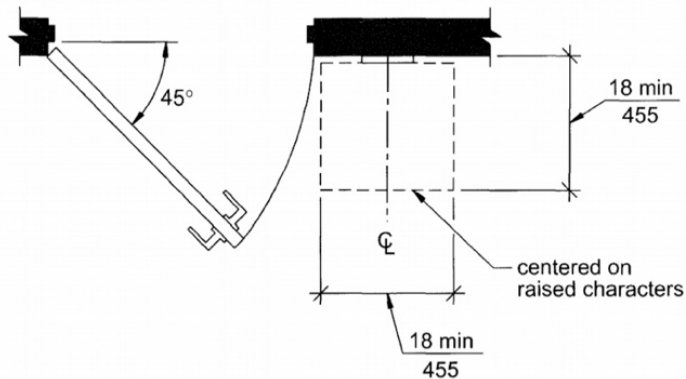
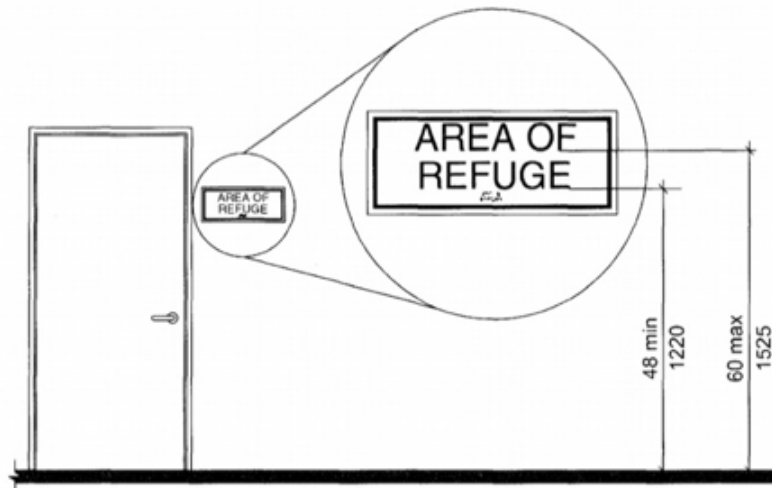


FIG. 703.3.11
LOCATION OF SIGNS AT DOORS

- C. For a pair of doors, mount signage to the right of the right-hand leaf.
- D. Mount signs so that the bottom of the text 48" minimum above finished floor and 60" maximum above the finished floor.



Note: For braille character mounting height see Section 703.4.5

FIG. 703.3.10
HEIGHT OF RAISED CHARACTERS ABOVE FLOOR

- E. Do Not mount signage directly to doors or frames.
- F. Mount with double faced foam tape and clear silicone.

3.03 CLEANING

- A. Remove protective coverings and items to remove adhesives and tape residue. Test all solvents on non-exposed surfaces prior to use.
- B. Clean surfaces after installation, according to manufacturer's written instructions.
- C. Refer to Section 017420 for Final Cleaning.

3.04 PROTECTION

- A. Protect materials from damage during remainder of construction period.

END OF SECTION

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SECTION 102813
RESTROOM ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Restroom accessories and attachment hardware in all restrooms.
- B. Provide and install flexible vinyl insulation on plumbing traps, supplies and stops beneath all lavatories, sinks and countertops which are exposed and subject to contact.

1.02 RELATED SECTIONS

- A. Section 061000 – Rough Carpentry (Solid Blocking)

1.03 SUBMITTALS

- A. Submit manufacturer's product data for Architect's review.

1.04 COMPLIANCE

- A. 2010 ADA Standard for Accessible Design
- B. International Building Code, Chapter 11
- C. ANSI A117.1.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.
- B. Pack accessories individually in a manner to protect finishes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. For description purposes, model numbers included for restroom accessories are items manufactured by Bradley or Bobrick. Similar products by Moen, or Franklin Brass are acceptable.
- B. Protective Plumbing insulation shall be equal to "Handi Lav-Guard" by Truebro, Inc., or Brocar Products, Inc.

2.02 GRAB BARS

- A. ADA compliant grab bars equal to Bradley series 800, 18 ga. 304 stainless steel tubing, 1½" diameter, safety grip finish, concealed mounting. At each accessible toilet, provide:
 - 1. One 42" horizontal grab bar
 - 2. One 36" horizontal grab bar
 - 3. One 18" vertical grab bar

2.03 ACCESSORIES

- A. Pre-manufactured flexible vinyl components to completely cover all exposed pipes, fittings and valves.
- B. Double roll toilet paper holder with phone shelf: Bradley Model 5263, Stainless Steel! Mount according to ANSI A117.1 Figure 604.7. One required at each toilet.
- C. Paper towel dispenser, Georgia Pacific enMotion, Model 59462. Mount so that paper dispenses no higher than 48" Above Finished Floor. One required at each lavatory.
 - 1. Include four D batteries per unit
 - 2. Include two rolls of paper towels per unit.
- D. Surface mounted Stainless Steel Soap Dispenser, Bradley Model 6562. One required at each lavatory. Mount no higher than 48" Above Finished Floor.
- E. Mirrors, 24" wide by 36" high, Model 780-2436. One required at each lavatory. Bottom surface shall be mounted at 40" Above Finished Floor.
- F. Mop and Broom Holder, Bradley #9954, one required at each Janitor Closet.
- G. Robe Hook: Bradley 915, Two required at each restroom. Mount one at 60" and one at 48".
- H. Surface Mount Baby Changing Station: Continental Model 8252-H, white, horizontal. One required at each public restroom.

PART 3 - EXECUTION

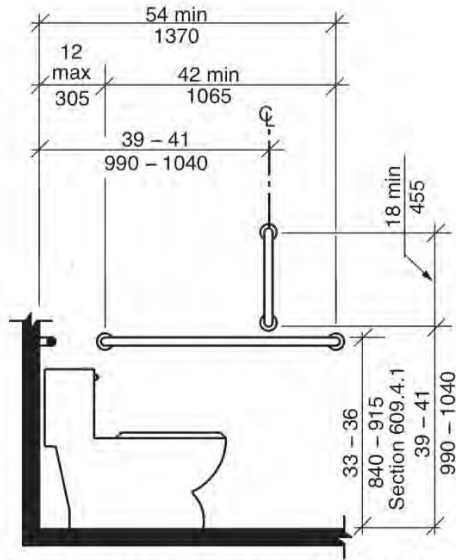
3.01 PREPARATION

- A. Provide solid blocking as required for mounting accessories.
- B. Before starting work, notify Architect of any conflicts detrimental to installation or operation of accessories.

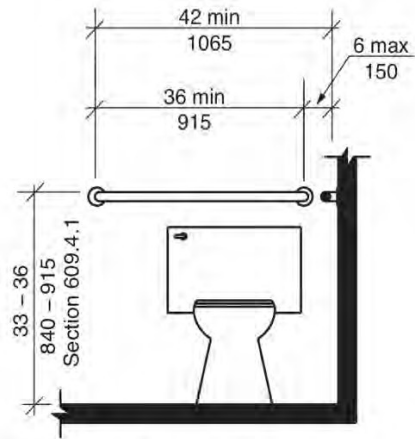
3.02 INSTALLATION

- A. Install accessories with attachment hardware as provided by manufacturer and in strict accordance with manufacturer's instructions.
- B. Install accessories plumb and level, securely anchored to substrate.
- C. At each accessible toilet, install grab bars according to ANSI a117.1 Figure 604.5.1 and 604.5.2.
 - 3. Install one 36" grab bar behind the toilet, mounted horizontally at 34" AFF.
 - 4. Install one 42" grab bar on the side wall, mounted horizontally at 34" AFF.

5. Install one 18" grab bar on the side wall, mounted vertically, 40" from the corner.



Note: For children's dimensions see Fig. 609.4.2
FIGURE 604.5.1
SIDE-WALL GRAB BAR FOR WATER CLOSET



Note: For children's dimensions see Fig. 609.4.2
FIGURE 604.5.2
REAR-WALL GRAB BAR FOR WATER CLOSET

- D. At each accessible toilet, install toilet paper holder as shown in ANSI 117.1 Figure 604.7 (a).

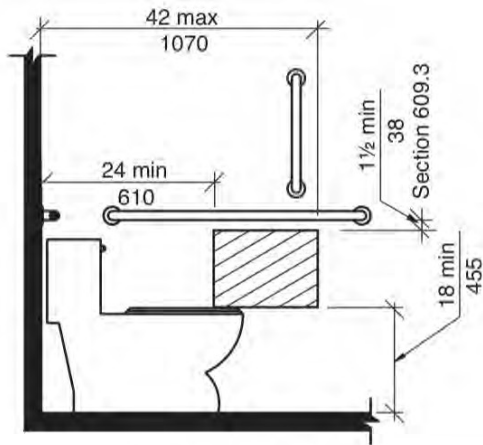


FIGURE 604.7.1(A)
DISPENSER OUTLET LOCATION - PROTRUDING DISPENSER
BELOW GRAB BAR

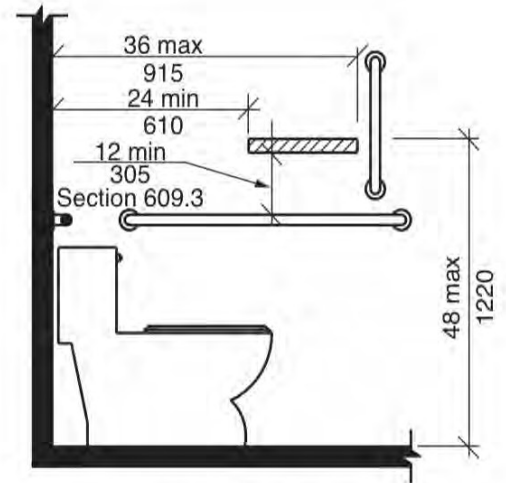
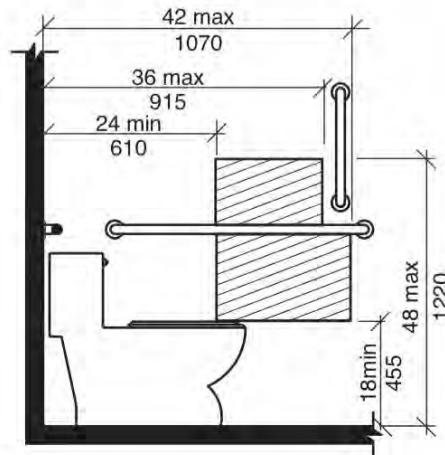


FIGURE 604.7.1(B)
DISPENSER OUTLET LOCATION
PROTRUDING DISPENSER ABOVE GRAB BAR



Note: For children's dimensions see Fig. 604.11.7 dispenser outlet location

FIGURE 604.7.1(C)
DISPENSER OUTLET LOCATION
RECESSED DISPENSER

3.03 PROTECTION

- A. Protect adjacent surfaces from damage during installation.

END OF SECTION

**SECTION 104400
FIRE EXTINGUISHERS AND CABINETS**

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install one fire extinguisher and cabinet as shown on Drawings.

1.02 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
- B. Include test, refill or recharge schedules, procedures, and re-certification requirements.

1.03 QUALITY ASSURANCE

- A. Manufacturer shall be an established firm, experienced in the manufacture of the specified product.
- B. Provide each component from a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- C. Conform to NFPA – 10, requirements for portable fire extinguishers.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Potter-Roemer, Inc.
- B. J.L. Industries
- C. Larsen's
- D. Or equal
- E. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 FIRE EXTINGUISHERS

- A. General Purpose for Light and Ordinary Hazard locations:
 - 1. 5 pound
 - 2. Type 2A10B:C U/L Rating
 - 3. Equal to Larsen's MP5

2.03 FIRE EXTINGUISHER CABINETS

- A. General Requirements:
 - 1. Aluminum construction.
 - 2. Semi-recessed mounted.
 - 3. Rolled radius frame.
 - 4. Full view panel.
 - 5. Size cabinets appropriately for the extinguisher housed.
 - 6. Cabinets shall comply with ADA requirements and protrude no more than 4 inches from the wall.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.

3.02 PREPARATION

- A. Do not install extinguishers when ambient temperatures may cause freezing.
- B. Verify cabinets are correctly sized and located.
- C. Beginning of installation indicates acceptance of existing conditions.

3.03 INSTALLATION

- A. Install cabinets plumb and level, 42 inches from finished floor to inside top of cabinet.
- B. Secure rigidly in place in accordance with manufacturer's instructions.
- C. Install cabinets in accordance with manufacturer's installation instructions and approved Shop Drawings.
- D. Caulk all joints with sealant in color to match cabinet.

3.04 CLEANING

- A. Remove protective coverings and decals. Remove adhesives and tape residue. Test all solvents on non-exposed surfaces prior to use.
- B. Clean surfaces after installation, according to manufacturer's written instructions.

END OF SECTION

SECTION 133419
METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Structural steel frame, secondary framing, and miscellaneous framing.
- B. Manufactured roof insulation system.

1.02 REFERENCES

- A. International Building Code
- B. ASTM International (ASTM)
 - 1. ASTM A 792 / A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 2. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. ASTM E 96 / E 96M - Standard Test Methods for Water Vapor Transmission of Materials.
 - 4. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- C. FM Global
 - 1. FMRC Standard 4471 - Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.
- D. Metal Building Manufacturers Association (MBMA)
 - 1. MBMA Metal Building Systems Manual.
 - 2. Seismic Design Guide for Metal Building Systems.
- E. Underwriters Laboratories (UL)
 - 1. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies.
 - 2. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.03 RELATED SECTIONS

- A. Section 033000 Cast-In-Place Concrete
- B. Section 042113 Brick Masonry Units
- C. Section 042200 Concrete Masonry Units
- D. Section 054400 Metal Stud Framing System
- E. Section 055000 Metal Fabrications
- F. Section 077200 Roof Accessories

- G. Section 081113 Hollow Metal Doors and Frames
- H. Section 099100 Paint
- I. Division 22 Plumbing
- J. Division 23 HVAC
- K. Division 26 Electrical

1.04 DESIGN REQUIREMENTS

- A. Perform structural design for the Metal Building System in accordance with the International Building Code.
- B. Design loads shall include dead loads, roof live loads, wind loads, seismic loads, collateral loads, auxiliary loads, floor live loads and applied or specified loads.
- C. Refer to Contract Drawings for additional concentrated loads to pre-engineered building.
- D. Deflection/drift criteria shall follow recommendations outlined in AISC Design Guide 3 and MBMA Serviceability recommendations.
- E. Construct assembly to permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 100 degrees F (37 degrees C) in a 24-hour period.
- F. Design and fabricate roof systems free of distortion or defects detrimental to appearance or performance.

1.05 QUALITY ASSURANCE

- A. Manufacturer shall have a minimum of 5 years experience in the manufacture of Metal Building Systems. Including:
 - 1. Member of the Metal Building Manufacturer's Association (MBMA).
 - 2. Accredited under the International Accreditation Service, Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems (AC472).
 - 3. AISC Certified Category MB.
- B. Metal building manufacturers are cautioned that this is a masonry building.
 - 1. The design shall limit drift at 10'-0" AFF to H/360, but in no case shall drift at 10'-0" AFF exceed 3/8".
 - 2. There will be no exceptions to this arrangement.
- C. Design structural system with close attention to the detailing of the architectural Drawings.
 - 1. Columns typically fall within CMU enclosures; therefore, columns shall be sized to fit within enclosure dimensions.
- D. Installer shall be experienced in performing work of this section who has a minimum of 2 years experience installing similar products.

1. Installer shall be approved, authorized, or licensed by manufacturer to install manufacturer's product.
 2. Installer shall have access to all manufacturer's required specifications, technical, installation and maintenance related documents.
- E. Provide each component from a single manufacturer.
- F. Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation recommendations and manufacturer's warranty requirements.

1.06 CODES AND STANDARDS

- A. The metal building shall meet or exceed the live load and wind load requirements of the International Building Code
- B. Metal building design loads
1. Dead Load: Self
 2. Roof Live Load: 20 psf
 3. Collateral Load: 5 psf
 4. Wind Load: 160 mph
 5. Provide additional framing and structural support for concentrated loads such as kitchen hoods and mechanical units.
- C. International Building Code Tributary Area Reduction is permissible for primary members for live load only. Tributary Area Reduction is NOT permissible for wind loads.

1.07 SUBMITTALS

- A. Submit according to provisions of Section 013300 Submittal Procedures.
- B. Submit the following
1. Manufacturer's specifications, product data, quantities, anchor details, and finishes.
 2. Shop Drawings
 - a. Including plans, sections, elevations, installation details, layout, dimensions, and connection details. Show anchorage and accessory items.
 - b. Show anchor bolt settings, transverse cross-sections, sidewall, endwall, and roof framing, flashing, and accessory installation details.
 - c. Field-verify dimensions prior to preparation of Shop Drawings.
 - d. An anchor bolt setting plan
 - 1) Include anchor bolt templates.
 - 2) Include minimum bolt diameter, length, and strength.
 - e. Structural design calculations

3. Manufacturer erection instructions showing
 - a. Preparation instructions and recommendations.
 - b. Storage and handling requirements and recommendations.
 - c. Erection Drawings and instructions with identification and assembly of building components.
 - d. Installation methods.
 4. Drawings shall be stamped and signed by an Engineer licensed in the Project State.
- C. Samples
1. Submit color samples showing manufacturer's full range of available colors and patterns for each finish product.
 2. After color selection submit samples representing actual product, color, and patterns.
 3. Include samples of accessories intended for use.
- D. Manufacturer certification that the building conforms to the contract documents and manufacturer's standard design procedures.
1. Certified Erector Certificate issued to the erector by the manufacturer.
 2. Material Test Reports (MTR) for all steel material used in the manufacture of primary and secondary framing members, panels, and bolts specified in this section.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 016500 Delivery, Storage, and Handling.
- B. Protect steel products from weather while in transit and storage.
- C. Deliver packaged products to the job site in sealed original labeled containers, bearing manufacturer's name, brand name, product enclosed, and color designation.
- D. Store components in locations that will avoid damage from job-site traffic, moisture, stacking, or other job-site contamination.
- E. Carefully handle and store materials to avoid racking, twisting, denting, or damage to finished surfaces.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. CECO Building Systems
- B. Varcco Pruden Buildings
- C. Nucor
- D. Or approved equal
- E. For substitutions, refer to Section 012500 Substitution Procedures.

2.02 STRUCTURAL STEEL FRAMING

- A. Unless otherwise specified, the minimum standard design thickness of structural framing members shall be as follows:
 - 1. Webs of welded built-up members: 0.125"
 - 2. Flanges of welded built-up members: 0.188"
 - 3. Cold-formed secondary framing members: 0.060"
 - 4. Cable bracing: 0.250
 - 5. Rod bracing: 0.625"
 - 6. Angle bracing: 0.1875"
- B. All hot-rolled sheet, plate, and strip steel used in webs from 0.125" to 0.225" thick shall conform to the provisions of ASTM A-1011 SS or HSLAS Grade 55 (55,000 psi minimum yield strength).
- C. All hot-rolled sheet, plate, and strip steel used in webs with thicknesses greater than 0.230" (to 0.500" inclusive) shall conform to ASTM A-572 Grade 55 (55,000 psi minimum yield).
- D. All hot-rolled flat bars used in flanges shall conform to the provisions of ASTM A-572 or A-529 Grade 55, with minimum yield of 55,000 psi.
- E. All wide-flange, channel, and "S" shapes shall conform to the provisions of ASTM A-36, ASTM A-572, or ASTM A-992.
- F. All tube and pipe shapes shall conform to ASTM A-500, Grade B.
- G. All hot-rolled or cold-rolled sheet and strip steel less than 0.150" thick used in fabrication of cold-formed structural members shall be of ASTM A-1011, Grade 55 (55,000 psi minimum yield stress).
- H. Structural steel members shall be sheared, formed, punched, welded, and painted by the manufacturer.
- I. All shop connections shall be welded in conformance with standards based upon the current edition of AWS D1.1, D1.8, or CSA W59.
 - 1. Welders and welding operators shall be qualified as provided in these same codes.
- J. All field connections of primary structural members shall be bolted with high strength bolts and nuts (ASTM A-325 or A490) and shall be snug tightened unless otherwise specified.
 - 1. Secondary structural members shall be field bolted with ASTM A-307, or A-325 bolt assemblies as called for in design.
- K. Light gage cold-formed sections shall be manufactured by roll or brake-forming. All dimensions shall be fabricated to MBMA tolerances.
- L. Do not splice load bearing members.
- M. All structural-framing members that are not galvanized shall be given one shop coat of a red primer and applied to a nominal thickness of 0.8 mil.

- N. All framing members shall have identifying marks to aid the erector in the erection of the building

2.03 PRIMARY MEMBERS

- A. Members fabricated from plate, plate coils, strip mill plate, or flat bar stock shall have flanges and webs joined on at least one side of the web by a continuous welding process. Minimum yield strength: 50,000 psi.
- B. Members fabricated from W shapes, conforming to physical specification of ASTM A-529. Minimum yield strength of 42,000 psi.
- C. Steel for hot-rolled shapes must conform to the requirements of ASTM Specifications A-36, A-572 or A-992, with minimum yield of 36 or 50 ksi, respectively.
- D. Steel for built-up sections must conform to the requirements of ASTM A-1011, A-1018, A-529, A-572 or A-36 as applicable, with minimum yield of 42, 46, 50, or 55 ksi as indicated by the design requirements.
- E. Steel for Cold-Formed Endwall "C" sections shall conform to the requirements of ASTM A-1011 or A-1039 Grade 55, or ASTM A-653 Grade 55 with minimum yield strength of 55 ksi.
- F. Rigid frame, sidewall columns, rafter beams, and canopy beams shall be shop-welded, built-up "I" shapes.
 - 1. Members may be of constant depth or tapered, having base plates, necessary clips, and splice plates for completely field-bolted assembly and attachment of secondary members.
- G. Rafter beams and endwall columns shall be either built-up "I" shapes, "WF" shapes, or roll-formed "C" sections as required to satisfy load and span requirements. Interior columns shall be round pipe sections.
- H. Primary frames may not exceed 24" depth up to 9'-0" A.F.F.
- I. Portal frames may not exceed 16" depth.

2.04 SECONDARY MEMBERS

- A. Purlins, girts, and eave struts shall be cold formed from steel which has a minimum yield strength of 55,000 psi.
- B. Purlins shall be "Z" sections.
- C. Girts shall be "Z" sections or brake-formed "C" sections.
- D. Eave struts shall be roll-formed or brake-formed "C" sections.
- E. Steel used to form purlins, girts, and eave struts must meet the requirements of ASTM A-1011 or ASTM A-1039 Grade 55 for primed material or ASTM A-653 Grade 55 for galvanized material with a minimum yield of 55 ksi.
- F. Design Thicknesses – Gauge to be determined by design to meet specified loading conditions.

- G. Base support for wall panels shall consist of a continuous base angle, base angle flash, or base girt which shall be securely attached to concrete using powder actuated drive pins or nails, expansion anchors, or other similar anchorage.

2.05 BRACING

- A. Wind bracing shall consist of diagonal cable, rod, or angle bracing.
 - 1. Adjustment to cable braces shall be made by an eyebolt assembly.
 - 2. Adjustment to rod bracing may be by threaded assembly.
 - 3. Angle bracing is not adjustable and may require final field welding.
- B. Flange bracing shall consist of angle bracing connected to the web of the purlin or girt and to the compression flange of the primary structural member.
 - 1. Flange braces shall be attached to bar joists either by field bolting or field welding.
- C. Transverse wind and seismic forces shall be transferred to the foundation through the use of portal bracing at walls in combination with "X" bracing in the plane of the roof.
- D. X-bracing shall conform to ASTM A-36 or ASTM A-529 for rod and angle bracing or ASTM A-475 for cable bracing.
- E. Cable used for diagonal bracing shall conform to ASTM A-475; coating Class A, Grade- Extra High Strength 7 wire.
 - 1. Threaded rod shall meet ASTM A-529 or A-572, Grade 50 requirements.
 - 2. Angle sections shall meet minimum A-36, A-572 or A-529 Grade 50 requirements.

2.06 FASTENERS

- A. ASTM A-325
- B. Anchor bolts shall be of sufficient length to extend to the bottom mat of reinforcing steel.
- C. Rigid Frame Connections
 - 1. Provide high strength bolts, nuts, and washers:
 - 2. Bolts: ASTM A 325 or ASTM A 490 Heavy Hex Structural Type I as required by manufacturer's design.
 - 3. Washers: ASTM F 436 Type 1 Hardened Steel
 - 4. Nuts: ASTM A 563 Grade C Heavy Hex.
 - 5. Coating: ASTM F 1941 Electrodeposited Yellow Zinc or Hot-Dipped Galvanized
- D. Roof panel to secondary structural fastener shall be a No. 12 self-drilling carbon steel screw, hex washer head with sealing washer, 1-1/4" long.

- E. Panel to panel, flash to flash, fastener for roof shall be a No. 12 self-drilling carbon steel screw, hex washer head with sealing washer, 7/8" long.
- F. Fasteners shall have a 20-year corrosion resistant coating.
- G. Fasteners shall have a painted head to match panel and/or trim color when used with painted materials.

2.07 INSULATION

- A. Fiberglass blanket insulation is required underneath all roof and wall panels of conditioned spaces.
 - 1. 3" fiberglass
 - 2. Laminated to 3.2 mil vinyl.
- B. UL flame spread of 25 or less.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refer to Section 017300 Execution.
- B. Ensure that plumbing and electrical items affecting this Section of work are properly placed and complete prior to commencement of installation.

3.02 PREPARATION

- A. Take special care to coordinate the work of this section with the following work sections:
 - 1. Section 033000 Cast-In-Place Concrete. Furnish and install anchor bolts, and anchor bolt setting plan, and anchor bolt templates for mounting of primary framing elements.
 - 2. Section 042200 Concrete Masonry Units
- B. Clean surfaces prior to installation.
- C. Prepare surfaces using methods recommended by manufacturer for best result for substrate.

3.03 FABRICATION

- A. Fabricate according to manufacturer's written instructions.
 - 1. Fabricate structural members made of welded plate sections by jointing the flanges and webs by continuous automatic arc welding process.
 - 2. Welding operators and processes shall be qualified in accordance with AWS D1.1.
 - 3. Prepare members for bolted field connection by making punched, drilled, or reamed holes in the shop.

- B. All surfaces must be cleaned of loose rust, loose mill scale, and other foreign matter prior to shop priming.
- C. All painted surfaces shall be free of excessive drips, runs, sags, and cracking.
 - 1. Reference MBMA and AISC for intended primer protection, proper care, erection, and function of shop prime coat.
- D. Mark all fabricated parts individually, using an identification marking corresponding to the marking shown on the Shop Drawings, using a method that remains visible after shop painting.
- E. Provide temporary bracing, shoring, blocking, bridging to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing.
- F. Tolerances
 - 1. Framing Members: 1/4 inch from level; 1/8 inch from plumb.
 - 2. Racking: 1/8 inch from true position. Provide shoring to maintain position prior to cladding installation.

3.04 ERECTION

- A. Erect framing in compliance with the latest edition of the MBMA Metal Building Systems Manual.
- B. Comply with all appropriate legal and safety requirements.
- C. Erect framing in accordance with manufacturer's instructions and approved Shop Drawings.
 - 1. Install structure and panels square, plumb, and level.
 - 2. Do not erect frames without complete installation of tie beams and anchorages.
 - 3. Set column base plates with non-shrink grout to full plate bearing.
 - 4. Do not field cut or alter structural members without written approval.
 - 5. After erection, prime welds, abrasions, and surfaces not primed with primer used in shop painting.

3.05 ROOF AND WALL PANEL INSTALLATION

- A. Install roof and wall panels in accordance with manufacturer's installation instructions and approved Shop Drawings.
- B. Use concealed fasteners.
- C. Locate end laps over supports.
 - 1. Lap panels according to manufacturer's recommendations.
- D. Place side laps over adjacent panel and mechanically seam per erection guidelines.

- E. Seal end-laps, side-laps, and accessories watertight and weather tight with a continuous row of tape mastic to prevent air and water from infiltrating the building.
- F. Provide expansion joints where indicated.
- G. Install system free of rattles or noise due to thermal movement and wind whistles.
- H. Install trim to maintain visual continuity of system.
- I. Flash penetrations through roofing with metal trim to match panels.
- J. Do not mark panels with any graphite or lead markers.
- K. Cutting
 - 1. When field-cutting or mitering roof panels, use non-abrasive cutting tools such as nibblers or tinsnips.
 - 2. Do not use abrasive cutting tools such as mechanical grinders, saws, shears, or scissors.

3.06 GUTTERS AND DOWNSPOUTS

- A. Rigidly support and secure gutters and downspouts.
 - 1. Join lengths with formed seams sealed watertight.
 - 2. Flash and seal gutters to downspouts.

3.07 CLEANING

- A. Refer to Section 017420 for Final Cleaning.
- B. Remove protective coverings. Remove decals, adhesives, and tape residue. Test all solvents on non-exposed surfaces prior to use.
- C. Clean surfaces after installation, according to manufacturer's written instructions.
- D. Clean roof surface daily of all filings, cuttings, screws, pencil markings, and debris to prevent damage due to oxidation of foreign materials.
- E. Thoroughly clean all panels, trim, and gutters of all foreign material upon completion of construction.
- F. Remove from the site all trash and debris that results from the operations of this category of work.

3.08 PROTECTION

- A. Protect frames and panels from damage during remainder of construction period.

END OF SECTION

**SECTION 313116
TERMITE AND INSECT CONTROL**

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Treatment below all new building slabs on grade and concrete foundation systems for subterranean insects.

1.02 REFERENCES

- A. EPA – Federal Insecticide, Fungicide and Rodenticide Act.
- B. USDA Forest Service.
- C. Mississippi Bureau of Plant Industry.

1.03 QUALITY ASSURANCE

- A. Applicator: Company specializing in soil treatment for termite control with three years documented experience.
- B. Materials: Provide certification that toxicants comply with requirements of EPA.
- C. Material Packaging: Manufacturer's labels and seals identifying content.

1.04 REGULATORY REQUIREMENTS

- A. Comply with State of Mississippi requirements for application licensing and authority to use toxicant chemicals.
- B. Comply with requirements of EPA.

1.05 PRODUCT DATA

- A. Submit product data.
- B. Indicate toxicants to be used, composition by percentage, dilution schedule, and intended application rate.
- C. Submit manufacturer's installation instructions.
- D. Submit warranty document for approval.

1.06 WARRANTY

- A. Provide five-year warranty for material and installation.
- B. Warranty: Cover against invasion or propagation of subterranean termites; damage to building or building contents caused by termites; repairs to building or building contents so caused.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Chemicals used shall be labeled and approved for termite control by the USDA, the Mississippi Department of Agriculture and Commerce – Bureau of Plant Industry and the EPA for use as a termite toxicant for which prolonged effectiveness may be anticipated.
- B. Products used must have passed the USDA 5-year field test.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that substrate is in friable condition with moisture content low enough to permit absorption of toxicant solution.
- B. Do not begin work until all preparatory work for slab placement has been completed.

3.02 APPLICATION

- A. Apply soil treatment to areas beneath concrete slabs and grade beams. The intent is to create a monolithic barrier to insects beneath the building foundation.
- B. Rates of Application:
 - 1. Apply in strict accordance with chemical manufacturer's written instructions.
 - 2. Strictly comply with EPA requirements and regulations.
- C. Application Technique:
 - 1. Treatment shall not be made when substrate is wet or immediately after heavy rains.
 - 2. Avoid surface flow of toxicant from the application area.
 - 3. Unless substrate is promptly covered with fill and vapor barrier, precautions shall be taken to prevent disturbance of the treatment and human or animal contact with treatment and treated soil.
- D. Reapply treatment if rainfall follows initial treatment or if slab is not poured within 24 hours of treatment.

END OF SECTION

SECTION 22 00 00
PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Section 23 01 00 - Mechanical General Requirements and Section 22 05 00 - Basic Materials and Methods, with modifications and additions specified herein, apply to the work specified in this Section.

1.2 SECTION INCLUDES:

- A. Soil, Waste, Drain, and Vent Systems.
- B. Domestic Water Piping System
- C. Plumbing Fixtures, Specialties, and Equipment.

1.3 SUBMITTALS:

- A. Submit product data and shop drawings under provisions of Section 23 01 00.
- B. Include component sizes, rough-in requirements, service sizes, trim, and finishes.
- C. Include certificate of compliance of pipe, fittings, and valves.

1.4 QUALITY ASSURANCE:

- A. Welders' Certification: In conformance with AWS D1.1.
- B. For each product, provide components by same manufacturer throughout

PART 2 - PRODUCTS

2.1 SOIL, WASTE, DRAIN, AND VENT PIPING:

- A. Underground Soil, Waste, Drain and Vent Piping:
 - 1. Polyvinyl Chloride (PVC) pipe and fittings shall be manufactured from PVC compound with a cell class of 12454 per ASTM D-1784 and conform with National Sanitation Foundation (NSF) standard 14. Pipe shall be iron pipe size (IPS) conforming to ASTM D-1785 and ASTM D-2665. Fittings shall conform to ASTM D-2665. All pipe and fittings to be produced by a single manufacturer and to be installed in accordance with manufacturer's recommendations and local code requirements. Solvent cements shall conform to ASTM D-2564; primer shall conform to ASTM F-656.
- B. Above Ground Soil, Waste, Drain and Vent Piping:
 - 1. Polyvinyl Chloride (PVC) pipe and fittings shall be manufactured from PVC compound with a cell class of 12454 per ASTM D-1784 and conform with National Sanitation Foundation (NSF) standard 14. Pipe shall be iron pipe size (IPS) conforming to ASTM D-1785 and ASTM D-2665. Fittings shall conform to ASTM D-2665. All pipe and fittings to be produced by a single manufacturer and to be installed in accordance with manufacturer's recommendations and local code requirements. Solvent cements shall conform to ASTM D-2564; primer shall conform to ASTM F-656.

- C. Cleanouts and Test Tees: Floor cleanouts shall be Smith 4031 series, Josam Series 58000, Zurn Z1425-3, or approved equal. Wall cleanouts shall be Smith 4710, Josam Series 58000, Zurn Z1440-1, or approved equal. Exterior Cleanouts shall be Smith 4231 series, Josam Series 56040, Zurn Z1420-27, or approved equal. Set in 15" x 15" x 6" concrete pad.

2.2 INTERIOR DOMESTIC WATER PIPING:

A. Materials:

1. Pipe shall be manufactured from cross-linked polyethylene (PEX) conforming to ASTM F876 & F877. Cold water piping shall be colored blue and hot water piping shall be colored red. Fittings shall be manufactured from solid brass and conform to ASTM F1807. Pipe and fittings shall be manufactured as a system and be the product of one manufacturer. All pipe and fittings shall be manufactured in the United States. Pipe and fittings shall conform to National Sanitation Foundation (NSF) Standard 61. Installation shall comply with the latest installation instructions published by the manufacturer.
- B. Water Hammer Arresters: Permanently sealed mechanical device, pre-charged, threaded connection. ASSE 1010 – 2004 certified. Install as close as possible to quick-closing valve. No access panel shall be required. Unit shall be hard drawn sealed copper body with plastic rings and piston, threaded adapter equal to Sioux Chief 650 series.
- C. Ball Valves: Valve shall have two piece forged brass or cast bronze body, blowout proof stem, PTFE seats/seals, chrome plated ball and full port design. Valves sizes 1/4" - 2" shall be pressure rated to 150 WSP/600Wog and conform to MSS-SP 110 and certified to CSA, UL, and FM. Valves Sizes 2 1/2" - 3" shall be pressure rated to 150 WSP/400 WOG and conform to MSS-SP 110. Provide extension through insulation as required. Valve shall be equal to Kitz valve #69.

2.3 PLUMBING FIXTURES SCHEDULE: Fixtures shall be Kohler, Crane, Eljer or American Standard equal to manufacture's numbers specified herein for identification of type.

AMERICAN STANDARD

FLUSH Valves

- A. WC-1 , Watercloset for Handicapped: General Description: 1.6 gal flush, Vitreous china, elongated bowl, 18" high, siphon jet action, 1-1/2 top spud, quiet flush valve with vacuum breaker and 1" angle stop, open front white seat with stainless steel self-sustaining check hinge.
1. Fixture: Equal to American Standard "MADERA" #3043.102
 2. Seat: Beneke #523-SS
 3. Valve, Manual: Sloan 111 –XL flush valve. Install flush valve in accordance with ADA guidelines.

WALL HUNG SINKS

- A. L-1, Lavatory: Vitreous china lavatory with back and soap depression, 20" x 18", concealed wall hanger, single faucet, self closing handle with aerator, angle supplies with stops and flexible risers and 1-1/4" cast brass adjustable "P" trap with cleanout and waste to wall.

1. Fixture: American Standard "LUCERNE" #0355.021

2. Faucet, Manual ADA: American Standard #1340.119
3. Drain: Dearborn Brass #760-1
4. P-Trap: Dearborn Brass #707-1

Supply: Brass Craft #OCR1920AZ C

MOP SINK

CORNER

- A. MS-1, Mop Sink: Precast Terrazzo mop sink 24" x 24" x 12" with 6" drop front, corner model with stainless steel cap on front curb. Chrome plated service faucet with integral stops, vacuum breaker, pail hook and 3/4" thread on spout with 30" hose/hose bracket and mop hanger.
 1. Fixture: Stern-Williams SBC-1700
 2. Faucet: Stern-Williams #T-15-VB
 3. Hose/Bracket: Stern-Williams #T-35
 4. Mop Hanger: Stern-Williams #T-40.

2.4 PLUMBING SPECIALTIES: Furnish and install the following plumbing specialties:

- A. HB-1, Non-Freeze Hose Bibb: Woodford Model B65 or equal, cast brass, vacuum breaker, heavy duty, wall hydrant with polished brass face, brass working parts, renewable nylon seat, 3/4" NPT hose outlet and T-handle.
- B. FD-1, Floor Drain: Equal to Josam #30003-A, Smith #2005-A (3") or Zurn #Z415 with Type B strainer. (Equal to Josam #30003-S, Smith #2005-A (3") or Zurn #Z415 with Type S strainer.) square. Install mechanical trap guard.
- C. FD-2, Floor Drain with Trap Primer: Equal to Josam #30003-5A-50 #8803 adaptor, and #88250-10 trap seal primer, Smith #2005-C (3") auxiliary inlet #2696, with automatic trap primer #2699-CP, Zurn #Z415 with type B STRAINER trap primer connector Z-1023 and Sani-gard primer Z-1022. All exposed piping to be chrome plated. (Equal to Josam #30003-5S-50 #8803 adaptor, and #88250-10 trap seal primer, Smith #2010-B (3") auxiliary inlet #2696, with automatic trap primer #2699, Zurn #Z415 with type S STRAINER trap primer connector Z-1023 and Sani-gard primer Z-1022. All exposed piping to be chrome plated.)square
- D. Lavatory Support: Equal to Smith 700, Josam 17100 Series or approved equal.
- E. AD-1, Access Door: White painted 10" x 10" lockable ceiling access door. Equal to Williams Corp. # WB-DW.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General: Installation of plumbing systems including fixtures, equipment, materials, and workmanship shall be in accordance with all local plumbing, building, and fire code requirements. When fixtures require both hot water and cold water supplies, provide the hot water supply to the left of the cold water supply. Plastic piping shall not penetrate fire rated walls, floors, or enclosures (including plenums) and shall be used on one side of

fire rated partitions not closer than 6 inches to a penetration.

3.2 PREPARATION:

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
- B. Verify adjacent construction is ready to receive rough-in work of this Section.

3.3 INSTALLATION:

- A. Install bell and spigot pipe with bell end upstream. Slope pipe in accordance with the requirements of SBCC Standard Plumbing Code.
- B. Tracer wire shall be installed for ductile-iron pipe and fittings in accordance with Section 23 01 00.
- C. Install specialties in accordance with manufacturer's instructions.
- D. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- E. Install water hammer arresters complete with accessible isolation valve.
- F. Install each fixture with chrome plated rigid or flexible supplies with stops, reducers, and escutcheons.
- G. Adjust stops or valves for intended water flow rate to fixture without splashing, noise, or overflow.
- H. Install water heaters in accordance with manufacturer's instructions and to UL requirements. Coordinate with plumbing piping and related electrical work to achieve a satisfactory operating system.
- I. While under construction, unattended exposed pipelines must have the ends capped. All materials to be used in construction shall be stored above the ground in a manner that will minimize the possibility of contamination.
- J. Where water lines cross over sewer lines, the pipe segments should be centered to provide maximum spacing of joints. A vertical separation of at least 18 inches should be maintained (water over sewer).
- K. Install tanks in accordance with manufacturer's instructions.
- L. Provide protective systems for all trench excavations in excess of 5 feet in depth as described by OSHA Regulation 1926.652: Requirements for Protective Systems.

3.4 FIELD TESTS:

- A. Waste and Drainage Piping: The entire drainage and venting system shall have all necessary openings plugged to permit the entire system to be filled with water to the level of the highest vent stack above the roof. The system shall hold this water for 30 minutes without showing a drop greater than 4". Where a portion of the system is to be tested, the test shall be conducted in the same manner as described for the entire system, except that a vertical stack 10 feet above the highest horizontal line to be tested may be installed and filled with water to maintain sufficient pressure or a pump may be used to supply the required pressure. The pressure shall be maintained for thirty minutes. Contact the A/E representative for test verification.

- B. Domestic Water Piping: Upon completion of the roughing-in and before setting fixtures, the entire hot and cold water piping system shall be tested at a hydrostatic pressure of not less than 100 pounds per square inch gauge, and proved tight at that pressure. Where a portion of the water piping system is to be concealed before completion, this portion shall be tested separately in the same manner as specified for the entire system. Contact the A/E representative for test verification.

3.5 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM:

- A. After completion of the construction and pressure testing of water distribution lines, they shall be flushed and disinfected using at least a 50 mg/L free chlorine solution for 24 hours or as described in the latest revision of AWWA C651. Large volume disposal of this water may require a permit from the Department of Environmental Quality/Office of Pollution Control.
- B. After completion of the construction and disinfection of water distribution lines, the contractor shall arrange for at least one microbiological water sample to be collected by a representative of the Mississippi State Department of Health or the Registered Professional Engineer in charge of the project, or the Certified Operator for the system from every dead-end line and every major looped line. Water being collected for testing shall not have chlorine residual higher than is normally maintained in other parts of the distribution system. No chlorine shall be present that is a result of line disinfection. No coliform bacteria and no confluent growth indication shall constitute a satisfactory sample when analyzed by the Mississippi State Department of Health or a laboratory certified by the State.
- C. Backflow Preventers: Provide a state certified tester to certify the backflow preventer operates properly and the results shall be sent to the City Engineer and the Water Department. The backflow preventer state forms shall be completed for proper operation of each device installed.

3.6 SERVICE CONNECTIONS:

- A. Provide new sanitary sewer service. Before commencing work check invert and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
- B. Provide new water service with water meter and backflow preventer. Provide sleeve in wall for service main and supported at wall, caulked and made watertight. Provide sleeve around service main to 6 inch above floor and 6 feet minimum below grade. Coordinate backflow preventer with Civil Engineer.

END OF SECTION

SECTION 22 05 00
BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Section 23 01 00 - Mechanical General Requirements, with modifications and additions specified herein, apply to the work specified in this Section.

1.2 SECTION INCLUDES:

- A. Noise and Vibration Isolation.
- B. Basic Piping Materials and Installation Procedures for All Piping Systems.
- C. Identification, Labeling, and Marking.
- D. Testing, Adjusting, and Balancing.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Type of pipe and fittings are specified under each piping system.

1.4 SUBMITTALS:

- A. Submit product data and shop drawings under provisions of Section 23 01 00.
- B. Submit noise and vibration isolation equipment data.
- C. Submit pipe hanger and support data along with certificate of compliance.
- D. Submit qualifications of testing and balancing firm.
- E. Include testing and balancing procedures (agenda) along with proposed forms.
- F. Submit final test and balance report.

1.5 QUALITY ASSURANCE:

- A. Agency: Testing and balancing agency shall be a company specializing in this type work for a minimum of three documented years and certified by AABC or NEBB.
- B. Welder Certification: In conformance with AWS D1.1.
- C. For each product, provide components by the same manufacturer throughout.
- D. Use domestic pipe, pipe fittings, valves, and motors on this project when available unless other specified.

PART 2 - PRODUCTS

2.1 NOISE AND VIBRATION ISOLATION

- A. Provide neoprene pads for all floor, base, and pad mounted equipment in accordance with ASHRAE A47.
- B. Provide spring and rubber type vibration isolators for all hanging equipment.

2.2 BASIC PIPING MATERIALS:

- A. Gate Valves: Valves up to 2-inch size shall have bronze body, bronze trim, inside screw, rising stem with hand-wheel, single wedge or disc, solder or threaded ends, Crane No. 1324, NIBCO No. S-126 or equal. Valves over 2-inches shall have iron body, bronze trim, rising stem with hand-wheel, OS&Y, double wedge, flanged ends.
- B. Butterfly Valves: Not accepted.
- C. Globe Valves: Valves up to 2-inch size shall have bronze body, bronze trim, rising stem and hand-wheel, inside screw, renewable composition disc, solder or screw ends to match adjacent piping, with back-seating capacity, and repackable under pressure. Valves over 2-inch size shall have iron body, bronze trim, rising stem, hand-wheel, OS&Y, plug type disc, flanged ends, renewable seat and disc.
- D. Ball Valves: Valves up to 2-inch size shall have bronze or stainless steel body, stainless steel ball, Teflon seats and stuffing box ring, lever handle, solder or threaded ends. Valves over 2-inch size shall have cast steel body, stainless steel ball, Teflon seat and stuffing box seals, lever handle, flanged ends.
- E. Plug Cocks: Plug cocks up to 2-inch size shall have bronze body, bronze tapered plug, non-lubricated, Teflon packing, threaded ends, with wrench operator. Plug cocks over 2-inch shall have iron body and plug, pressure lubricated, Teflon packing, flanged ends, with wrench.
- F. Swing Check Valves: Valves up to 2-inches shall have bronze body, 45 degree swing disc, solder or screwed ends. Valves over 2-inches shall have iron body, bronze trim, 45 degree swing disc, renewable disc and seat, flanged ends.
- G. Spring Loaded Check Valves: Iron body, bronze trim spring loaded, renewable composition disc and seat, screwed, wafer, or flanged ends.
- H. Strainers: Strainers up to 2-inches shall screwed brass or iron body, Y-pattern with stainless steel screen. Strainers over 2-inches shall have flanged iron body, Y-pattern with stainless steel screen.
- I. Escutcheon Plates: One piece or split hinge type metal plates for piping passing through floors, walls, and ceilings in exposed spaces, chromium-plated finish on plates in finished spaces, paint on plates in unfinished spaces, and with set screws to anchor plates in place securely.
- J. Unions: For pipe sizes under 2-inches use 150 psig malleable iron unions for threaded ferrous piping; bronze unions with solder joints for copper pipe.
- K. Flanges: For pipe size over 2-inches use forged steel slip-on flanges conforming to ANSI B16.1, Class 125, for use in ferrous piping; Bronze flanges conforming to ANSI B16.22 or B16.24 for use in copper tubing. Gaskets shall be full face flat type synthetic rubber, except use neoprene gaskets for gas service and shall conform with ANSI B16.21
- L. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, except both ends threaded for gas service, water impervious isolation. Use unions as manufactured by EPCO.
- M. Access Doors: Provide, 12" x 12" minimum size, factory prefabricated flush face steel access doors including steel door frame with continuous hinges and turn-screw-operated latch. Door frame shall be for installation in dry walls, plaster walls, or masonry walls. Furnish doors under this section to provide proper access to concealed valves; install doors under the appropriate section of this specification.

- N. Pipe Sleeves: Sleeves in masonry and concrete walls, partitions, floors, and roofs shall be constructed of, Schedule 40, hot-dipped galvanized, pipe conforming to ASTM A53. Sleeves in other type construction shall be constructed of steel sheet having a nominal weight of not less than 0.90 pounds per square foot.
- O. Flashing: Flashing for pipes passing through roof or waterproofing membrane shall be fabricated from 4-pound per square foot sheet lead. Flashing for plumbing vents through metal roof shall be made water-tight by special flashing obtained from the roof manufacture.
- P. Pipe Hangers and Supports: Provide MSS SP-58 and MSS SP-69, Type 1 or 6 of adjustable type. Attachments to steel W or S beams shall be with Type 21, 28, 29, or 30 clamps. Attachments to steel angles and channels (with web vertical) shall be with Type 20 clamp with beam clamp channel adaptor. Attachments to steel (with web horizontal) shall be with drilled hole on centerline and double nut and washer. Attachment to concrete shall be with Type 18 insert or drilled hole with expansion anchor. Attachment on roof shall be structural design with mechanically attached foam base, saddle for aligning pipe, and use of 3/8" or 1/2" threaded rod, equal to Roof Top Blox. Hanger rods and attachments shall be full size of the hanger threaded diameter. Provide Type 40 insulation protection shields for insulated piping. Provide steel support rods. Provide nonmetallic, hair felt or plastic piping isolators between copper tubing and the hangers or use copper hangers.
- Q. Tracer Wire for Nonmetallic Pipe: Tracer wire shall be bare copper wire not less than 0.10 inch in diameter and shall be continuous over entire length of nonmetallic pipe.

2.3 Identification:

- A. Stencils: With clean cut symbols and letters.
- B. Stencil Paint: In accordance with Section 09900, semi-gloss enamel.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

2.4 Adjusting, Balancing & Testing:

- A. General: The Contractor shall procure the services of an independent balance and testing firm, approved by the Architect which specializes in the balancing and testing of heating, ventilating and air conditioning systems; to balance, adjust, and test the mechanical systems performance in accordance with the contract plans and specifications.
- B. Quality: The testing firm shall be a member of Associated Air Balance Council. All work by this firm shall be done under direct supervision of a qualified engineer employed by them. The air balance firm shall provide proof of having successfully completed at least five projects of similar size and scope. All instruments used by this firm shall be accurately calibrated and maintained in good working order. If requested, the tests shall be conducted in the presence of the Contracting Officer.
- C. Testing: Balance and testing shall not begin until system has been completed and is in full working order. The Contractor shall put all heating, ventilation, and air conditioning systems and equipment into full operation and shall continue the operation of same during each working day of testing and balancing.
- D. Submittal: The Contractor shall submit six (6) copies of submittal data for the testing and balancing of the air conditioning, heating and ventilating systems.

- E. Warranty: Balance firm shall include and extended warranty of 90 days, after completion of work, during which time the Architect, at his discretion, may request a re-check of resetting of any water flow, outlet, supply air fan, or exhaust fan as listed in test report.

PART 3 - EXECUTION

3.1 NOISE CONTROL AND VIBRATION ISOLATION:

- A. Vibration Absorbing Supports: All items of mechanical piping and equipment, including compressors and pumps, shall be properly isolated from the building structure by means of approved vibration-absorbing supports or foundations. Each unit shall consist of machine and floor or foundation together with intermediate isolation materials. The isolation units shall be standard catalog products with printed loading ratings. The support for each piece of equipment shall be submitted for approval.

3.2 INSTALLATION OF PIPING:

A. Preparation:

1. Ream pipe and tube ends. Remove burrs. Bevel plain end of ferrous pipe.
2. Remove scale and dirt, on inside and outside of piping before assembly.
3. Prepare piping connections to equipment with flanges or unions.
4. Coordinate cutting or forming of roof or floor construction to receive drains to required invert elevations.

B. Installation:

1. Install piping to conserve building space and not interfere with use of space. Group piping whenever practical at common elevations. Route piping in an orderly manner, plumb, and parallel with the lines of the structure, and maintain gradient.
2. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
3. Install specialties and equipment in accordance with manufacturer's instructions.
4. Provide clearance for installation of insulation and access to valves and fittings.
5. Slope water piping and arrange to drain at low point.

C. Application:

1. Install specialties in accordance with manufacturer's instructions.
2. Install globe, plug cock, or ball valves for throttling, by-pass, or manual flow control services.
3. Install tracer wire over underground nonmetallic pipe.
4. Pipe Hangers and Supports: Support horizontal piping as follows:

<u>PIPE SIZE</u>	<u>MAXIMUM HANGER SPACING</u>	<u>HANGER ROD DIAMETER</u>
1/2 TO 1-1/4 INCH	6'-0"	3/8"
1-1/2 TO 2 INCH	8'-0"	3/8"
2-1/2 TO 3 INCH	10'-0"	1/2"

4 TO 6 INCH	12'-0"	5/8"
8 TO 12 INCH	14'-0"	7/8"
PLASTIC – ALL SIZES	4'-0" & AT ELBOWS	3/8"
CAST IRON PIPE	5'-0" & AT JOINTS	5/8"

5. Pipe Sleeves: Provide pipe sleeves where piping passes through walls, floors, roofs, and partitions. Secure sleeves in proper position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, floors, roofs, and partitions. Provide not less than 0.25-inch space between exterior of piping or pipe insulation and interior of sleeve. Firmly pack space with insulation and calk at both ends of the sleeve with plastic waterproof cement which will dry to a firm but pliable mass, or provide a segmented elastomeric seal. Seal both ends of penetrations through fire walls and fire floors to maintain fire resistive integrity with UL listed fill, void, or cavity material. Extend sleeves in floor slabs 3 inches above the finished floor, except sleeves are not required where DWV piping passes through concrete floor slabs located on grade.
6. Flashing: Pipes passing through roof or floor waterproofing membrane shall be installed through lead flashing within an integral skirt or flange. Flashing shall be suitable formed and the skirt or flange shall extend not less than 8-inches from the pipe and shall set over the roof or floor membrane in a solid coating of bituminous cement. The flashing shall extend up the pipe a minimum of 8-inches. The annular space between the flashing and the bare pipe shall be sealed. Flashing for dry vents shall be turned down into the pipe to form a waterproof joint. A sheet-lead flashing shield shall be provided for floor drains and pipe sleeves with integral clamping devices that penetrate a membrane. Flashing shield shall be made from sheet lead and extend not less than 8-inches from the drain or sleeve in all directions. Flashing shall be inserted into the clamping device and made watertight.
7. Flanges and Unions: Flanges shall be faced true. Flanges shall be provided with gasket and made square and tight. Except where copper tubing is used, union or flange joints shall be provided in each line preceding the connection to each piece of equipment or material requiring maintenance such as coils, pumps, control valves, and other similar items. A union shall be installed on the downstream of each valve.
8. Grading: Connections shall be carefully made to insure unrestricted circulation or flow, eliminate air pockets and permit draining of all systems. Hot and chilled water lines shall have a grade of not less than 1" in 40' up in the direction of flow to the high point air vent. Steam and steam condensate lines shall have a grade of not less than 1" in 20' down in the direction of flow. Use eccentric reducers to maintain top of heating and chilled water piping at proper grade and to maintain bottom of steam and steam condensate piping at proper grade.
9. Valve Stems: Valves in horizontal lines shall be installed with stems horizontal or above.

3.3 IDENTIFICATION, LABELING AND MARKING:

- A. General: Piping, valves, controls, and equipment shall be labeled or marked. Manufactured name plates and labels such as Brady or Seton will be acceptable and the Contractor is invited to submit, for examination and test, samples of materials he proposes to use.

- B. Piping: On all piping, stencil name of liquid or gas being handled, and direction of flow in contrasting colors. In general stencils shall be on piping at 20 foot intervals and near all operating valves & equipment. Lines less than 3/4" total diameter to be identified with brass tags, lines 1" to 2" to have 3/4" high stencils, lines 2-1/2" to 7" to have 1-1/2" high stencils and all larger lines to have 2" high stencils. Sizes given are after insulation is applied.
- C. Equipment: All apparatus, equipment, machines, controlling devices, controlled devices, starters, and switches are to be identified by name and number. Do not place label on cover or shield which is removable or interchangeable with other pieces. On all major equipment it shall be painted in prominent spots as selected. Number all boilers, fans, pumps, etc., as well as label.
- D. Valve Tags: All valves shall be provided with a nickel-plated brass tag not less than 1-1/2" in diameter with stamped numbers. Tag shall be secured to the valves with approved type S hooks. Also provide and mount under glass in the equipment room a typewritten valve list, listing functions of each valve, its location and service.

3.4 TESTING, ADJUSTING, AND BALANCING:

- A. General Requirements: All equipment and apparatus necessary for balancing and testing shall be furnished by the Contractor. All defects disclosed by the tests shall be rectified without additional cost to the Owner. Field tests shall be made under the direction and subject to the approval of the Contracting Officer.
- B. Piping Systems: Shall be tested after installation and before any insulation is applied. All controls and other apparatus that may be damaged by the test pressure shall be removed before the tests are made. Tests shall be made by the Contractor and the results submitted for approval. Each system shall be hydrostatically tested as outlined in applicable codes and standards. Test pressure shall be maintained for no less than 2 hours. No tar, grease, paint or any other compound shall be used to repair leaks.
- C. Operational Test: After the above testing all mechanical systems shall be started and operated to prove proper functioning of each type of equipment. Start-up and adjustment of the heat pumps shall be accomplished by the manufacturer's start-up Engineer. All operating tests shall be to the satisfaction of the Architect. Should any element not perform properly, the Contractor shall make all required corrections.
- D. The balance and testing firm shall test, balance, adjust and record the following for all systems as applicable.
 - 1. Test and adjust all blower RPM to design requirements.
 - 2. Test and record all motor full load amperes.
 - 3. Test and record system static pressure, suction and discharge.
 - 4. Test and adjust system for design recirculated air, CFM.
 - 5. Test and adjust system for design CFM outside air.
 - 6. Test and record entering air temperatures.
 - 7. Test and record leaving air temperatures.
 - 8. Test and adjust each diffuser, grilles and register to within ten percent of design requirements. Each grille, diffuser and register shall be identified as to location and area. Size, type, and manufacture of diffusers, grilles, registers, and all test

equipment shall be identified and listed. Manufacturer's ratings on all equipment shall be used to make required calculation.

9. In cooperation with the control manufacturer's representative, setting adjustment of automatically operated dampers to operate as specified, indicated and/or noted. Testing agency shall check all controls for proper calibrations and list all controls requiring adjustment by control installers.
- E. Performance Test: After completion of testing, balancing and adjusting the balance and testing firm shall make performance test of all mechanical system to determine compliance with the specification requirements. Any equipment that fails to equal or to exceed the specified performance shall be modified or replaced at no additional cost to the Owner.
- F. Test Data: The Contractor shall furnish to the Architect four (4) copies of the schedules of readings taken during the balance and testing operation indicating the required to specified reading and the final balanced reading of all items.

SECTION 23 00 00
HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Section 23 01 00 - Mechanical General Requirements, with modifications and additions specified herein, apply to the work specified in this Section.

1.2 SECTION INCLUDES:

- A. Variable Refrigerant Flow Systems
- A. Exhaust Fans and Accessories

1.3 QUALITY ASSURANCE:

- A. Fan Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.
- B. Fan Sound Ratings: AMCA 301; tested to AMCA 300 and bear AMCA Certified Sound Rating Seal.
- C. Fan Fabrication: Conform to AMCA 99 and/or ARI 430.

1.4 SUBMITTALS:

- A. Submit product data and shop drawings under provisions of Section 23 01 00.
- B. Submit manufacturer's installation instruction.
- C. Provide one (1) extra set of filters.

PART 2 – PRODUCTS

1.2 Variable Refrigerant Flow Systems

- A. System Description: The variable capacity, heat pump heat recovery air conditioning system shall be Variable Refrigerant Flow System. The system shall consist of the outdoor unit, multiple indoor units, and DDC (Direct Digital Controls). Each indoor unit or group of indoor units shall be independently controlled.
- B. Quality Assurance
 - 1. The units shall be listed by Electrical Laboratories (ETL) and bear the ETL label.
 - 2. All wiring shall be in accordance with the National Electrical Code (N.E.C.).
 - 3. The units shall be manufactured in a facility registered to ISO 9001 and ISO 14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).
 - 4. The condensing unit shall be pre-charged with R410A refrigerant sufficient for the outdoor unit, indoor units and 164' of total extended piping length.
- C. Delivery, Storage and Handling: Unit shall be stored and handled according to the manufacturer's recommendation.

D. Warranty: The units shall have a manufacturer's warranty for a period of one (1) year from date of installation. The compressor shall have a warranty of six (6) years from date of installation. If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer. This warranty does not include labor.

E. OUTDOOR UNITS:

1. HEAT PUMP (3-4 Tons):

a)General: The outdoor unit shall be a horizontal discharge, 208/230 volt, single-phase unit. The outdoor units shall be equipped with multiple circuit boards that interface to the controls system and shall perform all functions necessary for operation. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.

(i)The sum of connected capacity of all indoor units shall range from 50% to 130% of outdoor rated capacity.

(ii)Outdoor unit shall have a sound rating no higher than 52 dB(A).

(iii)Both refrigerant lines from the outdoor unit to indoor units shall be individually insulated.

(iv)The outdoor unit shall have an accumulator with refrigerant level sensors and controls.

(v)The outdoor unit shall have a high pressure safety switch, low pressure safety switch and over-current protection and DC bus protection.

(vi)The outdoor unit shall have the ability to operate with a maximum height difference of 98 feet and have a total refrigerant tubing length of 393 feet. The greatest length is not to exceed 262 feet between the outdoor unit and the CITY MULTI indoor units and shall not require line size changes nor traps.

(vii)The outdoor unit shall have rated performance for heat operation at 10°F ambient temperature without additional low ambient controls.

(viii)The outdoor unit shall be capable of cooling operation down to 23°F outdoor ambient without additional low ambient controls.

(ix)The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.

b)Unit Cabinet: The casing shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.

c)Fan:

(i)The unit shall be furnished with two direct drive variable speed motors.

(ii)The fans will be forward curved type blades for quiet operation.

(iii)The fan motor shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.

(iv)The fan motor shall be mounted for quiet operation.

(v)The fan shall be provided with a raised guard to prevent contact with moving parts.

(vi)The outdoor unit shall have horizontal discharge airflow.

d)Refrigerant: System shall use R410A refrigerant.

e)Coil:

(i)The outdoor coil shall be of nonferrous construction with lanced or corrugated fins on copper tubing.

(ii)The coil fins will have a factory applied corrosion resistant blue-fin finish.

(iii)The coil shall be protected with an integral metal guard.

(iv) Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.

f) Compressor:

(i) The compressor shall be a single high performance, inverter driven, modulating capacity scroll compressor.

(ii) The outdoor unit compressor shall have an inverter to modulate capacity. The capacity shall be completely variable down to 16% of rated capacity.

(iii) The compressor shall be equipped with an internal thermal overload.

(iv) The compressor shall be mounted to avoid the transmission of vibration.

g) Electrical:

(i) The outdoor unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.

(ii) The unit shall be capable of satisfactory operation within voltage limitations of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz)

(iii) The outdoor unit shall be controlled by integral microprocessors.

(iv) The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair, non-polar shielded cable to provide total integration of the system.

2. HEAT PUMP (6-20 Tons):

a) General: The outdoor unit shall be a vertical discharge, 208/230 volt, single-phase unit. The outdoor units shall be equipped with multiple circuit boards that interface to the controls system and shall perform all functions necessary for operation. The outdoor unit shall have a powder coated finish and be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.

(i) The sum of connected capacity of all indoor air handlers shall range from 50% to 130% of outdoor rated capacity.

(ii) Outdoor unit shall have a sound rating no higher than 63 dB(A).

(iii) Both refrigerant lines from the outdoor unit to indoor units shall be insulated.

(iv) The outdoor unit shall have an accumulator with refrigerant level sensors and controls.

(v) The outdoor unit shall have a high pressure safety switch, over-current protection and DC bus protection.

(vi) The outdoor unit shall have the ability to operate with a maximum height difference of 164 feet and have a total refrigerant tubing length of 984 feet. The greatest length is not to exceed 492 feet between the outdoor unit and the indoor units without the need for line size changes or traps.

(vii) The outdoor unit shall be capable of operating in heating at -4°F ambient temperature without additional low ambient controls.

(viii) The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.

b) Unit Cabinet: The casing(s) shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.

c) Fan:

(i) The 6-12 ton outdoor unit shall be furnished with one direct drive, variable speed propeller type fan.

(ii) The 14-20 ton outdoor unit shall be furnished with two direct drive, variable speed propeller type fans.

(iii) The fan motor shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.

- (iv)The fan motor shall be mounted for quiet operation.
- (v)The fan shall be provided with a raised guard to prevent contact with moving parts.
- (vi)The outdoor unit shall have vertical discharge airflow.

d)Refrigerant: Unit shall use R410A refrigerant.

e)Coil:

- (i)The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
- (ii)The coil fins shall have a factory applied corrosion resistant blue-fin finish.
- (iii)The coil shall be protected with an integral metal guard.
- (iv)Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.
- (v)The outdoor coil shall include 4 circuits with two position valves for each circuit, except for the last stage.

f)Compressor:

- (i)The 6-12 ton outdoor units shall be equipped with one inverter driven scroll hermetic compressor.
- (ii)The 14-20 ton outdoor unit shall be equipped with one inverter driven scroll hermetic compressor and one scroll hermetic compressor.
- (iii)A crankcase heater(s) shall be factory mounted on the compressor(s).
- (iv)The outdoor unit compressor shall have an inverter to modulate capacity. The capacity shall be completely variable down to 16% of rated capacity.
- (v)The compressor shall be equipped with an internal thermal overload.
- (vi)The compressor shall be mounted to avoid the transmission of vibration.

g)Electrical:

- (i)The outdoor unit electrical power shall be 208/230 volts, 3-phase, 60 hertz.
- (ii)The unit shall be capable of satisfactory operation within voltage limitations of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz)
- (iii)The outdoor unit shall be controlled by integral microprocessors.
- (iv)The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, non-polar twisted pair shielded cable to provide total integration of the system.

3. HEAT PUMP W/ SIMULTANEOUS HEATING & COOLING (6-20 Tons):

- a)General: The system shall consist of the outdoor unit, Branch Controller, indoor units, and DDC (Direct Digital Controls). Each indoor unit or group of indoor units shall be capable of operating in any mode independently of other indoor units or groups. System shall be capable of changing mode (cooling to heating, heating to cooling) with no interruption to system operation. The outdoor units shall be equipped with multiple circuit boards that interface to the controls system and shall perform all functions necessary for operation. The outdoor unit shall have a powder coated finish. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.
 - (i)The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of outdoor rated capacity.
 - (ii)Outdoor unit shall have a sound rating no higher than 63 dB(A).
 - (iii)Both refrigerant lines from the outdoor unit to the Branch Controller (Single or Main) shall be insulated.
 - (iv)There shall be no more than 3 branch circuit controllers connected to any one

outdoor unit.

- (v)The outdoor unit shall have an accumulator with refrigerant level sensors and controls.
 - (vi)The outdoor unit shall have a high pressure safety switch, over-current protection and DC bus protection.
 - (vii)The outdoor unit shall have the ability to operate with a maximum height difference of 164 feet and have total refrigerant tubing length of 984-1312 feet. The greatest length is not to exceed 492 feet between outdoor unit and the indoor units without the need for line size changes or traps.
 - (viii)The outdoor unit shall be capable of operating in heating down to -4°F ambient temperature without additional low ambient controls.
 - (ix)The outdoor unit shall not cease operation in any mode based solely on outdoor ambient temperature.
 - (x)The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.
- b)Unit Cabinet: The casing(s) shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.
- c)Fan:
- (i)The 6-12 ton outdoor unit shall be furnished with one direct drive, variable speed propeller type fan.
 - (ii)The 14-20 ton outdoor unit shall be furnished with two direct drive, variable speed propeller type fans.
 - (iii)All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.
 - (iv)All fan motors shall be mounted for quiet operation.
 - (v)All fans shall be provided with a raised guard to prevent contact with moving parts.
 - (vi)The outdoor unit shall have vertical discharge airflow.
- d)Refrigerant: Unit shall use R410A refrigerant
- e)Coil:
- (i)The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
 - (ii)The coil fins shall have a factory applied corrosion resistant blue-fin finish.
 - (iii)The coil shall be protected with an integral metal guard.
 - (iv)Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.
 - (v)The outdoor coil shall include 4 circuits with two position valves for each circuit, except for the last stage.
- f)Compressor:
- (i)The 6-12 ton outdoor units shall be equipped with one inverter driven scroll hermetic compressor.
 - (ii)The 14-20 ton outdoor unit shall be equipped with one inverter driven scroll hermetic compressor and one scroll hermetic compressor.
 - (iii)A crankcase heater(s) shall be factory mounted on the compressor(s).
 - (iv)The outdoor unit compressor shall have an inverter to modulate capacity. The capacity shall be completely variable down to 16% of rated capacity.
 - (v)The compressor will be equipped with an internal thermal overload.
 - (vi)The compressor shall be mounted to avoid the transmission of vibration.

g)Electrical:

- (i)The outdoor unit electrical power shall be 208/230 volts, 3-phase, 60 hertz.
- (ii)The outdoor unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253V (230V/60Hz).
- (iii)The outdoor unit shall be controlled by integral microprocessors.
- (iv)The control circuit between the indoor units, BC Controller and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

h)Branch Controllers:

- (i)General: The Branch Controllers shall be specifically used with R410A systems. These units shall be equipped with a circuit board that interfaces to the controls system and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish. The Branch Controller shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory. This unit shall be mounted indoors. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of rated capacity.

(ii)BC Unit Cabinet:

- (a)The casing shall be fabricated of galvanized steel.
- (b)Each cabinet shall house a liquid-gas separator and multiple refrigeration control valves.
- (c)The unit shall house two tube-in-tube heat exchangers.

(iii)Refrigerant: Unit shall use R-410A refrigerant.

(iv)Refrigerant valves:

- (a)The unit shall be furnished with multiple branch circuits which can individually accommodate up to 54,000 BTUH and/or three indoor units. Branches may be twinned to allow more than 54,000 BTUH.
- (b)Each branch shall have multiple two-position valves to control refrigerant flow.
- (c)Service shut-off valves shall be field-provided/installed for each branch to allow service to any indoor unit without field interruption to overall system operation.
- (d)Linear electronic expansion valves shall be used to control the variable refrigerant flow.

(v)Integral Drain Pan: An integral condensate pan and drain shall be provided.

(vi)Electrical:

- (a)The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
- (b)The unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253V (230V/60Hz).
- (c)The BC Controller shall be controlled by integral microprocessors.
- (d)The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total

integration of the system.

F. INDOOR UNITS:

1. WALL-MOUNTED INDOOR UNIT

- a)General: The unit shall be wall-mounted indoor unit section with a slim silhouette and shall have a modulating linear expansion device. The unit shall be used with the VRF outdoor unit. The unit shall support individual control using DDC controllers.
- b)Indoor Unit: The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.
- c)Unit Cabinet:
 - (i)The casing shall have a white finish.
 - (ii)Multi directional drain and refrigerant piping offering four (4) directions for refrigerant piping and two (2) directions for draining shall be standard.
 - (iii)There shall be a separate back plate which secures the unit firmly to the wall.
- d)Fan:
 - (i)The indoor fan shall be an assembly with one or two line-flow fan(s) direct driven by a single motor.
 - (ii)The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
 - (iii)A manual adjustable guide vane shall be provided with the ability to change the airflow from side to side (left to right).
 - (iv)A motorized air sweep louver shall provide an automatic change in airflow by directing the air up and down to provide uniform air distribution.

2.1 EXHAUST FANS AND ACCESSORIES:

- A. General: This Contractor shall furnish and install all exhaust fans. Fans shall be of the sizes and types shown on the Drawings and shall be complete with all accessories and specials scheduled. Fans shall be rated in accordance with AMCA Standards and shall be AMCA labeled. All fractional horsepower motors shall be provided with internal overload protections.
- B. Ceiling Mounted Fans: Fans shall be of the centrifugal direct drive type. Each fan shall have a removable front grille and gravity discharge damper. Interior of fan housing shall be lined with sound deadening insulation. Provide appropriate roof jack or wall discharge grille and connecting ductwork. Fans shall be Greenheck Model SP-A, Cook Model GC, Twin City Fan Model T, Broan, or approved equal.
- C. Wall Caps: Wall caps for ceiling type exhaust fans shall consist of flanged extruded aluminum louver with a wall sleeve and a spring loaded backdraft damper. Caps shall be Greenheck Model WLSP or approved equal.

PART 3 – EXECUTION

3.1 INSTALLATION:

- A. Install equipment in accordance with manufacturer's installation instruction.

- B. Coordinate installation with architectural, structural, mechanical, and electrical work.
- C. Pipe refrigerant relief valves to the outside.
- D. Pipe drains to floor drain.
- E. Clean and flush system before placing in operation.
- F. Verify that the proper utilities are connected and ready for use before operation of equipment.

END OF SECTION

SECTION 23 01 00
MECHANICAL GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. The general provisions of the Contract, including General and Supplementary Conditions, DIVISION 1 - GENERAL REQUIREMENTS, apply to the work specified in this Division, with additions and modifications specified herein.

1.2 APPLICATION: This section applies to all sections of Division 23 - Mechanical Work of these specifications, including modifications and additions specified in each individual section.

1.3 DESCRIPTIONS OF WORK:

- A. Scope: The work covered by this Division of these Specifications consist of furnishing all labor, equipment, appliances, and materials, and in performing all operations in connection with the mechanical work, including all items of special equipment specified herein, complete in strict accordance with this Division of these Specifications and the applicable Drawings.
- B. Work Included: The work involves a complete mechanical system. Generally the work includes, but is not limited to the following items. Complete heating, ventilating and air conditioning system.

- Complete heating, ventilating and air conditioning system

- Domestic hot and cold water distribution system.

- Waste and drainage system.

- Plumbing fixtures, appliances, equipment, and specialties.

- Temperature control system and Instrumentation.

- Terminal and acoustical insulation.

- Mechanical rough-in and mechanical connection of equipment furnished under other Divisions of this Contract.

- Maintain a clean work area.

- Testing, adjusting and balancing of the mechanical system.

- Equipment and piping identifications.

- Miscellaneous other work for a complete and operative mechanical system.

- Structural steel for equipment supports.

1.4 Related Work Specified Elsewhere: Generally the following work is specified under other Divisions of the project Specifications.

- A. Electrical power wiring and power connection to equipment.
- B. All painting except restoring finish on equipment that has sustained damage during shipment or installation.
- C. Receiving, uncrating and installing equipment furnished by others or the Owner.

1.5 SITE CONDITIONS: Before submitting a proposal for the work contemplated in these Specifications and accompanying Drawings, each bidder shall examine the site and familiarize himself with all the existing conditions and limitations. No extras will be allowed

because of the Contractor's misunderstandings as to the amount of work involved or his lack of knowledge of any condition in connection with the work.

- 1.6 FEES, PERMITS AND INSPECTIONS: This Contractor shall secure and pay all fees, permits and inspections required on work performed under this section of the contract Specifications. Fees shall include, but not limited to, sewer, water and/or gas taps and all gas/ water meter fees charged by the utility companies. He shall assume full responsibility for all assessments and taxes necessary for completion and acceptance of this work.
- 1.7 APPLICABLE CODES AND STANDARDS: All materials, arrangements, and workmanship shall comply with all applicable codes, specifications, federal and state laws, local ordinances, industry standards and utility company regulations. In case of difference between building codes, Specifications, Federal and State laws, local ordinances, standards and utility company regulations and the Contract Documents, the most stringent requirement shall govern. The Contractor shall promptly notify the Architect in writing of such difference. Should the Contractor perform any work that does not comply with requirements of the applicable building codes, Federal and State laws, local ordinances, industry standards, and utility company regulations, he shall bear all costs arising in correcting the deficiencies. Applicable Codes and Standards shall include all state laws, State Board Health and State Rating Bureau, local ordinances, industry standards, and utility company regulations. Comply with applicable requirements of the following national accepted codes and standards as though they were copied herein fully:

ARI	Air Conditioning and Refrigeration Institute
ADC	Air Diffusion Council
AMCA	Air Moving & Control Association
AABC	American Air Balance Council
AGA	American Gas Association
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigeration & Air Conditioning Engineers - Handbook
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society of Testing Materials
AWS	American Welding Society
AWWA	American Water Works Association
CISPI	Cast-Iron Soil Pipe Institute
CTI	Cooling Tower Institute
FM	Factory Mutual System
HI	Hydronic Institute
IBC	International Building Code
IEEE	Institute of Electrical and Electronic Engineers
IPC	International Plumbing Code
MSS	Manufacturer's Standardization Society
MPTA	Mechanical Power Transmission Association
NBS	National Bureau of Standards
NEMA	National Electrical Manufacturers Association
NEBB	National Environmental Balancing Bureau
NFPA	National Fire Protection Association - Fire Codes
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Act Standards

PDI	Plumbing and Drainage Institute
SMACNA	Sheet Metal & Air Conditioning Contractors National Association
SAE	Society of Automotive Engineers
UL	Underwriters' Laboratories

1.8 APPROVAL OF MATERIALS AND EQUIPMENT:

- A. **Quality Standards:** Whenever a material, article or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard of quality and shall not be construed as limiting competition. Any material, article or piece of equipment of other manufacturers or vendors which will perform adequately the duties impose by the design will be considered equally acceptable provided the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance, appearance and function. It shall not be purchased or installed by the Contractor without the Architect's written approval. In order that all bidders, manufacturers, and vendors receive fair and equal consideration, the procedures described hereinafter shall be complied with.
- B. **Approval of Substitutions:** Prior written approval by the Architect/Engineer is required for substitutions for all materials, articles and equipment specified without qualifications or followed by "or prior approved equal". Request for prior approval shall be submitted to the Architect, with copy to Engineer, at least ten (10) days before time of bid opening. Approved substitutions will be included in an addendum to the Specification or in writing at the discretion of the Architect. Request for approval for materials, articles, and equipment qualified with "equal to" or "or equal" shall be submitted within 30 days after award of contract but before purchase. **IN CONNECTION WITH THE USE OF ANY ALTERNATE ITEM APPROVED BY THE ARCHITECT, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT SUCH ITEMS MEET ALL REQUIREMENTS, AND THAT ANY ALTERATIONS TO CONNECTING OR ASSOCIATED ITEMS NECESSITATED BY USE OF THE ALTERNATE ITEMS ARE PROPERLY MADE WITHOUT ADDITIONAL COSTS TO THE OWNER.** This includes but is not limited to added breakers, fuses, disconnects, wiring, or piping that is not indicated by scheduled equipment. Architect's opinion shall be final on quality of substituted items.
- C. **Manufacturer's Brochures and Shop Drawings:** As soon as practicable after award of the contract and before starting installation of any materials or equipment, the Contractor shall submit to the Architect for approval six (6) copies of Manufacturer's brochures and shop Drawings giving rating, operating characteristics, wiring diagrams, power requirements, etc., of the material and equipment proposed for installation. A complete electrical connection diagram for each electrically controlled component shall be submitted for approval. The connection diagram shall identify each component and shall show all interconnected and interlocked components. Automatic temperature control diagrams shall be submitted. All data submitted shall be sufficiently complete to demonstrate conformance with the Specification requirements. Drawings showing all ducts, piping and installation details shall be submitted for approval with Material and Equipment submittal if equipment is different from that indicated on the Drawings. Checking and approval of brochures and shop Drawings by the Architect shall not relieve the Contractor from the responsibility for deviations from the Drawings and Specifications unless he has in writing called the Architect's attention to such deviations at time of submission and secured his written approval, nor shall it relieve him of responsibility for errors or omissions in the shop Drawings. Checking and approval by the Architect is only for general conformance with design intent and contract

requirements. It is the Contractor's responsibility to verify the accuracy of dimensions, obtaining field dimensions, by comparison and measurements in the field. Final shop Drawings shall indicate field verified dimensions.

1.9 DEVIATIONS:

- A. Drawings: The Mechanical Drawings show the general arrangement of all piping, equipment, and appurtenances and shall be followed as closely as actual building construction and the work of other trades will permit. The mechanical work shall conform to the requirements shown on all of the Drawings. General and Structural Drawings shall take precedence over Mechanical Drawings. Because of the small scale of the Mechanical Drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly, providing such fittings, valves and accessories as maybe required to meet such conditions. If major departures from the contract Drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted as soon as practicable for approval. No major departures shall be made without prior written approval.
- B. Space Conditions: Every attempt has been made to design the systems so as to cover the installation of all equipment and connections thereto without interference to the structural design of the building. Contractor shall note that space in some locations is critical, and shall prior to installing his work coordinate the location with all other trades. If interference results from failure of the Contractor to exercise such caution, work shall be relocated as the Engineer ascertains would most facilitate job progress. Relocation shall be at the expense of the Contractor whose work is relocated, and the decision of the Engineer shall be final. If Contractor is unable to achieve desired cooperation with other trades and/or subcontractors, he is cautioned not to proceed but to inform the Engineer as to his difficulties. Contractor shall make offsets, transitions and changes in direction in pipe, ducts, etc., as required to maintain proper grades, or essential elevations.

1.10 COOPERATION: Cooperate and coordinate with others in laying out work so that this phase of the work will properly fit the building and other contractors' requirements. Priority of locations shall be as follows:

- Light Fixtures
- Ceiling Mounted Air Control Devices
- Fire Protection System
- Ductwork
- Plumbing Waste, Drain and Vent System
- Mechanical Equipment
- Electrical Equipment
- Mechanical Piping Mains
- Electrical Feeders

1.11 OPERATING AND MAINTENANCE INSTRUCTIONS:

- A. Bound Instructions: Four (4) complete sets of instructions containing the manufacturer's operating and maintenance instructions for each piece of equipment shall be furnished to the Owner. Each set shall be permanently bound and shall have a hard cover. One complete set shall be furnished at the time the test procedure is submitted, and the remaining sets shall be furnished before the Contract is completed. Flysheet shall be placed before instructions covering each subject. Flysheet shall be placed before

instructions covering each subject. The instructions sheets shall approximately 8-1/2" by 11" with large sheets of Drawings folded in. The instructions shall include, but shall not be limited to the following:

1. System layout showing piping, valves, and controls.
 2. Approved wiring and control diagrams, with data to explain the detailed operation and control of each component.
 3. A control sequence describing startup, operation and shutdown.
 4. Operating and maintenance instructions for each piece of equipment, including lubrication instructions.
 5. Manufacturer's bulletins, cuts and descriptive data.
 6. Parts lists and recommended spare parts.
- B. Framed Instructions: Approved wiring and control diagrams showing the complete layout of the entire system, including equipment, piping, valves and control sequence, framed under glass or in approved laminated plastic, shall be posted where directed. In addition, condensed operating instructions explaining preventive maintenance procedures, methods of checking the system for normal safe operation, and procedures for safely starting and stopping the system shall be prepared in type form, framed as specified above for the wiring and control diagrams and posted beside the diagrams. Proposed diagrams, instructions and other sheets shall be submitted for approval prior to posting.
- C. Field Instructions: Upon completion of the work and at a time designated, the services of one project engineer shall be provided by the Contractor to instruct the representative of the Owner in the operation and maintenance of the mechanical systems.
- D. Temporary Equipment: Mechanical Contractor shall not run HVAC equipment during duration of project when dust from construction is present. When space is properly cleaned, the Engineer will inspect space conditions and approve the use of HVAC equipment. If temporary heating/cooling is necessary for construction of project, Mechanical Contractor will need to notify other trades that it will not be provided by them.

1.12 RECORD DRAWINGS:

- A. This Contractor shall provide record Drawings at completion of job. Drawings to show all significant changes in piping, equipment, wiring, etc. The actual location of all piping drains, clean-outs, apparatus and equipment shall be indicated. These Drawings are to be turned over to the Architect at completion. All cleanouts and concealed equipment (below grade) to be dimensioned from building lines, etc.

1.13 CONNECTION OF EQUIPMENT FIXTURES FURNISHED BY OTHERS:

- A. This Contractor shall provide all necessary materials and labor to connect to the mechanical systems all equipment and fixtures having mechanical connection and which are specified in other Divisions of the project Specifications. Drainage connections shall be trapped. The supply and return lines for each item of equipment or fixture, except control valves with integral stops, shall be provided with cut-off valves to enable isolation of the item for repair and maintenance without interfering with the operation of other equipment or fixtures. Refer to other Divisions of the project Specifications for additional requirements. Actual rough-in dimensions shall be obtained from shop Drawings or measurements of the equipment or fixture.

- B. The unpacking, assembling and setting of equipment furnished by the Owner or under other than Mechanical Sections of these Specifications will not be performed under this Division of the Specifications.
- C. Due to the fact that the manufacture of the equipment actually purchased may vary slightly from that specified in the above lists and therefore require some rearranging of equipment different from that indicated on the Drawings, the Contractor shall make connections to such rearranged equipment without additional cost to the Owner. That is, for an initial installation arrangement other than that indicated on the Drawings. Equipment will be furnished complete with faucets, waste strainer and tailpiece. This Contractor shall supply traps, supplies, and stops for above equipment.

1.14 ELECTRICAL:

- A. Refer to the Electrical Drawings and Division 16, ELECTRICAL WORK, for the characteristic of the available electrical power. All motors and equipment under this contract to be compatible with the local voltages.
- B. For each and every motor installed under this section of the contract, furnish to the Electrical Contractor for installation the proper motor starter, where not specified to be furnished by the electrical contractor and where required, pushbuttons or hand-off automatic controls, or other required relays or control devices. All motors which start and stop automatically or as specified, shall be furnished with magnetic starters, pushbuttons and relays as required. The Electrical Contractor will wire from service to starter to motor. Any additional secondary control circuits, such as remote control stations, and temperature control wiring shall be provided under this Division. Each and every wire in each and every junction box, starter, pull box or where else terminating or connecting or visible shall be color coded and numbered using Brady Stick-On numbers or equivalent. Upon completion of all wiring, including control and secondary wiring, Contractor shall furnish finished shop Drawing showing each wire number and connecting points for each and every unit. Contractor shall 'meg' every circuit to determine leaks or shorts and correct same before calling for inspection by Engineer.
- C. All wiring installed under the responsibility of this Contractor shall be in conduit and in strict accordance with the National Electrical Code and DIVISION 16, ELECTRICAL WORK of the project Specifications.

1.15 WORKMANSHIP:

- A. All work shall be executed in a neat and substantial manner by skilled workmen well qualified and regularly engaged in the type of work required. Substandard work shall be removed and replaced by the Contractor at no cost to the Owner.

1.16 CUTTING AND PATCHING:

- A. This Contractor shall provide all cutting, digging, etc., incident to his work and shall make all required repairs thereafter to the satisfaction of the Architect, but in no case shall the Contractor cut into any major structural element beam or column without written approval of the Architect. Pavements, sidewalks, roads, curbs, walls, ceilings, floors and roofs shall be cut, patched, repaired and/or replaced as required to permit the installation of the work and such cutting, patching, repairing, and replacing shall be the responsibility of and paid for by the Contractor under this section of the Specifications.
- B. The Contractor shall bear the expense of all cutting, painting, patching, repairing or replacing of the work of other trades required because of his fault, error or tardiness or because of any damage done by him.

1.17 CLEANING AND PAINTING:

- A. The respective Contractors or Sub-contractors for the various phases of the work shall clear away all debris, surplus materials, etc., resulting from their work or operations, leaving the job and equipment furnished under any or all Contracts in a clean first class condition.
- B. All plumbing fixtures shall be thoroughly cleaned of all plaster, stickers, rust stains and other foreign matter or discoloration, leaving every part in an acceptable condition and ready for use. The surfaces of all pumps, motors, floor drains, cleanouts and other equipment shall be cleaned and each item shall be left in a first class condition.
- C. Painting of materials and equipment furnished under the mechanical portion of the Contract is specified under the General Construction Contract as described in other Sections. The Mechanical Contractor shall, however, refinish and restore to the original conditions and appearance, all mechanical equipment which has sustained damage to manufacturer's prime and finish coats of enamel or paint. Materials and workmanship shall be equal to the requirements described for other painting.

1.18 MECHANICAL DEMOLITION: Contractor shall visit the building to determine the existing conditions and review the items of work required to establish the planned and specified construction work. The Mechanical Contractor shall coordinate his demolition with the General Contractor, in establishing his schedule and shall consider the requirements that all activities of the existing building shall, during normal operating hours, with designated representatives of the Owner, and The Architect. All utility outages shall be approved through the Owner's Engineering Department. Contractor shall terminate and cap all active utility lines to the demolished areas, except that the Contractor shall maintain active lines that supply or drain the existing building to remain. Any damage during this contract, to existing utility lines serving the existing building to remain, shall be properly repaired and reactivated at no expense to the Owner. Contractor shall haul all debris, equipment, and fixtures from the site before any significant accumulation appears. Removal shall be done without undue noise, dust, and shall be accomplished without interfering with normal plant operations.

1.19 EQUIPMENT SAFETY: Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, rotating parts, and other power transmission apparatus, located so that any person can come in close proximity thereto, shall be fully enclosed or properly guarded in accordance with OSHA 1910.219. Provide positive means of locking out equipment so that it cannot be accidentally started during maintenance procedures. High-temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation of a type as specified. Ensure that access openings leading to equipment are large enough to carry through routine maintenance items such as filters and tools.

1.20 DELIVERY AND STORAGE: Equipment and materials shall be handled, stored, and protected to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Architect/Engineer. Damaged or defective items shall be replaced.

1.21 STANDARD PRODUCTS/SERVICE AVAILABILITY:

- A. Materials and Equipment: Materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products, which are of a similar material, design and workmanship. The standard products shall have been in satisfactory commercial or industrial use for two years prior to bid opening. The two-year use shall include applications of equipment and materials under similar

circumstances and of similar size.

- B. Experience Required: The two-year experience must be satisfactorily completed by a product which has been sold or is offered for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures.
- C. Service Support: The equipment items shall be supported by service organizations. The Contractor shall submit a certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.
- D. Manufacturer's Nameplate: Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

1.22 EXISTING UTILITIES, STRUCTURES AND OTHER PROPERTY: Prior to any excavation, it shall be the responsibility of the Contractor to locate and avoid damage to any and all existing water, gas, sewer, electric, telephone and all other underground utilities or structures. The Contractor shall contact the various local utility departments or other responsible agencies and obtain location Drawings, or other assistance in the locations of existing underground work. The Contractor shall repair or pay for all damage caused by his operations to all existing property, public or private, whether it is below or above ground, and shall settle in total cost all damage suits which may arise as a result of his operations.

1.23 GUARANTEE: This Contractor shall guarantee to Owner, all work performed under this contract to be free from defects in workmanship and materials for a period of one year from date of final acceptance by Architect and Owner. Any defects arising during this period will be promptly remedied by the Contractor without cost to the Owner. Compressors shall have a five (5) year warranty.

PART 2 - NOT APPLICABLE

PART 3 - NOT APPLICABLE

END OF SECTION

SECTION 23 07 00
INSULATION OF MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Section 23 01 00 - Mechanical General Requirements, with modifications and additions specified herein, apply to the work specified in this Section.

1.2 SECTION INCLUDES:

- A. Piping Insulation, Jackets, and Accessories.
- B. Equipment Insulation and Covering.
- C. Ductwork Insulation, Jackets and Lining.

1.3 QUALITY ASSURANCE:

- A. Applicator: A company specializing in insulation application with three years minimum experience.

1.4 SUBMITTALS:

- A. Submit product data under the provisions Section 23 01 00.
- B. Include product description, list of materials and thickness for each service, equipment and location.
- C. Submit manufacturer's installation instructions.

1.5 MANUFACTURER'S STAMP OR LABEL:

- A. Every package of insulation, jackets, cement, adhesives, and coatings delivered to the project site must have the manufacturer's stamp or label attached giving name of manufacturer, brand, and description of material.

1.6 FLAME SPREAD AND SMOKE DEVELOPED RATINGS:

- A. In accordance with NFPA 255, ASTM E 84, or UL 723, the materials shall have a flame - spread rating of not more than 25 and a smoke - developed rating of not more than 50.
- B. Materials Tests: UL label or satisfactory certified test report from a testing laboratory will be required to indicate that the fire hazard ratings for the materials proposed for use do not exceed those specified. Test factory-applied materials as assembled. Field-applied materials may be tested individually. Flame-proofing treatments subject to deterioration due to effects of moisture or high humidity are not acceptable.
- C. Materials Exempt From Fire-Resistant Rating: Nylon anchors and PVC fitting covers.

PART 2 - PRODUCTS

2.1 PIPING SYSTEMS INSULATION:

- A. Piping systems requiring insulation, types of insulation required, and insulation thickness shall be as listed in Tables I and II herein. Insulate all fittings, flanges, and valves with factory premolded, precut, or field-fabricated insulation of the same thickness and

conductivity as used on adjacent piping. Use factory premolded, precut, or field-fabricated insulation of the same thickness and conductivity as used on adjacent piping. Insulation exterior shall be cleanable, grease resistant, non-flaking and non-peeling.

B. Pipe Insulation:

1. Glass Fiber Insulation: ANSI/ASTM C547; `K' value of .24 at 75 degrees F.; noncombustible.
2. Cellular Glass Insulation: ANSI/ASTM C552; maximum water vapor transmission rating of 0.1 perm; `K' value of 0.40 at 75 degrees F.
3. Flexible Unicellular Insulation: ASTM C 534. Adhesive shall be as recommended by the insulation manufacturer and applied in accordance with the manufacturer's published instructions.
4. Hydrous Calcium Silicate Insulation: ANSI/ASTM C533; rigid white; asbestos free; `K' value of 0.44 at 300 degrees F.

C. Pipe Insulation Finishes:

1. All-Purpose Jacket: Except calcium silicate and unicellular insulation, provide a factory applied all-purpose jacket with or without integral vapor barrier as required by the service. Provide jackets in exposed locations with a white surface suitable for field painting without sizing. Allow a maximum water vapor permeance of 0.05 perm per ASTM E 96, a puncture resistance of not less than 50 Beach units, and a minimum tensile strength of 35 pounds force per inch of width in accordance with ASTM D 828.
2. Vapor Barrier Materials: Kraft reinforced foil vapor barrier with self-sealing adhesive joints. Resistant to flame, moisture penetration, and mold growth. Provide vapor-barrier materials on pipe as required in Table I.

2.2 DUCTS AND PLENUMS (HVAC) INSULATION:

- A. Duct Insulation in Concealed Spaces: Insulation shall be blanket type flexible mineral fiber conforming to ASTM C 553, Type I, Class B-3, 1.0 pounds per cubic foot nominal, and 2.0 inches thick. Flexible insulation shall be used in concealed spaces only.
- B. Duct Insulation Exposed in Mechanical Rooms: Insulation shall be mineral fiber board per ASTM C 612, Class 2, 6 pounds per cubic foot average density, one-inch thick.
- C. Acoustically Lined Ducts: Ductwork indicated or specified in Section 23 30 00, Air Distribution, to be acoustically lined shall not be insulated.
- D. Duct Insulation Finishes:
 1. All-Purpose Jacket: Provide a factory applied all-purpose jacket with integral vapor barrier as required by the services. Provide jackets in exposed locations in equipment rooms with a white surface suitable for field painting without sizing.
 2. Vapor Barrier Material: Scrim foil facing. Materials shall be resistant to flame, moisture penetration, and shall not support mold growth. Provide vapor barrier on all HVAC duct insulation. All-purpose jacket shall have a maximum water vapor permeance of 0.05 perm per ASTM E 96; a puncture resistance of not less than 50 Beach units; and a tensile strength of not less than 35 pounds-force per inch width in accordance with ASTM D 828.

2.3 EQUIPMENT:

- A. Insulate all equipment and accessories as specified in Table III. Increase the specified insulation thickness for equipment only where necessary to equal the thickness of angels or other structural members to make a smooth exterior surface.

2.4 ADHESIVE, SEALANTS, AND COATING COMPOUND:

- A. Adhesive for Securing Insulation to Metal Surfaces and Vapor Barrier Lap Adhesive: ASTM C 916, Type I, (and adhesive in which the vehicle is nonflammable in the liquid state and which will pass the burning test).
- B. Mineral Fiber Insulation Cement: ASTM C 195, thermal conductivity 0.85 maximum at 200 degrees F. mean when tested per ASTM C 177.
- C. Vapor Barrier Coatings: Manufacturer's recommendation for indoor on surface temperature of 60 degrees and above, color white.
- D. Flexible Unicellular Insulation Adhesive: Compatible with the Insulation.
- E. Finishing Cement: ASTM C 449.

2.5 ACCESSORIES:

- A. Staples: ASTM A 167, Type 304 or 316 stainless steel, outside-clinch type.
- B. Insulation Bands: 3/4-inch wide: 0.20-inch aluminum.
- C. Glass Cloth and Tape: Tape shall be 4-inch wide rolls, shall be 405 ounces per square yard. Open weave glass membrane may be used in lieu of glass cloth.
- D. Wire: Soft annealed stainless steel, 0.047-inch nominal diameter.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Do not insulate materials until all system tests have been completed and surfaces to be insulated have been cleaned of dirt, rust, and scale and dried. Insulate return ducts, outside air intakes and supply ducts to the room outlets, exhaust ducts, flexible run outs, plenums, casings, mixing boxes, filter boxes, coils, fans, and the portion of air terminals not in the conditioned spaces. Ensure full range of motion of equipment actuators. Modify insulation to avoid obstruction with valve handle, safety relief, etc. Insulation shall be continuous through sleeves, wall and ceiling openings, except at fire dampers in duct systems. Extend all surface finishes to protect all surfaces, ends, and raw edges of insulation. Apply coatings and adhesives at the manufacturer's recommended coverage per gallon. Individually insulate piping and ductwork. Provide a moisture and vapor seal where insulation terminates against metal hangers, anchors and other projections through the insulation on surfaces for which a vapor seal is specified. Keep insulation dry during the application of any finish. Bevel and seal the edges of exposed insulation. Unless otherwise indicated, do not insulate the following:
 - 1. Factory pre-insulated flexible ductwork.
 - 2. Factory insulated ductwork, plenums, casing, mixing boxes, and filter boxes.
 - 3. Vertical portion of interior roof drain pipelines, chrome plated pipes, and fire protection pipes.
 - 4. Vibration isolating connections.
 - 5. Adjacent insulation.

6. ASME stamps.
7. Equipment name plates.
8. Access plates in fan housing.

3.2 PIPING INSULATION:

- A. General: Insulation shall be continuous through sleeves, wall and ceiling openings. Extend all surface finishes to protect all surfaces, ends, and raw edges of insulation. Provide a moisture and vapor seal where insulation terminates against metal hangers, anchors and other projections through the insulation on surfaces for which a vapor seal is specified. Bevel and seal the edges of exposed insulation.
- B. Glass Fiber and Cellular Glass Pipe Insulation: Place sections of glass fiber pipe insulation around the pipe and joints tightly butted into place. Place sections of cellular pipe insulation around pipe and joints; seal all horizontal joints, butt joints, ends, longitudinal joints, etc. with hot asphalt or Hydrocal B-11 gypsum cement. Secure jacket with fire resistant adhesive or factory applied self-sealing lap. Cover circumferential joints with butt strips, not less than 3-inches wide, of material identical to the jacket material. Overlap longitudinal laps of jacket material not less than 1-1/2 inches. When a vapor barrier jacket is required, as indicated in TABLE I, or on the ends of section of insulation that butt against flanges, unions, valves, and fittings, and joints, use a vapor-barrier coating. Apply this vapor barrier coating at all longitudinal and circumferential laps. At penetrations by pressure gauges and thermometers, fill the voids with the vapor barrier coating. Seal with a brush coat of the same coating.
- C. Flexible Unicellular Insulation: Bond cuts, butt joints, ends, and longitudinal joints with adhesive. Miter 90-degree turns and elbows, tees, and valve insulation. Where pipes penetrate fire walls, provide mineral-fiber insulation inserts and sheet-metal sleeves. Insulate flanges, unions, valves, and fittings in accordance with manufacturer's published instructions. Apply two coats of vinyl lacquer finish to flexible unicellular insulation in outside locations.
- D. Calcium Silicate Pipe Insulation: Secure insulation with metal bands on 12-inch maximum centers. Apply a skim coat of hydraulic setting cement directly to the insulation. When dry, apply a flooding coat adhesive over the hydraulic setting cement. Press a layer of glass cloth or tape into adhesive and seal laps and edges with adhesive. Coat cloth with adhesive cut at a ratio of one part water to five parts adhesive in color other than white for the purpose of visual inspection to ensure sizing of entire surface.
- E. Hangers and Anchors: Pipe insulation shall be continuous through pipe hangers. Where pipe is supported by the insulation, provide MSS SP-58, Type 40 galvanized steel shields or MSS SP-58, Type 39 protection saddles conforming to MSS SP-69. Where shields are used on pipes 2 inches and larger, provide insulation inserts at points of hangers and supports. Vapor seal insulation around anchors. Insulation inserts shall be of calcium silicate, cellular glass (minimum 8 pcf), molded glass fiber (minimum 8 pcf), or other approved material of the same thickness as adjacent insulation. Inserts shall have sufficient compressive strength to support the pipe without compressing the inserts to a thickness less than the adjacent insulation. Insulation inserts shall cover the bottom half of the pipe circumference 180 degrees and be not less in length than the protection shield. Vapor-barrier facing of the insert shall be of the same material as the facing on the adjacent insulation. Where protection saddles are used, fill all voids with the same insulation material as used on the adjacent pipe
- F. Sleeves: Where penetrating interior walls, extend a metal jacket 2 inches out on either

side of the wall and secure on each end with a band. Where penetrating floors, extend a metal jacket from a point below the back-up material to a point 10 inches above the floor with one band at the floor and one not more than one inch from end of metal jacket. Where penetrating exterior walls, extend the metal jackets through the sleeve to a point 2-inches beyond the interior surface of the wall.

- G. Flanges, Unions, Valves and Fittings Insulation for Hot Piping: Factory fabricated removable and reusable insulation covers may be used. For domestic hot water, heating hot water, A/C condensate drains, steam and condensate return systems; exposed hot water piping and drains in handicap areas, place factory premolded, precut or field-fabricated segmented insulation of the same thickness and conductivity as the adjoining pipe insulation around the flange, union, valve, and fitting abutting the adjoining pipe insulation. Elbows insulated using segments shall have not less than three segments per elbow. Place and joint the segments with manufacturer's recommended water vapor resistant, fire retardant, and adhesive appropriate for the temperature limit of the service. Upon completion of installation of insulation, apply two coats of lagging adhesive with glass tape embedded between coats. Where unions are indicated not to be insulated, taper the insulation to the union at a 45 degree angle. Coat the insulation and all-purpose jacket with two coats lagging adhesive and with glass tape embedded between coats. Factory pre-mold one-piece PVC fitting covers may be used in lieu of two coats of adhesive with tape embedded between coats. Factory premolded field-fabricated segment or blanket insert insulation shall be used under the fitting covers. Install factory premolded one-piece PVC fitting covers over the insulation and secure by stapling, taping with PVC vapor barrier tape, or with metal or plastic tacks made for securing PVC fitting covers.
- H. Flanges, Unions, Valves, Anchors, Fittings for Cold Piping: Factory-fabricated removable and reusable insulation covers may be used. For piping insulation, domestic cold water, chilled water supply and return, refrigerant suction, drinking fountain drain piping to sewer tie-in, horizontal roof drain leaders, and exposed lavatory drains, coat pipe insulation ends with vapor barrier coating not more than six inches from each flange, union, valve, anchor or fitting. Place insulation of the same thickness and conductivity as the adjoining pipe insulation (either premolded or segmented) around the item, butting the adjoining pipe insulation. Elbows insulated using segments shall not have less than 3 segments per elbow. Apply two coats of vapor barrier coating with glass tape embedded between coats. Overlap tape seams one inch. Extend the coating out onto the adjoining pipe insulation 2 inches. Seal the insulation and jacket with two coats of vapor barrier coating with glass tape embedded between coats. Insulate anchors attached directly to the pipe for a sufficient distance to prevent condensation but not less than 6 inches from the insulation surface. At the option of the Contractor, premolded, one-piece polyvinyl chloride (PVC) fitting covers may be used in lieu of the embedded glass tape. Factory premolded insulation or field-fabricated insulation segments shall be used under the fitting covers. Secure the covers with adhesive and vapor barrier tape, or with tacks made for securing PVC covers. Then coat all tape seams and tacks with vapor barrier coating.

3.3 DUCTS AND PLENUMS (HVAC) INSULATION:

- A. General: Insulate return ducts, outside air intakes, supply ducts to the room outlets, exhaust ducts, flexible run outs, plenums, casings, mixing boxes, filter boxes, coils fans, and the portion of air terminals not in the conditioned spaces. Insulation shall be continuous through sleeves, wall and ceiling openings. Extend all surface finishes to protect all surfaces, ends, and raw edges of insulation. Provide a moisture and vapor seal where insulation terminates against metal hangers, anchors and other projections

through the insulation on surfaces for which a vapor seal is specified. Bevel and seal the edges of exposed insulation.

- B. Rigid Insulation: Secure rigid insulation by impaling over pins or anchors located not more than 3 inches from joint edges of boards, spaced not more than 12 inches on centers and secure with washers and clips. Spot weld anchor pins or attach with a waterproof adhesive especially designed for use on metal surfaces. Apply insulation with joints tightly butted. Neatly bevel insulation around name plates and access plates and doors. Cut off protruding ends of pins, after clips are sealed with coating compound.
- C. Flexible Blanket Insulation: Apply insulation with all joints tightly butted. Secure insulation to ductwork with adhesive in 6-inch wide strips on 12 inch centers. Staple laps of jacket with outward clinching staples and seal with foil scrim kraft (FSK) tape. For ductwork over 24-inches on horizontal duct runs, provide pins, washers and clips. Use pins on sides of vertical ductwork being insulated. Space pins and clips on 18 inch centers and not more than 18 inches from duct corners. Carry insulation over standing seams and trapeze-type hangers. Install speed washers with pins and pin trimmed to washer. Sagging of flexible duct insulation will not be permitted. Cut off protruding ends of pins after clips are secured and sealed with coating compound. Vapor seal all joints and staple.
- D. Insulation Finishes and Joint Sealing: Fill all breaks, punctures, and voids with vapor barrier coating compound. Vapor seal all joints by embedding a single layer of 3-inch wide open weave glass membrane, 20 by 20 mesh maximum size between two 1/16-inch wet film thickness coats of vapor barrier coating compound. Draw glass fabric smooth and tight with a 1-1/2 inch overlap. At jacket penetrations such as hangers, thermometers, and damper operating rods, fill voids in the insulation with vapor barrier coating. Brush a coat of vapor barrier coating on HVAC ducts. Provide vapor barrier jacket continuous across seams, reinforcing, and projections. Where height of projections is greater than insulation thickness, carry insulation and jacket over the projection.
- E. Access Plates and Doors: On acoustically lined ducts, plenums, and casings, provide insulation on access plates and doors. On externally insulated ducts, plenums, and casings, provide insulation-filled hollow steel panels and doors for access openings. Bevel insulation around access plates and doors.

3.4 EQUIPMENT INSULATION:

- A. General Procedures: Apply equipment insulation suitable for temperature and service in rigid block or semi-rigid board or flexible form to fit as closely as possible to equipment. Stagger end joints where possible. Bevel the edges of the insulation for cylindrical surfaces to provide tight joints. Join sections of cellular glass insulation with bedding compound. After the cellular glass insulation is in place on areas to be insulated, except where metal-encased, fill joints, seams, chipped edges, or depressions with bedding compound to form a smooth surface. Fill mineral fiber joints with insulating cement conforming to ASTM C 195. Bevel insulation around name plates, ASME Stamp, and access plates. For insulation on equipment that must be opened periodically for inspection, cleaning, or repair, construct insulation to be removable and replaceable without damage. Protect exposed insulation corners with corner angles under wires and bands.
- B. Pumps: Insulate pumps used for chilled water with 2-inch thick rigid mineral fiber insulation as follows:
 - 1. Insulate pumps by forming a box around the pump housing, drive shaft, and piping.

Apply insulation to inside surfaces of 20-gauge stainless steel sheet-metal boxes having openings for drive shaft and pipes. Construct the box by forming the bottom and sides using joints which do not leave raw ends of insulation exposed. Band bottom and sides to form a rigid housing that does not rest on the pump. Between top cover and sides, fit joints tightly forming a female shiplap joint on the side pieces and a male joint on the top cover to make the top cover removable. Secure insulation to the box with adhesive. Allow clearance for draining and adjustment of pump shaft seal.

TABLE 1					
INSULATION MATERIAL FOR PIPING					
<u>SERVICE</u>	<u>MATERIAL</u>	<u>SPECIFICATION</u>	<u>TYPE</u>	<u>CLASS</u>	<u>VAPOR BARRIER REQUIRED</u>
Refrigerant Suction	Flexible Unicellular	ASTM C 547	I or II	1	No
Chilled Water	Cellular Glass	ASTM C 552	II	2	No
	Flexible Unicellular	ASTM C 547	I or II	1	No
Heating Hot Water	Mineral Fiber	ASTM C 547		1	No
	Flexible Unicellular	ASTM C 434	I or II	1	No
Domestic Hot Water	Mineral Fiber	ASTM C 547		1	No
Domestic Cold Water	Mineral Fiber	ASTM C 547		1	Yes
A/C Condensate Drain	Flexible Unicellular	ASTM C 534	I or II		No
Drinking Fountain Drain	Flexible Unicellular	ASTM C 534	I or II		No
Horizontal Roof Drain Leader (Including Underside of Roof Drain)	Mineral Fiber	ASTM C 547	I	B-3	Yes
Exposed Domestic Hot Water Piping & Drains to Areas for Handicapped Personnel	Flexible Unicellular	ASTM C 534	I or II		No
Exterior Backflow Preventer and Exposed Water Piping	Flexible Unicellular	ASTM C 534	I or II		Yes
Steam Steam Condensate	Calcium Silicate	ASTM C 533			No

TABLE 2

INSULATION SIZES FOR PIPING

<u>SERVICE</u>	<u>MATERIAL</u>	<u>1/4" - 1-1/4"</u>	<u>1-1/2" - 3"</u>	<u>4" - UP</u>
Refrigerant Suction	Flexible Unicellular	3/4"	3/4"	3/4"
Chilled Water	Cellular Glass	1"	1-1/2"	2"
	Flexible Unicellular	3/4"	N/A	N/A
Heating Hot Water	Mineral Fiber	1"	1-1/2"	2"
	Flexible Unicellular	3/4"	N/A	N/A
Domestic Hot Water	Mineral Fiber	1"	1"	1-1/2"
Domestic Cold Water	Mineral Fiber	1/2"	1/2"	1/2"
A/C Condensate Drain	Flexible Unicellular	1/2"	1/2"	1/2"
Drinking Fountain Drain	Flexible Unicellular	1/2"	1/2"	1/2"
Horizontal Roof Drain Leader (Including Underside of Roof Drain)	Mineral Fiber	1/2"	1/2"	1/2"
Exposed Domestic Hot Water Piping & Drains to Areas for Handicapped Personnel	Flexible Unicellular	1/2"	1/2"	1/2"
Exterior Backflow Preventer and Exposed Water Piping	Flexible Unicellular	3/4"	3/4"	3/4"
Low Pressure Steam Medium Pressure Steam High Pressure Steam Steam Condensate	Calcium Silicate	1"	1-1/2" 1-1/2" 2" 1"	2" 2" 2" 1-1/2"

END OF SECTION

SECTION 23 09 00
CONTROLS AND INSTRUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Section 23 01 00 - Mechanical General Requirements, with modifications and additions specified herein, apply to the work specified in this Section.

1.2 SECTION INCLUDES:

- A. Complete system of automatic controls.
- B. Instrumentation.

1.3 SUBMITTALS:

- A. Submit product data and shop drawings under provisions of Section 23 01 00.
- B. Shop drawings shall indicate operating data, system diagrams, wiring diagrams, interlock diagram indicating inter-connection for all motor starters, description of operating sequences, and sizing of components.
- C. Provide product data for each manufactured component.
- D. Include list of instruments which indicates use, range, and location.

PART 2 – PRODUCTS

2.1 Instrumentation and Control Devices

A. Actuators and Operators

- 1. Electric Actuator :Valve and Damper Operators: Operators shall be provided for each automatic valve and damper and shall be of sufficient capacity to operate the valve or damper under all conditions, and to guarantee tight close of the devices against system pressures encountered. Each operator shall be full-proportioning type unless indicated otherwise and shall be provided with spring-return to fail-safe as required to meet conditions. Each operator shall operate at the rate of speed corresponding to the dictates of the controller. Where sequencing is required, the operators shall be provided with positive positioning devices and adjustable operating range and starting point. Electric operators shall be hydraulic or oil immersed gear-train type with machine cut gears.

B. Dampers

- 1. Control Dampers: Frames shall be constructed of galvanized welded steel with welded or riveted corner reinforcement. Blades shall be galvanized steel, maximum blade size 8 inches wide, 48 inches long, attached to minimum 1/2 inch shafts with set screws. Blade seals shall be synthetic elastomeric or neoprene mechanically attached. Shaft and linkage bearings shall be oil impregnated sintered bronze or graphite impregnated nylon sleeve. Leakage shall be less than two percent based on approach velocity of 2000 ft/min and 4 inches wg. Test in accordance with AMCA 500.

C. Miscellaneous Control Devices

1. Motor Starters and Contactors: Provide magnetic motor starters for each piece of motor operated mechanical equipment installed unless motor starter is in the motor control center specified to be furnished under Division 16, Electrical Work. Starters shall provide overload protection, properly sized, in each phase. Starters shall be enclosed in a NEMA 1 enclosure where installed indoors and enclosed in a NEMA 3R enclosure where installed outdoors. Provide heavy duty Contactors for 120 volt fractional horsepower motors that have internal overload protection.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General: The control system shall be installed, tested, and adjusted by competent mechanics under the supervision of the contractor for the work specified to be furnished under Division 15.
- B. Electrical Work: All power wiring is specified to be furnished under Division 16, Electrical Work of these specifications. Furnish the contractor for the electrical work, equipment electrical requirements and other data pertaining to the electrical phases of the mechanical installation. All control wiring of the mechanical systems shall be accomplished under this Division. Control and interlock wiring shall be fully color coded, numbered using Brady Stick-On numbers, in conduit, and shall comply with all the requirements of Division 16, Electrical Work.
- C. Coordination: Any changes in the required controls as a result of equipment substitution under this division shall be the responsibility of the contractor for this division and shall be accomplished at no additional cost to the owner.

3.2 INSTRUMENT INSTALLATION:

3.3 SEQUENCE OF OPERATION:

- A. DX Split Systems with Electric Heat:
 1. SUPPLY FAN START/STOP: The supply fan will be started according to the schedule. If the supply fan status does not match the commanded value an alarm will be generated. When the supply fan status indicates the fan started, the outside air damper will open and the control sequence will be enabled.
 2. ZONE CONTROL: The heating stages, and the dx cooling stages will modulate/cycle in sequence to maintain the zone temperature at setpoint.
 3. NIGHT SETBACK/NIGHT SETUP: when in "unoccupied" mode, the unit will cycle as necessary to maintain the night setback zone temperature at setpoint. a differential prevents the unit from cycling excessively.
 4. SAFETY:
 - a) All of the safety devices are manual reset; the device that has tripped must be manually reset before restarting the air handling unit.
 - b) If a fire alarm shutdown contact is provided, the supply fan will be shutdown when triggered.
 5. SHUTDOWN:
 - a) When the unit is shutdown by either a stop command or system safety the unit will be set as follows:
 - b) Supply fan will be off

- c) Outside air damper will close
 - d) DX cooling will be off
 - e) Electric Heat will be off
6. THERMOSTAT: Matched to unit for operation, will have two daily programs minimum per day, will have lock box for wall installation with keys to owner. Unit will include FAN-AUTO, auto changeover between heat and cool with 72F cooling setpoint and 68f heating setpoint. Both setpoints will be user adjustable.
- B. Exhaust Fan: Toilet exhaust fan will be interlocked to lights under Division 26 – Electrical Work.

END OF SECTION

SECTION 23 20 00
HEATING AND AIR CONDITIONING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Section 23 01 00 - Mechanical General Requirements, with modifications and additions specified herein, apply to the work specified in this Section.

1.2 SECTION INCLUDES:

- A. Refrigerant Piping
- B. Drain, Vent, and Overflow Piping.

1.3 SUBMITTALS:

- A. Submit product data and shop drawings under provisions of Section 23 01 00.
- B. Submit certification of pipe conformance to Specification.

1.4 Quality Assurance

- A. Welders' Certification: In conformance with AWS D1.1.
- B. For each product, provide components by same manufacturer throughout.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS:

- A. Refer to Section 22 05 00, BASIC MATERIALS AND METHODS, for basic piping materials.
- B. General: All piping in conjunction with the heating and air conditioning system shall be complete as indicated on the drawings or as required for the proper operation of the system.

2.2 REFRIGERANT PIPING:

- A. Hard Drawn:
 - 1. Tubing: Type ACR hard drawn conforming to ASTM B 280.
 - 2. Fittings: Wrought copper fittings conforming to ANSI B16.22.
 - 3. Joints: Silver brazed joints conforming to ANSI A5.8.
- B. Soft Drawn (Accepted Up To 3ft Maximum Length):
 - 1. Tubing: Type K copper tubing conforming to ASTM B88
 - 2. Fittings/Joints: Flared tube end with compression type fittings conforming to ASME/ANSI B16.26.
- C. Sight Glass: A combination moisture and liquid indicator, double port type, UL listed. The indicator shall have a glass port for complete view of the refrigerant flow and moisture sensitive indicator of the type that changes color. Sight glass shall be equal to Sporan "See-All".

- D. Driers: Permanent type liquid line dehydrator with inlet and outlet shut-off valves. Driers shall be equal to Sporlan "Catch-All".
 - E. Expansion Valves: The valves shall be of the stainless steel diaphragm type with external equalization and external super-heat adjustment set for 10°F super-heat.
 - F. Shut-Off-Valves: Manual valves shall be for refrigeration service with back seating construction and cap seals. Valves shall be Mueller Brass or approved equal.
- 2.3 DRAIN, VENT, AND OVERFLOW PIPING: Materials: Schedule 40 PVC or copper tubing, Type L, conforming to ASTM B 88 with cast-brass or wrought-copper sweat joint fittings. Drains at air handling units shall be provided with water seals, depth equal to the total static pressure of the blower, constructed of two tees and an appropriate U-bend with open end of each tee plugged. Pipe and equipment drains with valves shall provide complete draining of all systems. Pipe to nearest open-sight drain, floor drain, wet vent, or as indicated on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General: Piping shall comply with the general piping installation specified in Section 22 05 00, Basic Materials and Methods.
- B. Install specialties in accordance with manufacturer's instructions to permit intended performance.
- C. Dry refrigerant systems per manufacturers direction. Purge all systems with inert gas similar to nitrogen prior to pulling vacuum and charging system.

END OF SECTION

SECTION 23 30 00
AIR DISTRIBUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Section 23 01 00 - Mechanical General Requirements, with modifications and additions specified herein, apply to the work specified in this Section.

1.2 SECTION INCLUDES:

- A. Ductwork and Ductwork Accessories.
- B. Grilles and Registers
- C. Louvers & Block Vents.

1.3 SUBMITTALS:

- A. Submit product data and shop drawings under provisions of Section 23 01 00.

1.4 REGULATORY REQUIREMENTS:

- A. Construct Ductwork to recommendations in SMACNA Duct Construction Manual, and to the requirements of NFPA 90A.

PART 2 - PRODUCTS

2.1 DUCTWORK MATERIALS:

- A. Sheet Steel for Ducts: ASTM A 525 and ASTM A 527 galvanized sheet steel, lock-forming quality, having zinc coating of 1.25 oz. per sq. ft. for each side in conformance with ASTM A 90.
- B. Galvanized Steel Hot Dipped After Fabrication: ASTM A 123.
- C. Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

2.2 LOW PRESSURE DUCTS: All ducts except high pressure supply ducts from the central air handling unit serving variable volume terminal units.

- A. General: Construction, metal gauge, and reinforcements shall conform to NFPA 90A and SMACNA LPDCS. Ductwork shall be airtight and shall not vibrate or pulsate when system is in operation. Air leakage shall be less than 5 percent of system capacity. Construct ductwork of galvanized steel.
- B. Curved Elbows: Make curved elbows with a centerline radius not less than 1-1/2 times the width or diameter of the duct.
- C. Joints and Laps: Make substantially airtight. Make laps at joints in the direction of air flow. Button-punch or bolt-connection in standing seams shall be spaced at fixed centers not greater than 6 inches. "Button Punch Snap-Lock" may be used instead of Pittsburgh Lock.

2.3 FLEXIBLE DUCT

- A. Characteristics of flexible duct:
 - 1. Approved as UL-181 Class 1 air duct.
 - 2. Flame spread rating less than 25 and smoke developed rating less than 50.
 - 3. Rated for 10" wg. positive pressure, 4" wg. negative pressure, and 4000 fpm air velocity.
 - 4. Tear and puncture resistant reinforced duct fabric mechanically locked together with a corrosive resistant galvanized steel helix.
 - 5. Insulated with minimum 1/2" thick fiberglass insulation with vapor barrier jacket.
- B. Seal off the insulation jacket at its ends and at joints with mastic, equal to Hardcast Duct-Seal 321. Sealants, mastics used for flexible duct connectors shall be listed and labeled in accordance with UL-181B. Replace flexible duct if jacket is punctured.
- C. Flexible duct is NOT to be used for run outs where it must pass through walls or through smoke or fire partitions. Flexible duct is not to be used in exposed application. Flexible duct lengths shall not exceed 6 feet at each connection.
- D. No bends shall be made in flexible duct with the center line radius less than one and one-half duct diameter and only one bend may occur per 6 foot length of duct material.

2.4 DUCTWORK ACCESSORIES:

A. DAMPERS

- 1. Automatic Control Dampers: All automatic control dampers to be furnished by Control Subcontractor and installed by this Contractor (except unit mounted dampers).
 - a) Automatic control dampers to be low-leak, galvanized steel or aluminum construction parallel blade type, Ruskin Model CD36 or approved equal.
 - b) Dampers to be complete with minimum 4" deep, 16 gage hat-shaped channel frame, minimum 16 gage blades on maximum 6" centers, 1/2" diameter shafts, and corrosion resistant bearings.
 - c) Dampers to have extruded vinyl blade seals and stainless steel or aluminum flexible metal compression type jamb seals to limit leakage to a maximum of 1/2% (maximum of 5.4 cfm/sq. ft. leakage for 48" x 48" size damper) when tested in accordance with AMCA Standard 500,
 - d) Motor actuator to be oil immersed gear train, 120-volt line voltage type with spring return. to closed position on power interruption. Provide Honeywell Model M445/845 or approved equal complete with damper linkages.
- 2. Manual Volume Dampers (MVD): Manual volume dampers to be hand-operated type dampers constructed of galvanized steel, minimum 22 gauge for duct widths 18" and less, minimum 16 gauge for duct widths greater than 18". Dampers for ducts to 12" height and 12" diameter to be single blade carried on a 3/8" round steel rod mounted inside of duct without frame and fitted with locking type quadrant and brass end bearing plate accurately drilled and secured to duct. Dampers for ducts greater than 12" height to be multiblade type, 12" maximum blade width up to 30" blade length and 10" maximum blade width over 30" blade length. Blades to be mounted on frame with brass sleeve bearings interconnected for operation from one locking type hand quadrant. Round pivot rods to have section faced flat to receive locking setscrew in locking quadrant. Refer to SMACNA manual Figures 2-14 and 2-15.

3. Backdraft Dampers (BDD): Backdraft dampers to be Ruskin Model CBD6 or approved equal low-leak counterbalanced backdraft dampers. Dampers to be heavy-duty type suitable for air velocities to 2500 fpm with all extruded aluminum construction, minimum 0.81" thick frame, and minimum .050" thick blades on maximum 4" centers. Provide blades with vinyl edge seals. Provide dampers with aluminum linkage and corrosion resistant type bearings. Provide dampers with adjustable counterbalances on blades to assist closing.
- B. FLEXIBLE CONNECTORS: Install UL listed flexible duct connectors between duct and fan/equipment connections. Flexible duct connectors to be made of 28 ounce, heavy glass fabric double coated with neoprene. Seal duct connection with mastic equal to Hardcast Duct-Seal 321. Sealants, mastics used for flexible duct connectors shall be listed and labeled in accordance with UL-181B.
 - C. DUCT SLEEVES: Duct sleeves shall be provided for all ducts passing through floors, walls, ceilings, or roof and shall be installed by the contractor for this Section during the construction of the building. Sleeves shall be wood, galvanized sheet steel, or other approved materials to meet the conditions encountered.
 - D. DUCT CLOSURE COLLAR: A collar constructed of galvanized sheet steel not less than 4-inches wide shall be provided on each side of floors, walls, partitions, and under ceilings at each duct sleeve except where grilles, registers, or diffusers are installed. Collar shall be installed and secured tight against the surfaces. Collars at fire and smoke dampers shall be 1-1/2-inch by 1-1/2-inch by 10-gauge steel angles as indicated in the SMACNA Guide.
 - E. DUCT ACCESS DOORS
 1. Duct access doors to be provided for access to all coils, fire, fire/smoke, and smoke dampers, automatic and backdraft dampers, duct smoke detectors, static pressure and air volume sensing devices, and other equipment installed in ducts and at other points indicated on drawings.
 2. Access door construction and air tightness must be suitable for the duct pressure class used (low, medium, or high).
 3. Access doors to be double-panel, galvanized steel construction with minimum 1" rigid insulation between panels. Access doors in exhaust duct and unlined return duct may be un-insulated single panel, galvanized steel construction. Doors to mount in rigid frame constructed of formed galvanized steel. Angle iron bracing to be used as required to provide rigid assembly. Doors to hinge on one side with door latch on opposite side.
 4. Access doors in ductwork shall fully comply with Figure 2-10 and 2-11 of SMACNA manual. Casing access doors shall fully comply with Figure 6-11 and 612 of SMACNA manual.
 5. Doors to close against gasket seal.

2.5 Grilles, Registers, and Diffusers

- A. Manufacturers: Price, Titus, Nailor, or approved equal.
- B. SQUARE CEILING DIFFUSERS: Provide Titus TDC-AA or approved equal round or square neck, louvered face ceiling diffusers at all locations designated by schedule on drawings. Diffusers to be all aluminum construction each complete with opposed-blade volume damper. Frame to be flush mount for diffusers in "hard" ceilings and lay-in T-bar

mount for diffusers in lay-in ceilings. Finish to be baked-on, off-white enamel.

- C. CEILING RETURN & EXHAUST REGISTERS: Provide Titus Model 50-F or approved equal at locations designated on drawings. Registers to be complete with 1/2" cube egg-crate aluminum grid, and opposed-blade volume damper. Finish to be baked-on, off-white enamel. Border to be flush mounted frame style.

2.6 AIR LOUVERS:

- A. Outside air stationary air louvers to be rain resistant, extruded aluminum construction, fixed drainable blade type as manufactured by Ruskin, Greenheck, or approved equal. Louvers to be constructed of minimum 0.081" thick frame and blades. Louver depth to be 5" with equal blade spacing. Blade construction to provide built-in rain stops. Provide 1/2" mesh expanded aluminum screen with removable frame mounted on inside face of louver. Design basis shall be Ruskin Model ELF-375X for rectangular louver. All air louvers shall be provided by DIV 15. Reference mechanical and architectural drawings. Color as selected by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General: Installation shall conform to NFPA and SMACNA. Provide mounting and supporting of ductwork and accessories including, but not limited to, structural supports, hangers, vibration isolators, stands, clamps and brackets, access doors and dampers. Install ductwork accessories as indicated in accordance with the manufacturer's printed instruction. Allow clearance for inspection, repair, replacement, and service.
- B. Ductwork: Install airtight. When air distribution systems are operated, there shall be no chatter, vibration, or dust marks.
- C. Duct Supports: Ducts shall be supported by not less than two 1-inch wide by 1/16-inch thick galvanized strap of sheet steel hangers located one on each side of duct, spaced not over 5-feet on centers for round ducts and not over 6-feet on centers for ducts up to 24-inches wide and not over 3-1/2-feet on centers for ducts over 24-inches wide. Support flexible ducts every 3 feet. Provide sway bracing. Anchor risers in the vertical run to allow ends of riser free vertical movement. Attach supports only to structural framing members and concrete slabs. Provide suitable metal intermediate framing where supports are required between structural framing members. Do not support ducts from metal decking.
- D. Fire and smoke Dampers: All devices shall adhere to the UL listed installation based on wall construction and the fire/smoke damper rating. The automated dampers that include a spring return operator shall be mounted for correct operation. The controls contractor shall be responsible to insure the operation of fire/smoke dampers with operators are connected to a fire alarm connection. Coordinate with fire alarm contractor to insure all relays and terminals are able to accept the device. Provide a control transformer if power for device is required.

END OF SECTION