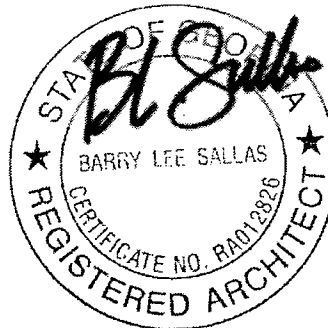
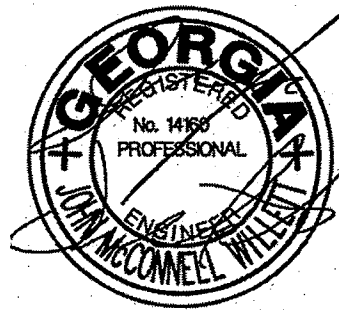
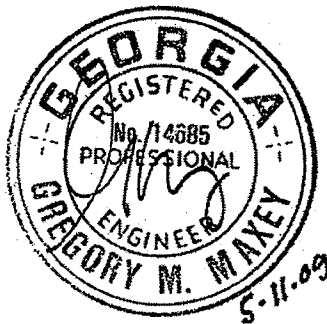
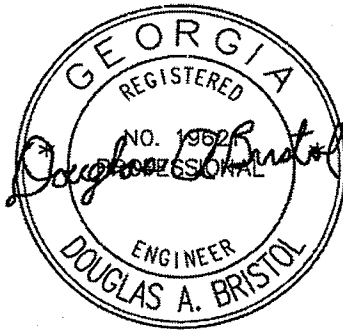


**Chattahoochee High School  
Band Suite Addition  
RFP 413-11  
Fulton County Board of Education**

3 November 2010



Architects Engineers Constructors

2727 Paces Ferry Road, Building 1, Suite 1800  
Atlanta, Georgia 30339, 770-933-9242, Fax 770-933-9246



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**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 0

PROCUREMENT & CONTRACTING REQUIREMENTS



PROPOSAL DOCUMENTS  
FOR  
FULTON COUNTY SCHOOLS

VOLUME 1

CHATTAHOOCHEE HS - BAND SUITE ADDITION

AT

5230 TAYLOR ROAD  
JOHNS CREEK, GA 30022

Prepared by OWNER:

FULTON COUNTY SCHOOLS  
OPERATIONS DIVISION  
CAPITAL PROGRAM CONTRACTS DEPARTMENT  
The Meadows Operations Center  
5270 Northfield Boulevard  
College Park, Georgia 30349

For OWNER:

FULTON COUNTY BOARD OF EDUCATION  
Fulton County, Georgia  
{November, 2010}

OWNER PROJECT NO.: {LN-7004321; SA-7004301}

BRPH Architects - Engineers, Inc., ARCHITECT

Spencer Bristol Engineering, Inc., MECHANICAL ENGINEER

Southern Civil Engineers, CIVIL ENGINEER



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School Code: 0392

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01740	Warranties



**SECTION 00100  
REQUEST FOR PROPOSAL**

The Fulton County Schools invites you to submit a proposal for furnishing any or all items as listed on the proposal forms provided herein for Chattahoochee HS - Band Suite Addition at 5230 Taylor Road, Johns Creek, GA 30022.

Sealed Proposals will be received subject to the attached terms specified in Section 00200 – Instructions to Offerors, the Operations Division, Capital Program Contracts Department, The Meadows Operations Center, 5270 Northfield Boulevard, College Park, Georgia 30349. The proposal will be received up to **2:30 p.m.** local time, as per the Capital Program Contracts Department time clock, **Tuesday, December 7, 2010.**

Questions regarding the Request for Proposal process should be directed to Angela R. Young, Capital Program Contracts Department via facsimile at (404) 765-7152 or email [cpcontracts@fulton.k12.ga.us](mailto:cpcontracts@fulton.k12.ga.us). Only questions received prior to **4:30 p.m., Friday, November 19, 2010** (as per the Capital Program Contracts Department time clock) will be considered.

Offer (commonly known as Bid) security in the amount of five percent (5%) of the lump sum base offer shall accompany each proposal. The surety issuing the bond shall meet the requirements set forth in Articles 5.10 of the General Conditions. A pre-proposal conference will be held in accordance with Section 00325. The offeror is responsible for ensuring that they have complete Proposal Documents including all Addenda provided by the OWNER, prior to the proposal submission date.

**PLEASE BE AWARE OF RECENT REVISIONS TO SECTION 00700**

**1) General Conditions, Paragraph 5.12, which requires certain subcontractors to provide payment and performance bonds.** Please be sure to review this new Paragraph.

**2) GENERAL CONDITIONS, Subparagraphs 5.1.2.4.1 and 5.1.2.2, which requires the Contractor to procure and provide Builder's Risk Insurance on certain projects.** Please be sure to review these new Subparagraphs.

**PROPOSALS MUST BE SUBMITTED IN A SEALED ENVELOPE, ONE PROPOSAL PER ENVELOPE, PLAINLY MARKED "REQUEST FOR PROPOSAL NO. RFP 413-11". ON THE OUTSIDE OF THE ENVELOPE, AS WELL AS DATE OF PROPOSAL SUBMISSION. "NO PROPOSAL" MUST BE INDICATED AS SUCH ALONG WITH THE PROPOSAL NUMBER ON THE OUTSIDE OF ENVELOPE. FOR IDENTIFICATION PURPOSES, THE OFFEROR'S NAME AND COMPLETE ADDRESS MUST BE CLEARLY PRINTED OR TYPED ON THE OUTSIDE OF THE ENVELOPE. FAXED RESPONSES WILL NOT BE ACCEPTED.**



**REQUEST FOR PROPOSAL (RFP)  
NO. RFP 413-11**

**FOR**

**Chattahoochee HS - Band Suite Addition**

**FULTON COUNTY SCHOOLS  
CAPITAL PROGRAM CONTRACTS DEPARTMENT  
5270 NORTHFIELD BOULEVARD  
COLLEGE PARK, GEORGIA 30349**



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**REQUEST FOR PROPOSAL NO. RFP 413-11**

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## PROPOSAL CONDITIONS

### SECTION I – PREPARATION AND SUBMISSION OF PROPOSALS

#### 1. INTRODUCTION

This solicitation is a Request for Proposal (RFP) and is a “competitive sealed proposal” process made pursuant to O.C.G.A. § 36-91-21(c). The contract will be awarded to the responsible and responsive offeror whose proposal is determined in writing to be the most advantageous to the Fulton County Schools, taking into account the factors set forth in this RFP. See O.C.G.A. § 36-91-21(c)(1)(C).

This RFP has and/or will be advertised in accordance with O.C.G.A. § 36-91-21(c)(1)(A). This RFP and the accompanying documents contain conceptual program information that describes the required services in a level of detail appropriate to the RFP process and further describes the relative importance of each of the evaluation factors. Id.

All proposals must be received by **Tuesday, December 7, 2010 @ 2:30 p.m.** local time (per the FCS Capital Program Contracts Department time clock). See O.C.G.A. § 36-91-21(c)(1)(B). The proposals will then be opened and evaluated by a committee based on the evaluation factors discussed in the Proposal Documents. Offeror(s) should make their best effort to satisfy the requirements at their best price because a contract may be awarded based on the initial evaluation. If a contract is not awarded based on the initial evaluation, the committee will afford the “responsible offerors” an opportunity for discussions, negotiations and revisions of their proposals. See O.C.G.A. § 36-91-21(c)(2). A “responsible offeror” is one whose proposal meets the criteria proposed by the Fulton County Schools and whose proposal is reasonably susceptible of being selected for contract award. Id. A proposal is “reasonably susceptible of being selected for contract award” if it is within the “competitive range” established by the evaluation committee. Id. If an offeror’s proposal is not evaluated as being within the competitive range, the offeror and its proposal will be excluded from the discussions to save time and money for both the offeror and Fulton County Schools.

Responsible offerors who are within the “competitive range” and have submitted proposals that are reasonably susceptible of being selected for contract award will be given an opportunity to discuss negotiate and revise their proposals. O.C.G.A. § 36-91-21(c)(2). The discussions, negotiations and revisions shall take place at the Meadows Operations Center. The evaluation committee will not disclose the contents of an offeror’s proposal to another offeror. Id. At the conclusion of discussions, negotiations, and revisions, best and final offers (BAFOs) will be solicited from the responsible offerors.

The BAFOs will be evaluated and the results will be reported to a selection official who will select the proposal that is the most advantageous to the Fulton County Schools based on the evaluation factors in the Proposal Documents. O.C.G.A. § 36-91-21(c)(1)(C). The committee and/or selection official will prepare a written report setting forth the basis on which the award is made. Id. The selection will then be presented to the Fulton County Board of Education for its approval. If approved by the Board and other matters (insurance, bonds, etc.) are settled, a contract will be awarded.

## PROPOSAL CONDITIONS

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### SECTION I – PREPARATION AND SUBMISSION OF PROPOSALS

#### 2. REQUEST FOR PROPOSAL PROCESS

- a. To be entitled to consideration, sealed proposals shall be presented in accordance with the instructions of this solicitation and within the time constraints stated.
- b. Sealed proposals consisting of one (1) original and six (6) copies will be mailed to the office of the Director of Contracting, 5270 Northfield Boulevard, College Park, Georgia 30349.
- c. Proposals received after the date and time specified by the time clock in the FCS Capital Program Contracts Department will not be considered.
- d. The Fulton County Board of Education reserves the right to accept or reject any or all proposals and to waive any or all irregularities or technicalities. The Fulton County Board of Education reserves the right to take whatever actions which, in its sole judgment, it deems to be in the best interests of the Fulton County Schools. The judgment of the Fulton County Schools on such matters shall be final.

#### 3. OWNER'S REPRESENTATIVE

- a. The owner for whom the work will be executed is the Fulton County Schools, hereinafter referred to as "FCS."
- b. The owner's representative who will manage the owner's program is Parsons Corporation.

#### 4. PROPOSAL DOCUMENTS

- a. Offerors are notified that they must thoroughly examine the Proposal Documents which include: the Cover Sheet, Table of Contents, Proposal Conditions, Project Manual or Specifications, Drawings, Request for Sealed Proposal documents, and Bidder's Checklist, together with all Addenda thereto issued prior to receipt of the proposals.
- b. Proposal Documents may be obtained for a cost of \$50.00 for digital format; \$150.00 for printed bond set on Monday through Friday from:

BRPH Architects – Engineers Inc.  
Barry L. Sallas, AIA  
2727 Paces Ferry Road, Bldg One, Suite 1800  
Atlanta, GA 30339  
Phone: (678) 784-5832  
Fax: (770) 933-9246  
bsallas@brph.com

- c. Offerors shall utilize a complete set of Proposal Documents in preparing a proposal.



## PROPOSAL CONDITIONS

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### SECTION I – PREPARATION AND SUBMISSION OF PROPOSALS

- d. The failure or omission of an offeror to receive any Proposal Document, form, instrument, Addendum or other document shall not relieve the offeror from any obligations with respect to the proposal and/or contract.

#### 5. PREPARATION OF PROPOSALS

- a. All proposals shall be printed in ink or typewritten. Errors may be crossed out and corrections printed in ink or typewritten adjacent to the error. The person signing the proposal shall initial corrections in ink.
- b. By submitting a proposal, the offeror warrants that any goods supplied to the FCS conform to specifications set forth in the drawings and specifications.
- c. To be considered for award, goods of foreign manufacture shall meet all specifications contained in the solicitation, shall be in stock in the continental United States, and shall be available for immediate shipment at the time an offeror submits a proposal.
- d. The Program Manager will be the sole judge in making determinations as to the quality of any goods.
- e. All supplies, materials, and equipment provided to the FCS shall be new and in first-class condition unless the solicitation specifically allows the use of used, reconditioned, or remanufactured items. If newly manufactured products are specified, such products shall be of recent origin and not previously used. No equipment of any type is acceptable if serial numbers or any other manufacturer's identification labels or marks have been removed, obliterated, or changed in any way. A vendor delivering any such equipment to the FCS will be deemed to have breached the contract, and appropriate action will be taken by the FCS Director of Contracting.
- f. Time of delivery is part of the solicitation and an essential element of the contract that is to be awarded. If the offeror cannot meet the required delivery date, a proposal should not be submitted. Offerors may provide alternative schedules and/or delivery dates in their proposals. Time shall be stated in "calendar" days. Failure to deliver in accordance with the contract awarded could result in the Contractor being declared in default.
- g. An authorized officer of the company shall sign the proposal.
- h. All proposals shall be completed in their entirety, and the failure to complete the Proposal Documents in their entirety may result in the proposal being deemed non-responsive.

## PROPOSAL CONDITIONS

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### SECTION I – PREPARATION AND SUBMISSION OF PROPOSALS

#### 6. FAILURE TO RESPOND TO THE SOLICITATION

If a proposal is not submitted, the solicitation is to be returned marked “no proposal”. Failure to provide a proposal or “no proposal” may result in the offeror being removed from the FCS mailing list.

#### 7. TAXES

FCS is exempt from all state sales tax and Federal Excise Tax. These taxes shall not be included in proposals.

#### 8. ADDENDA

Offerors are notified that they must thoroughly examine proposal documents, which include the Cover Sheet, Table of Contents, Proposal Conditions, Project Manual or Specifications, Drawings, Request for Sealed Proposal and Offeror’s Checklist, together with the Addenda thereto issued prior to the receipt of proposal.

Any Addenda issued in writing during the time of solicitation shall be included in the proposal, and each Addenda will be incorporated in the subsequent contract.

If any person or firm contemplates submitting a proposal and is in doubt as to the meaning of any part of the solicitation documents, they may submit a written request to the Capital Program Contracts Department for interpretation. Requests for interpretation must be submitted in writing not-less-than ten (10) days prior to the proposal due date and addressed to the Capital Program Contracts Department.

Interpretations of proposal documents will be made by Addenda only. Copies of all Addenda will be posted on the FCS Capital Program Contracts Department’s website, [www.fcscpcontracts.org](http://www.fcscpcontracts.org), for all who have obtained a set of submittal documents from the Capital Program Contracts Department to use in the preparation of submittals. The Fulton County Schools will not be responsible for any other interpretations or explanations.

No oral interpretations will be made to offerors as to meaning of proposal documents. Requests for written interpretations shall be made in writing to the Capital Program Contracts Department. Failure on the part of the offeror to do so shall not relieve it of the obligation to execute such work in accordance with a later interpretation by the Fulton County Schools. All interpretations made to the offerors shall be made to the form of Addenda to the proposal documents and sent to all offerors. Offerors are strongly urged to make arrangements to visit and inspect the site(s) prior to proposing if the configuration, structure, condition, etc. of the site will influence the proposal for contract performance.

## PROPOSAL CONDITIONS

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### SECTION I – PREPARATION AND SUBMISSION OF PROPOSALS

#### 9. WITHDRAWAL OF PROPOSALS

A proposal cannot be withdrawn after it is delivered to the FCS, unless the offeror makes a request in writing to the FCS prior to time set for opening proposals, or unless the FCS fails to accept or reject the proposal within ninety (90) days after the date fixed for receiving said proposals.

#### 10. ADDITIONAL TERMS

The FCS shall not be bound by any terms and conditions included in any offeror's packaging, service catalog, brochure, technical data sheet or other document which attempts to impose any conditions at variance with or in addition to the terms and conditions contained in this solicitation or the FCS purchase order related to this solicitation or contract. If the offeror objects to any term or condition that shall relate to a contract resulting from this solicitation, the objection shall be clearly stated on a separate page entitled "Objection to Term or Condition" and placed in the proposal immediately after the executive summary.

If the objection is accepted by FCS it will be stated in the contract. If not stated in the contract the terms and conditions shall remain as written in the solicitation.

#### 11. COMPLIANCE WITH LAWS

All property or services furnished in a Contract resulting from this solicitation shall comply with all applicable Federal, State and Local laws, codes and regulations.

#### 12. PROTESTS

Protests dealing with the specifications or the solicitation shall be filed not later than three (3) working days prior to the proposal due date. Other protests shall be filed not later than three (3) working days after the proposal due date, or if the protest is based on subsequent action of the FCS, not later than three (3) working days after the aggrieved person knows or should have knowledge of the facts given rise to the protest. Protests are considered filed when received by the Capital Program Contracts Manager. Issues not raised in the initial protest may be deemed waived at the discretion of FCS. Protests which are not filed in a timely manner, as set forth above will not be considered.

The FCS reserves the right to continue with the project, notwithstanding a protest, if it finds, in its sole determination, that continuing with the project is in the public's best interest.

#### 13. PURCHASING POLICY

The FCS Purchasing Policy, Purchasing Procedures and Regulations are incorporated to this solicitation (and, therefore, any contract awarded as the result of this solicitation) by reference. By participation in this solicitation a offeror, potential offeror or contractor agrees to be bound by the FCS Purchasing Policy, Purchasing Procedures and Purchasing Regulations in any issue or action related to this solicitation or subsequent contract resulting from this solicitation.

## PROPOSAL CONDITIONS

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### SECTION I – PREPARATION AND SUBMISSION OF PROPOSALS

#### 14. OFFEROR BOND

A Offeror Bond in the amount of five per cent (5%) of the total cost of work shall be submitted with the proposal. Failure to provide a offeror bond will result in the proposal being considered non-responsive.

#### 15. PERFORMANCE AND PAYMENT BONDS

The selected offeror will be required to furnish a performance bond and a payment bond issued by a surety company licensed by the Commissioner of Insurance of the State of Georgia to do business as an insurance company in the State of Georgia. The performance and payment bonds must be in an amount equal to one hundred percent (100%) of the contract price.

These bonds will be furnished as security for the faithful performance of the work included in this Construction Contract Agreement, including stipulations and agreements of the Contract, the payment of all bills and obligations arising out the performance of the Contract, which bills and obligations might or would in any manner become a claim against the Owner, and guaranteeing the work included in the Construction Contract Agreement against faulty materials or poor workmanship, or both, for one (1) year after final acceptance of the work by the Owner. All performance bonds and payment bonds provided by the selected offeror shall be accompanied by an affidavit from the selected offeror that an investigation has been made and that the surety is licensed by the Commissioner of Insurance to do business as an insurance company in Georgia and is further authorized to serve as a surety.

A performance bond satisfactory to Owner in amount equal to one hundred percent (100%) of the total contract price and a payment bond in amount equal to one hundred percent (100%) of the total contract price shall be required of the selected offeror to guarantee completion of the work under the contract and payment for all labor and materials.

Bonds shall be executed by an agent of the surety residing in the State of Georgia. The date of these bonds shall be the same as the date of the award letter. The surety shall appoint an agent for service in Atlanta, Georgia, upon whom all notices shall be shown on each bond.

The person executing the bonds on behalf of the surety shall file with the bonds a General Power of Attorney, unlimited as to amount and type of bonds covered by such Power of Attorney, and certified by an official of said surety.

The Construction Contract will not be executed by FCS until after the receipt and approval of the bonds by FCS.

If, at any time after the execution of the Construction Contract, the surety has been determined to be unsatisfactory by FCS, FCS shall have the right to require new bonds by issuing a notice to contractor that the surety on the bonds is unsatisfactory to FCS. Failure of the contractor to provide replacement performance and payment bonds, issued by a surety that is found to be satisfactory to FCS shall constitute a default under this paragraph.

## PROPOSAL CONDITIONS

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### SECTION I – PREPARATION AND SUBMISSION OF PROPOSALS

In the event of the contractor's default under the terms and conditions of the General Conditions, FCS shall have such rights and may take such actions as are granted to FCS in the event of a default by the contractor pursuant to the General Conditions.

The FCS shall not be responsible for any costs incurred as a result of the selected offeror's failure to comply with its obligation to secure performance and payment bonds as set forth herein.

In addition, for each Subcontractor having a Subcontract of \$100,000.00 or more for roofing, HVAC, plumbing, sprinkler system and electrical work, the Subcontractor shall procure payment and performance bonds for one hundred percent (100%) of the Subcontract amount. The Subcontractor's bonds shall be written by a surety having the qualifications set forth above. The Subcontractor's payment and performance bonds shall be presented to Owner prior to the Contractor billing for or receiving payment for amounts under the applicable Subcontracts.

#### 16. OFFEROR'S REPRESENTATIONS

Offeror, by submitting a proposal, warrants and represents that:

- a. Offeror has read, comprehends and submits the proposal in accordance with the provisions and requirements of the Proposal Documents.
- b. Offeror has visited the Project site and is completely familiar with the conditions under which the Work is to be performed and the local conditions as related to the requirements of the Proposal Documents.
- c. The proposal is based upon the scope, materials, equipment and systems as required by the Proposal Documents, without exception.
- d. Offeror has the expertise and financial capacity to perform and complete all obligations under the Proposal Documents.
- e. The individual executing the Proposal Documents is duly authorized and empowered to execute the Proposal Documents on behalf of the offeror.
- f. Offeror is aware of and will comply with all applicable code requirements in the performance of the Work.
- g. All expenses incurred by offeror in preparing the proposal shall be borne solely by offeror.

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## PROPOSAL CONDITIONS

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### SECTION I – PREPARATION AND SUBMISSION OF PROPOSALS

#### 17. LICENSE REQUIREMENTS

At the time the proposal is submitted and throughout the performance of the Work, offeror shall ensure offeror and all subcontractors, regardless of tier, possess the appropriate license issued by the State of Georgia Professional Licensing Boards Division for the Work to be performed under the Contract. FCS shall verify offeror's licensing information prior to awarding the Contract.

**PROPOSAL CONDITIONS****SECTION II – CONTRACT AWARD****1. CONTRACT LETTER**

The Document 00400, Offer and Acceptance Form and/or establishing purchase order prepared by Fulton County Schools, furnished, to the selected Offeror within the time for acceptance specified, results in a binding contract without further action by either party. The contract shall consist of this solicitation and any addenda thereto, the selected Offeror's proposal (as amended by a best and final offer if called for), and the Document 00400, Offer and Acceptance Form. Unless specifically deleted in writing by addendum or amendment to one of the aforementioned documents of the contract by the FCS Director of Contracting all terms and conditions of the FCS contract documents shall be in affect and shall govern if in conflict with any term or condition otherwise presented. The contract shall be interpreted, construed and given effect in all respects according to the laws of the State of Georgia.

**2. CONTRACT AWARD**

A contract will be awarded to the responsible and responsive offeror whose proposal is determined to be the most advantageous to the Fulton County Schools, based on the evaluation factors set forth below.

**3. CONFLICTS IN TERMS AND CONDITIONS**

In a conflict between terms and conditions in any document that will be part of the contract, FCBE terms and conditions shall govern.

**4. INSURANCE**

When the selected offeror has been identified, it will be notified of the necessity to provide the required insurance. Proof of insurance shall be provided within Ten (10) days of the date of written notification to the offeror.

A. The following general requirements apply to any and all work under this contract by all Contractors and Sub-Contractors of any tier.

- 1) Any and all insurance required by this contract shall be maintained during the entire length of this contract, including any extensions thereto, and until all work has been completed to the satisfaction of Fulton County Schools. Any and all insurance must be on an occurrence basis.

No Contractor or Subcontractor shall commence any work of any kind under a contract until all insurance requirements contained within the solicitation have been complied with and until evidence of all insurance requirements in each and every contract with each and every subcontractor of any tier and shall require the same to comply with all such requirements.

- (2) The Fulton County Schools shall be covered as an Additional Insured under any and all insurance required by the contract. Confirmation of this shall appear on all certificates of insurance and on any and all applicable policies.

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## PROPOSAL CONDITIONS

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### SECTION II – CONTRACT AWARD

- (3) The Fulton County Schools shall be given no less than thirty (30) days prior written notice of cancellation of any policy of insurance required under this agreement. The Fulton County Schools shall be given not less than thirty (30) days prior written notice of any material changes to any policy of insurance required under this contract.
- (4) Each and every agent shall warrant when signing the certificate of insurance that he is acting as an authorized representative on behalf of the companies affording insurance coverage under the contract, that he is licensed by the State of Georgia to conduct insurance business in the State of Georgia, and that the companies affording insurance coverage are currently licensed by the State of Georgia and are currently in good standing with the Commissioner of Insurance for the State of Georgia.
- (5) Any and all companies providing insurance required by the contract must meet the minimum financial security requirements as set forth below. The rating for each company must be indicated on the certificate of insurance.

For all contracts, regardless of risk, companies providing insurance under this contract must have a current:

- (a) Best's Rating not less than A, and
  - (b) Best's Financial Size Category not less than Class AVIII
- (6) In the event the Contractor neglects, refuses, or fails to provide the insurance required by the Contract Documents, or if such insurance is cancelled for any reason, FCS shall have the right, but not the duty, to: (i) procure the same and deduct the cost thereof from monies then due or thereafter to become due to the Contractor; or, (ii) shall have the right to cancel the contract.



## PROPOSAL CONDITIONS

### SECTION II – CONTRACT AWARD

**B. Worker's Compensation and Employer's Liability Insurance**

The contractor shall procure and maintain Worker's Compensation and Employer's Liability Insurance in the following limits. Such insurance is to cover each and every employee who is or may be engaged in work under this contract.

Worker's Compensation	Statutory
Employer's Liability	
Bodily Injury by Accident	\$1,000,000 each accident
Bodily Injury by Disease	\$1,000,000 each employee
Bodily Injury by Disease	\$1,000,000 policy limit

**C. Commercial General Liability Insurance**

The contractor shall procure and maintain Commercial General Liability Insurance in an amount not less than \$1,000,000.00 for bodily injury and property damage combined single limit. The following specific extensions of coverage shall be provided and indicated on the certificate of insurance.

- 1) Comprehensive Form
- 2) Contractual Insurance
- 3) Personal Injury
- 4) Board Form Property Damage
- 5) Premises - Operations
- 6) Completed Operations

This coverage shall cover the use of all equipment, hoists, and vehicles on the site(s) not covered by Business Automobile Liability Insurance under this contract. Policy coverage must be on an occurrence basis.

**D. Business Automobile Liability Insurance**

The contract shall procure and maintain Business Automobile Liability Insurance in an amount not less than \$1,000,000.00 for bodily injury and property damage combined single limit. The following extensions of coverage shall be provided and indicated on the certificate of insurance:

- (1) Comprehensive Form
- (2) Owned, Hired, Leased and non-owned vehicles to be covered.

**E. Builder's Risk Insurance**

- (1) Projects Over \$1,000,000.00

On all Projects where the Contract Amount is greater than \$1,000,000, FCS shall procure Builder's Risk Insurance including coverage for the Work, on a replacement cost basis,

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## PROPOSAL CONDITIONS

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### SECTION II – CONTRACT AWARD

providing the perils included on a Special Form property policy, including, but not limited to, the perils of fire, lightning, explosion, windstorm, flood and earthquake (including sinkholes and subsidence), strike, riot, civil commotion, vandalism and malicious mischief, insuring the buildings, structures, machinery, equipment, facilities, fixtures and other properties constituting a part of the Work and property of Others.

In connection with any claims made under the Builder's Risk Insurance provided by FCS, Contractor shall reimburse FCS for the first \$10,000.00 (in the aggregate) paid by FCS as a deductible under the policy. Should Contractor fail to reimburse FCS for any such amounts within thirty (30) days of FCS's request, FCS may withhold such amounts from any payments owed to Contractor.

(2) Projects less than \$1,000,000.00

On all Projects where the Contract Amount is less than \$1,000,000.00, Contractor shall provide Builder's Risk Insurance including coverage for the Work, on a replacement cost basis, providing the perils included on a Special Form property policy, including, but not limited to, the perils of fire, lightning, explosion, windstorm, flood and earthquake (including sinkholes and subsidence), strike, riot, civil commotion, vandalism and malicious mischief, insuring the buildings, structures, machinery, equipment, facilities, fixtures and other properties constituting a part of the Work and property of Others for which Contractor has responsibility to insure. Coverage shall be written on an occurrence basis in the amount of contract award, with a deductible of not more than \$25,000.00

F. Hold Harmless Agreement

The Contractor shall Hold Harmless the Fulton County Schools from any and all claims, suits, actions, damages, liability and expenses in connection with loss of life, bodily or personal injury or property damage, including loss of use thereof, directly or indirectly caused by, resulting from, arising out of or occurring in connection with the performance of this contract. The Contractor's obligation shall not be limited by, or in any way to, any insurance coverage or by any provision in or exclusion of omission from any policy of insurance.

## PROPOSAL CONDITIONS

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### SECTION III – POST AWARD

#### 1. ASSIGNMENT

By the submission of this proposal, the offeror agrees not to assign to others unless specifically authorized in writing by the FCS Capital Program Contracts Manager.

#### 2. COSTS OF INSPECTION OR TESTING

Costs of inspection or testing which do not meet specifications shall be paid by the vendor.

#### 3. PAYMENT

The Contractor shall invoice Fulton County Schools on a monthly basis, or, if payment is to be made by line item, when a single line item has been satisfactorily delivered. Complete payment will be made within thirty (30) days from either the date of delivery or the receipt of satisfactory invoice in triplicate, whichever occurs later. All invoices shall show the contract number, work performed and period of work performance.

#### 4. TERMINATION FOR DEFAULT:

- a. In the event any property or service to be furnished by the Contractor under a contract or purchase order should for any reason not conform to the specifications contained therein or to the sample submitted by the Contractor with his proposal, the FCS may reject the property or service and may terminate the contract for default.

Prior to a termination for default, the Contractor will be given the opportunity to respond to a "cure notice" and/or a "show cause notice". In either case the Contractor will be expected to either correct the offending situation or provide an acceptable plan and time frame for correction within five (5) days of receipt of either notice. Failure to either correct the offending situation or provide an acceptable plan and time frame for correction will be cause for termination.

- b. If the contract is terminated for default, FCS may procure such property or services from other sources and shall have the absolute right to deduct from any monies due the Contractor or that may thereafter become due to the contractor, the difference between the contract price and the actual cost of the property or service to be replaced or substituted.
- c. Failure by a Contractor to perform on delivery of goods or services as specified may also result in the removal of the contractor from doing business with FCS for a period of up to one (1) year.

## PROPOSAL CONDITIONS

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### SECTION III – POST AWARD

**5. TERMINATION FOR CONVENIENCE:**

FCS reserves the right to terminate for convenience a contract awarded through this solicitation.

**6. PERMITS, TAXES, LICENSES, ORDINANCES, AND AGREEMENTS**

The Contractor shall, at his own expense, obtain all necessary permits, give all notices, pay all license fees and taxes, and comply with all applicable local, State and Federal laws, ordinances, rules and regulations. The Contractor shall maintain the licenses required in a current status after award and throughout the course of the contract.

In the performance of the contract, the Contractor shall comply with all local agreements which it has made with any association, union or other entity with respect to wages, salaries and working conditions, so as not to cause inconvenience, picketing or work stoppage.

**7. NON-APPROPRIATION**

Notwithstanding any other provision of this agreement, the parties hereto agree that the charges hereunder are payable to the Contractor by Fulton County Schools solely from appropriations received by Fulton County Schools. In the event such appropriations are determined in the sole discretion of the Chief of Operations of Operations to no longer exist or to be insufficient with respect to the charges payable hereunder; this agreement shall terminate without further obligation of FCS at the end of any fiscal period (hereinafter referred to as "Event"). In such Event, the Chief of Operations of Operations of FCS shall certify to the Contractor the occurrence thereof, and such certification shall be conclusive.

**8. OFFEROR'S APPLICATION FORM**

In order to register your company with Fulton County Schools' vendor database, each contractor will need to go to the FCS Capital Program Contracts Department's website on the World Wide Web at [www.fcscpccontracts.org](http://www.fcscpccontracts.org) and complete the vendor application.

**9. PROGRESS REPORTS**

When requested by FCS, the Contractor shall furnish such reports as required.

## PROPOSAL CONDITIONS

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### SECTION IV – OTHER

**1. NONDISCRIMINATION**

The Contractor, by the submission of a proposal or the acceptance of an order or contract, agrees to provide the goods and services covered under the proposal or contract without discriminating in any way against any person or persons or refuse employment of any person or persons on account of color, religion, national origin, or sex.

**2. FCS NONDISCRIMINATION**

Fulton County School System does not discriminate on the basis of race, color, religion, sex, national origin, age, disability, or any other legally protected status in any of its employment practices, education programs, services or activities.

**3. MINORITY AND FEMALE BUSINESS ENTERPRISES**

It is the intent of FCS to assure that Minority Business Enterprises (MBE) and Female Business Enterprises (FBE) have an equal opportunity to participate in FCS Purchasing requirements.

**4. DRUG-FREE WORKPLACE**

By submission of a proposal, the offeror certifies that he/she will not engage in the unlawful manufacture, sale distribution, dispensation, possession, or use of a controlled substance or drug during the performance of the contract and that a drug-free workplace will be provided for the contractor's employees during the performance of the contract. The offeror also certifies that he will secure from any subcontractor who works on the contract, written certification of the same drug free workplace requirements. False certification or violation by failing to carry out requirements of O.C.G.A. § 50-24-3 may cause suspension, termination of contract, or debarment of such offeror.

**5. CERTIFICATION OF NONCOLLUSION**

By submitting a proposal, the offeror certifies that: "This proposal is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a proposal for the same materials, supplies, or equipment, and is in all respects fair and without collusion or fraud. Collusive pricing is understood to be a violation of State and Federal law and can result in fines, prison sentences, and civil damage awards."

**6. AUTHORIZED OFFICIAL**

It is agreed that all conditions of the proposal shall be abided and that the person signing this proposal is authorized to sign the proposal for the offeror.

## **PROPOSAL CONDITIONS**

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### **SECTION IV – OTHER**

#### **7. TERMINATION OF SOLICITATION**

In any event in which this solicitation is terminated or cancelled, in whole or in part, or in which all proposals are rejected, there shall be no liability on the part of FCS for any costs incurred by offerors or potential offerors in relation to the solicitation.

#### **8. RIGHTS AND REMEDIES**

The rights and remedies of FCS provided above shall not be exclusive and are in addition to any other rights and remedies provided by law or under the contract.

## REQUEST FOR PROPOSAL

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The Fulton County School System invites proposals for:

**1. CONTRACT TYPE**

The contract type contemplated for this requirement is a Lump Sum General Contract.

**2. CONTRACT TIMEFRAME**

The contract timeframe will be for the duration of the project.

**3. CATEGORIES OF AWARD**

Award will be made on an "All or None" basis.

**4. OTHER PROCEDURES**

a. Standard Fulton County Schools Program Management contract and general conditions will be used as the form of contract.

b. The requirements of Georgia House Bill 1079 shall govern in case of conflict with any terms and conditions of this document or contracts awarded.

**5. RECEIPT OF ADDENDUM CLAUSE**

Offerors are encouraged to contact the FCS Capital Program Contracts Department prior to submitting a bid or proposal to determine if any addendum has been issued which they have not received. Addenda issued to solicitations will be available at the FCS Capital Program Contracts Department or on the department web site located at [www.fcsepccontracts.org](http://www.fcsepccontracts.org). However, FCS Capital Program Contracts Department shall not bear responsibility for receipt of addenda by mail.

**6. OWNER'S REPRESENTATIVE**

Management of the contract will be performed by the Owner's Representative, Parsons Corporation.

**7. OFFEROR'S RESPONSIBILITY**

It shall be the responsibility of the selected Offeror to meet all specifications and guidelines set forth therein. No offer will be considered that does not provide a serious and reasonable proposal to the solicitation. Each proposal will be evaluated in its entirety.

**8. PURPOSE**

Fulton County School (FCS) intends to contract for the services of a General Contractor for the construction of Chattahoochee HS - Band Suite Addition. To qualify for

## REQUEST FOR PROPOSAL

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consideration, firms shall possess and be prepared to provide expertise, financial resources, and personnel experienced in construction of educational facilities.

The services to be performed by the General Contractor shall have as their objective the efficient, economical, timely and complete delivery of the work by managing the construction of the project within the time and cost limitations and within established quality requirements.

### 9. SCOPE OF WORK

- a. This project will include all site and building work required for construction of an Chattahoochee HS - Band Suite Addition.
- b. FCS anticipates that construction on these projects will begin no later than February 2011 and be substantially completed no later than June 10, 2011.
- c. The selected firm will provide the required services for a lump-sum price.

### 10. SPECIFICATIONS

The selected contractor shall adhere to the attached project manual that details the general conditions and specifications for execution of the work.

### 11. OFFEROR BOND

A Bond in the amount of five percent (5%) of the total price of work shall be submitted with the proposal. Failure to provide a bond will result in proposals being considered non-responsive. (See Page 9, Section I, Paragraph 14, Bond.)

### 12. PERFORMANCE AND PAYMENT BONDS

The selected offeror will be required to furnish a performance bond and a payment bond issued by a surety company licensed by the Commissioner of Insurance of the State of Georgia to do business as an insurance company in the State of Georgia. The performance and payment bonds must be in an amount equal to one hundred percent (100%) of the Offer Price. (See Page 9, Section I, Paragraph 15, Performance and Payment Bonds.)

In addition, for each Subcontractor having a Subcontract of \$100,000.00 or more for roofing, HVAC, plumbing, sprinkler system and electrical work, the Subcontractor shall procure payment and performance bonds for one hundred percent (100%) of the Subcontract amount. The Subcontractor's payment and performance bonds shall be presented to Owner prior to the Contractor billing for or receiving payment for amounts under the applicable Subcontracts.



## REQUEST FOR PROPOSAL

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**13. SITE VISITS:**

Prior to submission of proposals, FCS will provide the opportunity to arrange walk through inspection of project site upon request. To schedule a site visit, please contact FCS Capital Program Contracts Department at 404-669-8974.

**14. SUBMISSION OF PROPOSAL:**

Proposals shall be submitted in four sections: (1) price, (2) schedule, (3) technical capability, and (4) business stability. One (1) original and six copies (6) of the proposal shall be provided in a loose-leaf, three-ring binder.

**15. EVALUATION OF PROPOSALS:**

Proposals will be evaluated on the following factors: (1) price, (2) schedule, (3) technical capability, and (4) business stability. The evaluation factors shall be scored by the following percentages totaling to a maximum score of 100. Firms receiving a minimum score of 80 shall be in the competitive range, be deemed to be "responsible offerors," be asked to engage in discussions, negotiations and revisions, and be asked to provide a Best and Final Offer (BAFO):

1.	Price	25 Points
2.	Schedule	30 Points
3.	Technical Capability	25 Points
4.	Business Stability	20 Points

**16. PREPARING THE PROPOSAL:**

Begin each section and subsection on a separate page. Number the pages in each section consecutively. If any confidential and/or proprietary information is included, then each page containing such information must be stamped "proprietary". It is not acceptable to label the entire proposal as confidential and proprietary.

**17. EXECUTIVE SUMMARY**

An executive summary of not more than two (2) pages stating the Offeror's overview of the project shall precede the specific required sections.

### REQUEST FOR PROPOSAL

#### 18. THE PROPOSAL

##### SECTION I - PRICE

In this section, the Offeror shall offer the lump-sum cost of construction and related services together with a schedule of values and requested unit pricing. The lump-sum price shall include any allowances specified in the project documents.

##### A. Base Price:

The Offeror proposes to fully and completely construct the Project in conformity with all requirements of the Contract Documents and furnish all necessary labor, material and equipment for such construction, and furthermore, to fully, completely, and strictly perform all obligations of the Contractor as set forth in the Contract Documents, for the lump sum contract price of

\_\_\_\_\_ (\$ \_\_\_\_\_) **(Note: price shall include ALL Allowances listed in item B below)**. Said lump sum contract price is allocated, in its entirety, to the following minimum elements of the work [enter "Not Applicable (N/A) if work is not included in project]:

General Conditions:	\$ _____
Earthwork:	\$ _____
Concrete Foundation and Slabs:	\$ _____
Masonry:	\$ _____
Structural Steel:	\$ _____
Roofing:	\$ _____
Doors & Windows:	\$ _____
Finishes:	\$ _____
Mechanical:	\$ _____
Electrical:	\$ _____
Fire Protection:	\$ _____
Plumbing:	\$ _____
Data:	\$ _____
Special Systems:	\$ _____
Allowances (Item B below)	\$ _____
Other:	\$ _____
Total:	\$ _____

##### B. Allowances / Unit Pricing: N/A

Item Description	Qty	Unit	Unit Price	Allowance

**TOTAL UNIT COST: N/A**

## REQUEST FOR PROPOSAL

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### SECTION II - SCHEDULE

#### A. Detailed Construction Schedule

- (1) Provide a detailed construction schedule in Primavera or program compatible with Primavera P3ec V.5 indicating that the project will achieve substantial completion no later than June 10, 2011. Include critical path and demonstrate key approval and delivery dates to maintain the schedule, as well as opportunities for acceleration or improvement where possible. Milestones must show start and finish for each phase.

#### B. Schedule Performance

- (1) Demonstrate your ability from prior projects to deliver accelerated completion schedules and/or fast track projects as well as phased renovations where tenant will occupy building during construction as identified by owner.
- (2) Document your schedule management techniques for (a) managing a fast track project and (b) implementing recovery plans when applicable. (c) managing a phased renovation project.
- (3) Provide qualifications of project scheduler.

### SECTION III - TECHNICAL CAPABILITIES

#### A. Project Approach:

In this section, the Offeror shall describe in detail the methodology and approach that will be used to accomplish this project. This should include, but not be limited to, the following: planning, mobilization, project coordination, construction access, minimization of impacts to community, field procedures, and estimating, forecasting and valuation techniques. Offeror should include any other details that will aid in understanding how the job is proposed to be accomplished.

#### B. Capabilities:

- (1) Details of current and past experience in providing construction services for K-12 educational projects so as to demonstrate appropriate expertise in these areas.
- (2) Provide an outline of the organization that will be employed. The organization outline should clearly describe the numbers and professional category or personal to be employed, the chain of command of the organization, and the names of key personnel. Include resumes outlining the qualification of each key staff member who will be assigned to the project. The resumes shall include the individual's educational background, professional category (including certifications, licenses, etc.) and relevant work experience including similar major project participation.
- (3) Describe the work that will be self performed and provide a list of all major subcontractors including contact information and approximate contract value.

## REQUEST FOR PROPOSAL

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The list should include subcontractors that have a significant role in the cost and schedule of the project, but not limited to the following: Site, Concrete, Steel, Masonry, Roofing, Finishes, Casework, Mechanical, Electrical, Data and Special Systems (Low Voltage).

- (4) Show evidence of established safety program, including OSHA Safety Record and Experience Modification Rate (EMR).
- (5) Show ability to guarantee cost effectiveness as evidenced by the results of successful contracts with comparable school districts.
- (6) Show evidence of established process and procedures in the areas of cost estimating, value engineering, project procurement, project management, and technology that qualifies the Offeror to provide construction services.
- (7) Describe any auxiliary or related services which may augment the proposed services and prove advantageous to Fulton County Schools. The Offeror must provide sufficient detail and evidence to show proficiency and experience in the provision of these services, as well as a detailed indication of how these services are to be provided or performed.
- (8) Describe other resources or services the contractor can make available to Fulton County Schools. Such services must be currently provided by the Offeror to other clients and resources must belong to the Offeror.

### SECTION IV - BUSINESS STABILITY

- A. History and Organizational Structure of the Firm** - Provide a cover letter introducing the company and including the corporate name, address and telephone number of the corporate headquarters and local office. The name and phone number of one individual who will be the company's primary contact with FCS for contract negotiation and the name of the project manager proposed for this project should also be listed. The cover letter should also include a brief history of the company and the present organizational structure of the firm describing the management organization and this project's coordination structure; if the firm is a partnership, indicate the name of all partners; if incorporated indicate where and when.
- B. Financial Status** - Describe the financial status of the firm and include the audited financial statements (income statements and balance sheets) for the past two (2) accounting years.
- C. References** - List as references (names, address, contact persons and toll-free phone numbers) a minimum of three (3) clients of similar size and nature to FCS for which a project was completed within the last three (3) years. A brief description of the services provided shall accompany each reference.

## REQUEST FOR PROPOSAL

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- D. Previous Default** - Indicate if the Offeror has ever defaulted on a contract or been denied a proposal due to non-responsibility to perform. If so, provide the facts and circumstances.

**20. REQUEST FOR INFORMATION**

All questions and/or correspondence during the entire proposal process shall be directed in writing to the Capital Program Contracts Manager.

During the entire period of solicitation, proposal and evaluation, no Offeror shall contact any member or employee of FCS concerning this solicitation. Such action could result in the Offeror being removed from further consideration in this solicitation.

**21. DISCUSSIONS, NEGOTIATIONS AND REVISIONS:**

Fulton County Schools may require Responsible Offerors to participate in discussions, negotiations and revision regarding their proposals and qualifications for this project and to answer questions posed by the Fulton County Schools. Discussions will be held with responsible offerors in the competitive range at the Meadows Operations Center. Responsible offerors will be notified in writing if they are selected to engage in discussions.

**22. BEST AND FINAL OFFERS (BAFOs)**

BAFOs will be requested by the Capital Program Contracts Department in writing and with a specified date and time for submission. The BAFOs will be evaluated on the aforementioned factors and a written determination shall be made as to which proposal/BAFO is the most advantageous to the Fulton County Schools.

**23. CONTRACT AWARD**

The BAFOs will be evaluated based upon the factors set forth above. The contract will be awarded to the responsible and responsive offerors whose proposal is determined to be the most advantageous to the Fulton County Schools, taking into consideration all of the factors set forth above. The notice of intent to award the contract shall be made in writing and shall indicate the basis on which the award is to be made.



**REQUEST FOR PROPOSAL**

DATE: \_\_\_\_\_

TIME: \_\_\_\_\_

PROPOSAL NO.: \_\_\_\_\_

NAME OF COMPANY: \_\_\_\_\_

The Fulton County Board of Education  
5270 Northfield Boulevard  
College Park, Georgia 30349

Gentlemen:

Having carefully examined the Proposal Conditions and Specifications entitled "**Request for Proposal No. RFP 413-11**" for the performance of subject work all dated \_\_\_\_\_, and the Addendum(a) \_\_\_\_\_, as well as the site and premises, and conditions affecting the work, the undersigned proposes to furnish all services, labor and materials called for by them for the entire work, in accordance with said documents.

The Offeror's Checklist has been complied with, is completed, and is enclosed with this proposal.





COMMITMENT TO PERFORM AS PROPOSED

Respectfully submitted,

\_\_\_\_\_  
Name of Company

\_\_\_\_\_  
Address of Company

\_\_\_\_\_  
E-Mail Address

\_\_\_\_\_  
Business Telephone Number

\_\_\_\_\_  
Fax Number

\_\_\_\_\_  
Printed Name and Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

The full names and addresses of persons and firms interested in the foregoing proposals as principals are as follows:

\_\_\_\_\_  
\_\_\_\_\_

The legal name of the Offeror is:

\_\_\_\_\_



**OFFEROR'S CHECKLIST**

PROJECT: \_\_\_\_\_

PROPOSAL NO.: \_\_\_\_\_

- We have acknowledged receipt of addendum(s) received.
- We have included the 00400 Document , Offer and Acceptance Form Document
- We have included the 00410 Document, Offer Security Form for five (5% of the base offer amount).
- We have completed and included the 00480 Document, Non- Collusion form.
- Seven (7) proposals (1-original, 6-copies) of all information requested have been provided.
- The proposal has been signed by an authorized principal or authorized official of the firm.
- No conditions, restrictions or qualifications have been placed by the company on this proposal that would have the proposal declared non-responsive.
- We are prepared to provide the insurance required in this solicitation.

\_\_\_\_\_  
TYPE OR PRINT NAME OF PERSON COMPLETING CHECKLIST

\_\_\_\_\_  
SIGNATURE OF PERSON COMPLETING CHECKLIST

\_\_\_\_\_  
DATE

\_\_\_\_\_  
(COMPANY FEDERAL ID NUMBER)

\_\_\_\_\_  
(E-MAIL ADDRESS)

COMPANY NAME

**READ AND COMPLETE THIS CHECKLIST BEFORE SUBMITTING THE PROPOSAL**

**RETURN WITH PROPOSAL**

*It is the policy of the Fulton County School System not to discriminate on the basis of race, color, sex, religion, national origin, age, or disability in any employment practice, educational program or any other program, activity or service. If you wish to make a complaint or request accommodation or modification due to discrimination in any program, activity or service, contact Compliance Coordinator Mr. Ron Wade, 786 Cleveland Avenue, SW, Atlanta, Georgia 30315, or phone (404) 763-4585. TTY 1-800-255-0135*



**APPENDIX I**

**PREQUALIFICATION OF OFFERORS**



## **PREQUALIFICATION OF BIDDERS**

### **I. Purpose**

This procedure sets forth standards to determine what Bidders are not responsible and to disqualify non-responsible Bidders from contracting or subcontracting with the Fulton County School Board (Board) and the Fulton County School District (District). It applies to all construction contracts which the Board and the District are required by law to award to the lowest responsible Bidder.

This procedure provides protection for the Board, the District and the public interest by only awarding contracts to responsible Bidders.

Each prospective Bidder shall receive a copy of the Prequalification Criteria as part of the District's bid package.

### **II. Authority**

This procedure is adopted by the Board and District pursuant to O.C.G.A. § 20-2-50; O.C.G.A. § 36-91-20(f); and Procedure DJE (E) (1).

### **III. Responsibility**

The Superintendent is generally responsible to implement and enforce this policy and may designate subordinate officers or employees to perform any functions provided for in this procedure.

### **IV. Definitions**

"Adequate evidence" means evidence sufficient to support a reasonable belief in the truth of the fact or conclusion it is offered to support and does not require proof in accordance with technical rules of evidence.

"Bidder" means any person or entity responding to an invitation for bids, Request for Proposals, Request for Qualifications or otherwise seeking to contract with the Board or District or with Contractors.

"Contractor" means any person independent of the Board or District who does or seeks to do business with the Board or the District pursuant to mutual agreement and includes persons who subcontract with the Board or District Contractors.

"Conviction" means a judgment or conviction of a criminal offense by any court of competent jurisdiction, whether entered upon a verdict or a plea, including a plea of nolo contendere regardless of whether an appeal of the conviction has been sought.

"Debarment" means exclusion as a Contractor for a specified time.

"Disqualification" means exclusion as a Contractor from award of any particular contract.

"Person" means an individual, company, firm, association, corporation, partnership, or other legal entity.

### **V. Disqualification through Prequalification Standards**

All Contractors are presumed to be qualified unless disqualified in accordance with this procedure.

- A. A Bidder or Contractor may be disqualified with respect to any particular bid or contract award for any one or more of the following causes:

Conviction or civil judgment of an offense in obtaining or attempting to obtain a public or private contract or subcontract or in the performance of such contract or subcontract;

Conviction or civil judgment under state or federal anti-trust statutes;

Conviction or civil judgment of any offense indicating a lack of business integrity or business honesty;

Conviction or civil judgment for a violation of any laws governing labor or employment, including wages and hours, child labor, or discrimination on the basis of race, color, sex or national origin;

Conviction or civil judgment for a violation of any election or campaign finance laws;

Failure without good cause to perform in accordance with the terms of a previous contract with Fulton County School Board and District; or failure to perform in accordance with the terms of one or more contracts with any person or entity within a reasonable period of time before or during the District's decision;

Failure to cooperate in any investigation or audit conducted by or through the Fulton County Board of Education or the Fulton County School District;

Providing false or misleading information as part of any prequalification statement, bid or contract, including but not limited to financial statements, fair employment forms, or product descriptions;

Unauthorized payments, gifts or other valuable consideration to any person having any official duties, direct or indirect, in connection with bidding, awarding or performing District contracts;

Inadequate financial resources to perform the contract;

Inadequate experience, organization, or technical resources to perform the contract;

Any other facts or circumstances showing a reasonable likelihood of inability to perform the contract including, but not limited to, that the Contractor proposes a Subcontractor who already is, or the District determines to be, disqualified under these criteria;

Any other cause which is determined to be so serious and compelling as to affect responsibility as a Contractor with Fulton County School District, including debarment or disqualification by another contracting entity; or any other lawful reason.

- B. Procedure for Disqualification through Prequalification Procedure

The Superintendent or his or her designee shall begin disqualification proceedings by giving notice of the intent to disqualify to the Bidder or Contractor by certified mail or overnight delivery stating:

1. The intent to disqualify and the bid or contract involved;
2. The reasons for disqualification, along with a summary of the information on which the finding of disqualification is based;



3. The date the contract award is expected to be considered by the Board of Education; and

4. The disqualification shall be effective to render the Bidder or Contractor ineligible for the contract award at issue unless the Bidder or Contractor submits a written response before contract award by the Board of Education, including information sufficient to create a genuine dispute as to the facts on which it is based or to the application of this procedure.

VI. If a Bidder or Contractor timely opposes disqualification, the District official who issued the notice of disqualification shall, upon receipt of the response to disqualification, promptly refer this matter to the Board or, at their request, to the Superintendent or his or her designee. The Superintendent or his or her designee shall make a recommendation to the Board. The Board's decision shall be final.

A record shall be kept by the Superintendent of all disqualification procedures under this section and of all persons disqualified.

VII. Responsibility for Agents

Bidders, Contractors, and affiliates are deemed responsible for the acts of persons acting for or on their behalf.

VIII. Period of Disqualification

Depending on the nature of the basis for disqualification, it may be only for the particular project being bid or may be for a period of time not to exceed three (3) years. The notice advising a Contractor of such proposed disqualification shall state the limits of the period of disqualification.

The Board may reduce the period of disqualification upon the Bidder's or Contractor's written request supported by adequate evidence of good cause, such as:

- a. Reversal of the conviction or judgment upon which the disqualification was based without a new trial within a reasonable time;
- b. Bona fide change in ownership or management of the Bidder; or
- c. Elimination of other causes for which disqualification was imposed.

END OF SECTION



**APPENDIX II**

**SB 529**



**FULTON COUNTY SCHOOLS**

**IMMIGRATION AND SECURITY FORM**

- A. In order to insure compliance with the Immigration Reform and Control Act of 1986, P.L. 99-603 (IRCA) and the Georgia Security and Immigration Compliance Act O.C.G.A. § 13-10-90 et seq., Contractor must initial one of the sections below:

\_\_\_\_\_ Contractor has 500 or more employees and Contractor warrants that Contractor has complied with the Immigration Reform and Control Act of 1986, P.L. 99-603 (IRCA) and the Georgia Security and Immigration Compliance Act by registering at <https://www.vis-dhs.com/EmployerRegistration>, verifying information of all new employees and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-.01 et seq.

\_\_\_\_\_ Contractor has 100-499 employees and Contractor warrants that no later than July 1, 2008, Contractor will register at <https://www.vis-dhs.com/EmployerRegistration> to verify information of all new employees in order to comply with the Immigration Reform and Control Act of 1986, P.L. 99-603 (IRCA) and the Georgia Security and Immigration Compliance Act and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-.01 et seq.

\_\_\_\_\_ Contractor has 99 or fewer employees and Contractor warrants that no later than July 1, 2009, Contractor will register at <https://www.vis-dhs.com/EmployerRegistration> to verify information of all new employees in order to comply with the Immigration Reform and Control Act of 1986, P.L. 99-603 (IRCA) and the Georgia Security and Immigration Compliance Act and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-.01 et seq.

- B. Contractor warrants that Contractor has included a similar provision in all written agreements with any subcontractors engaged to perform services under this Contract.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Firm Name: \_\_\_\_\_

Street/Mailing Address: \_\_\_\_\_

City, State, Zip Code: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Email Address: \_\_\_\_\_



**CONTRACTOR AFFIDAVIT AND AGREEMENT**

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm, or corporation which is contracting with the Fulton County Board of Education has registered with and is participating in a federal work authorization program or any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986, P.L. 99-603 (IRCA), in accordance with the applicability provisions and deadlines established in O.C.G.A. § 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performance of services pursuant to this contract with (name of public employer), contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. § 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01- .08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the Fulton County Board of Education at the time the subcontractor(s) is retained to perform such service.

\_\_\_\_\_  
EEV/Basic Pilot/E-Verify Program User Identification Number

\_\_\_\_\_  
BY: Authorized Officer or Agent  
(Contractor Name)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Title of Authorized Officer or Agent of Contractor

\_\_\_\_\_  
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN  
BEFORE ME ON THIS THE

\_\_\_\_ DAY OF \_\_\_\_\_, 200\_\_\_\_

\_\_\_\_\_  
Notary Public

My Commission Expires:\_\_\_\_\_

\*As of the effective date of O.C.G.A. § 13-10-91, the applicable federal work authorization program is the "EEV/Basic Pilot Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).





**SUBCONTRACTOR AFFIDAVIT**

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract with \_\_\_\_\_, which is under contract with the Fulton County Board of Education, and that the subcontractor has registered with and is participating in a federal work authorization program or any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986, P.L. 99-603 (IRCA), in accordance with the applicability provisions and deadlines established in O.C.G.A. § 13-10-91.

\_\_\_\_\_  
EEV/Basic Pilot/E-Verify Program User Identification Number

\_\_\_\_\_  
BY: Authorized Officer or Agent  
(Subcontractor Name)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Title of Authorized Officer or Agent of Subcontractor

\_\_\_\_\_  
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN  
BEFORE ME ON THIS THE  
\_\_\_\_ DAY OF \_\_\_\_\_, 200\_\_\_\_

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

\*As of the effective date of O.C.G.A. § 13-10-91, the applicable federal work authorization program is the "EEV/Basic Pilot Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).



**SECTION 00200  
INSTRUCTIONS TO OFFERORS**

1.01 GENERAL

- A. This Section provides offerors instructions on proposal conditions, requirements, and procedures in order to submit a proposal for the Project.
- B. Offeror is required to complete and submit the following documents in duplicate as part of their sealed proposal (as identified with solid borders). The documents for actual use by the offeror can be found in Section 00950 – Required Proposal Forms
  - 1. Document 00400 – Proposal and Acceptance Form
  - 2. Document 00410 - Proposal Security Form
  - 3. Document 00480 - Non-Collusion Affidavit
  - 4. Senate Bill 529 – SB 529 Documents will be required after notification of contract award

1.02 RELATED SECTIONS

- Section 00100 – Request for Proposal
- Section 00325 - Pre-proposal Conference
- Section 00330 – Pre-proposal Request for Information
- Section 00700 - General Conditions
- Section 00800 - Supplementary Conditions
- Section 00950 - Required Proposal Forms

1.03 LICENSE REQUIREMENTS

- A. At the time of proposal submission and throughout performance of the Work, offeror shall ensure offeror and all subcontractors, regardless of tier, possess the, possess the appropriate license (if any) issued by the State of Georgia Professional Licensing Boards Division for the Work to be performed under the Contract.
- B. OWNER will verify offeror licensing information before transmitting the Notice of Intent to Award.

1.04 OBTAINING PROPOSAL DOCUMENTS

- A. Proposal Documents may be obtained Monday through Friday from:

BRPH Architects - Engineers, Inc.  
Barry L. Sallas, AIA  
2727 Paces Ferry Road, Bldg One, Suite 1802  
Atlanta, GA 30341  
Phone: 678-784-5832  
Fax: 770-933-9246  
Email: bsallas@brph.com

- B. The cost for a set of Proposal Documents is \$50.00 for digital format; \$150.00 for printed bond set. Check must be payable to obtain documents.

- C. Offerors shall utilize a complete set of Proposal Documents in preparing a proposal.
- D. The failure or omission of offeror to receive any Proposal Document, form, instrument, Addendum, or other document shall not relieve offeror from any obligations with respect to the proposal and/or Contract.

#### 1.05 EXAMINATION OF PROJECT SITE, WORK AND PROPOSAL DOCUMENTS

- A. Offeror shall thoroughly examine and be familiar with the Proposal Documents.
- B. Offeror shall, prior to submission of proposal, inspect and examine the Project site of the Work and sites adjacent to the Work, examine the grounds and all improvements and must satisfy by examination, testing and/or other means the offeror may prefer in order to determine the actual conditions and requirements under which the Work must be performed.
- C. If upon inspection and examination by offeror there is any existing improvement, condition, matter or thing, or condition or requirement of the Work which offeror does not completely understand, offeror shall inquire as set forth in Section 00200 – Instructions to Offerors.
- D. Failure of offeror to examine any Proposal Document, form, instrument, Addenda, or other document or to visit the Project site and be acquainted with existing conditions shall not relieve offeror from any obligations with respect to the proposal and/or Contract.

#### 1.06 ADDENDA

- A. Information or any other notice of a change in the Proposal Documents will be issued only by the OWNER'S Capital Program Contracts Department office and only in the form of a written Addendum, transmitted by fax or e-mail to all who are known by the issuing office to have received a complete set of Proposal Documents.
- B. Copies of Addendum will be made available for inspection wherever Proposal Documents are on file for inspection.
- C. Each Addendum will be numbered, dated and identified with the Project number.
- D. It is the offeror's responsibility to ensure the submitted proposal includes all Addenda issued prior to the proposal submission date.
- E. Oral statements or any instructions in any form, other than Addendum as described above, shall be void and unenforceable.
- F. Addendum issued by the Owner's Capital Program Contracts Department office and not noted as being received by offeror as required in Document 00400 – Proposal Acceptance Form, may result in the proposal being deemed non-responsive.

#### 1.07 COMPLETION OF PROPOSAL FORMS

- A. All documents listed in subparagraph 1.01(B) of this Section shall be completed in their entirety.
- B. Blanks: All blanks shall be completed by filling in the requested information; the proposal may be deemed non-responsive if this requirement is not met.
- C. Erasures: The submitted proposal shall not contain any erasures, deletions or other corrections unless each such correction is authenticated by affixing in the margin immediately opposite the correction the signature or signatures of the person or persons

signing the proposal.

- D. Modifications: Changes in, or additions to the proposal, recapitulations of the proposed Work upon, alternative proposals, or any other modifications of the form which is not specifically called for in the Proposal Documents may result in the proposal being deemed non-responsive.
- E. Name and nature of offeror legal entity: Offeror shall complete the proposal form according to the following:
  - 1. The firm name or name style of the offeror shall agree with offeror Business License.
  - 2. Proposal shall be signed by offeror or an individual on behalf of the offeror and only a handwritten signature shall be acceptable.
  - 3. Successful offeror may be required to furnish a letter setting forth the organizational structure of offeror and further describing the firm members and those persons authorized to sign legal documents.
- F. Offeror shall make no stipulations on the Proposal Acceptance form nor qualify the offer in any manner.
- G. Offeror failure to submit a price for any offer item or unit price will result in the proposal being deemed non-responsive. If proposal items are called for and no change in the lump sum base offer is required, enter "No Change."

#### 1.08 OFFER GUARANTEE

- A. Offeror shall attach to the offer, an offer guarantee, if required herein, in the form of a certified or cashier's check or an offer bond as set forth in Document 00410 – Offer Security Form. If offeror intends to submit a bond (commonly known as a bid bond), offeror shall utilize a security form, supplied by OWNER as denoted in Document 00410, secured by a Georgia admitted Surety Company satisfactory to OWNER, as a guarantee.
- B. The offer guarantee shall be applied toward, but shall not be considered a limitation upon, any damage which may be sustained by OWNER if the offeror fails to abide by any provisions of the Notice of Intent to Award.
- C. In the case of an irregular bond, OWNER will contact the surety to confirm the validity of the bond.
- D. Attorneys-in-Fact who sign bonds must file with each bond a certified and effective dated copy of their power of attorney.
- E. Offer shall be guaranteed for a period of ninety (90) days from the date of submission, or as extended by mutual agreement.
- F. If offeror fails and/or refuses to execute Document 00400 – Offer Acceptance Form, provide the necessary bonds within the required time frames, or fails to abide by any provisions of the Notice of Intent to Award, the proposal guarantee shall become the property of OWNER, as damages; provided that the amount of the offer guarantee which becomes the property of OWNER shall not, in any event, exceed the difference between the offer amount and the offer amount of the next lowest, responsible offeror. OWNER reserves all other rights and remedies permitted by Georgia law

#### 1.09 OFFEROR REPRESENTATIONS

Offeror, by proposal submission, warrants and represents:

- A. Offeror has read, comprehends and submits proposal in full accordance with provisions of the Proposal Documents.
- B. Offeror has visited the Project site and is completely familiar with the conditions under which the Work is to be performed and the local conditions as related to the requirements of the Proposal Documents.
- C. Offer is based upon the scope, materials, equipment, and systems as required by the Proposal Documents without exception.
- D. Offeror has the expertise and financial capacity to perform and complete all obligations under the Proposal Documents.
- E. The individual executing the proposal forms is duly authorized and empowered to execute the proposal forms on behalf of the offeror.
- F. Offeror is aware of and will comply with all applicable code requirements in the performance of the Work.
- G. All expenses incurred by offeror in preparing the proposal shall be borne solely by offeror.

#### 1.10 SUBMISSION OF PROPOSALS

- A. Submit all documents listed in accordance with requirements of the Request for Proposal instructions.
- B. OWNER requests all pricing on Document 00400 – Offer Acceptance Form, be submitted at the time and place indicated in the proposal documents and on document 00400.
- C. Proposal shall be submitted in sealed envelope clearly marked "Request for proposal No. 413-11".
- D. Envelope shall plainly show name of offeror, description of the Work, RFP number, proposal submission date; and shall be deposited with the Contracting Department prior to the time scheduled for submission of proposals.
- E. A proposal arriving on or after the specified time is deemed non-responsive and will not be accepted.
- F. Offeror assumes all responsibility for timely delivery of the proposal at the location designated for submission of proposals.
- G. Oral, telephonic, facsimile, or a telegraphic proposal are invalid and will not be accepted.
- H. The submission of proposals shall be taken as prima facie evidence of compliance with Section 00200 – Instructions to Offerors.

#### 1.11 MODIFICATION OR WITHDRAWAL OF PROPOSAL

- A. Prior to submission of the proposal, a submitted proposal may be modified or withdrawn by notice to OWNER at the location designated for submission of proposals. Such notice shall be in writing over the signature of offeror. A change so made shall be worded as not to reveal the amount of the original offer and may be written on the outside of the proposal envelope.
- B. A withdrawn proposal may be resubmitted up to the proposal deadline, provided it then fully

complies with the proposal requirements.

- C. Offer Security shall be five percent (5%) of the amount of the offer.
- D. If offeror claims to have made a clerical error in their proposal, OWNER must receive a written request for release from offer within five (5) business days after the submission of the proposal. In this request, offeror must certify under penalty of perjury and indicate the date of proposal and Project name. The request must also contain: a request to be released from proposals; a detailed explanation of the error; the amount of the error; the offer amount if the error had not been made; and, the original unaltered estimating sheets the offer was based on.
- E. Offeror's will be notified of any weaknesses of the proposal by the Owner in writing. The offeror will be provided the opportunity to discuss the weaknesses identified and provide a date and time for submission of a Best and Final Offer, in accordance with the requirements of the Request for Proposal process.

#### 1.12 SUBMISSION OF PROPOSALS

- A. Proposals will be submitted at the time specified, on the date specified, at Operations Division, Capital Program Contracts Department, The Meadows Operation Center, 5270 Northfield Boulevard, College Park, Georgia 30349.
- B. As Offerors, their representatives, and other interested persons will submit documents for evaluation at a later specified time and date as determined by the Owner, there is no PUBLIC OPENINGS OF THE PROPOSALS.

#### 1.13 REJECTION OF PROPOSALS

- A. OWNER has the right to reject any and all proposals.
- B. OWNER has the right to deem any proposal not accompanied by all items required by the proposal documents, or a proposal that is in any other way deemed materially incomplete or irregular as a non-responsive proposal.

#### 1.14 PROPOSAL PROTEST

- A. This section describes the mandatory administrative procedure whereby offerors may challenge contracts or awards. The OWNER will process proposal protests in a timely and consistent manner to assure that all offerors are accorded equal consideration for the award of Contracts.
- B. All protests must be submitted in writing to the Capital Program Contracts Department within three (3) business days after the proposal submission. Any protest received after the three (3) day period will not be considered. OWNER will only consider those protests from offerors who submitted a timely proposal for the applicable Contract.
- C. The initial protest should include all matters the offeror wishes the OWNER to consider in deciding the protest outcome. Additionally, the protest must include the following:
  - 1. School name and Project description;
  - 2. Project number and proposal number;
  - 3. Nature of protest;
  - 4. Documentation supporting the allegations;
  - 5. Statement of the specific relief requested.

Issues not raised in the initial protest may, at OWNER's discretion, be deemed waived

with prejudice.

An aggrieved offeror may supplement its protest with supporting exhibits, evidence or documents that were not available at the time of the initial protest filing. However, such supplemental documentation must be provided to OWNER as soon as such material is reasonably available and must be provided prior to any ruling on the protest.

- D. Protests should be sent by U.S. Mail, overnight delivery or hand delivery to:

Director of Contracting  
Fulton County Schools  
The Meadows Operations Center  
5270 Northfield Blvd.  
College Park, Georgia 30349

The outside of the envelope should clearly state "Bid Protest" in large bold letters.

Protests will be deemed received when they are **physically received** by the Capital Program Contracts Department.

- E. OWNER will thoroughly review and evaluate all proposal protests and base the decision on the merits of the protest. A written response will be provided by the OWNER with all findings and specified remedies within five (5) business days of the receipt of the protest. Any appeal from OWNER's decision shall be made in accordance with Fulton County Board of Education Procedure DJE.

#### 1.15 AWARD

- A. OWNER has the right to waive any minor irregularities in a proposal and to accept the best value, responsive and responsible offeror as determined by the OWNER as set forth in Section 00100 – Request for Proposal.
- B. OWNER may request offerors to submit a cost breakdown prior to award. Failure to submit may render your proposal non-responsive.
- C. OWNER will transmit a Notice of Intent to Award or reject all proposals. Within seven (7) business days after receipt of the Notice of Intent to Award, offeror shall submit to OWNER the following:
1. One (1) executed original of the payment bond.
  2. One (1) executed original of the performance bond.
  3. One (1) executed original certificate of insurance.
- D. If offeror submits all items as required by the Notice of Intent to Award within the specified time frame and if all such items comply with the requirements of the Proposal Documents and are acceptable to OWNER, OWNER will execute the Contract and return a signed copy to the CONTRACTOR.

#### 1.16 CONTRACT DOCUMENTS

After execution of the Contract by OWNER, OWNER shall provide to CONTRACTOR at OWNER expense, five (5) copies of the Contract Documents. Any further copies of the Contract Documents are at the sole expense of the CONTRACTOR.

END OF SECTION



**SECTION 00300**  
**INFORMATION AVAILABLE TO OFFERORS**

1.01 GENERAL

- A. This Section sets forth the following information made available to offerors. The provided information is not part of the Contract Documents.
- B. The information is provided in conjunction with, but not limited to, the provisions of Sections 4.2, 4.3, 4.5, and 4.6 of the General Conditions.

1.02 SUBSURFACE CONDITIONS

- A. In the preparation of the Drawings and Specifications, ARCHITECT and/or ARCHITECT Consultants have relied upon the following reports of exploration and tests of subsurface conditions at, or contiguous, to the Project site of the Work:

**Available Upon Request**

- B. The information is provided for offeror investigation. OWNER does not warrant the accuracy or completeness thereof. Offeror is responsible for conducting all tests, investigations, sampling, and/or inquiries to ascertain all actual conditions that may affect the Work.

1.03 PHYSICAL CONDITIONS

- A. In the preparation of the Drawings and Specifications, ARCHITECT and/or ARCHITECT Consultants have relied upon the following drawings, descriptions, photographs, and/or mapping of physical conditions, other than Subsurface Facility, which are at, or contiguous, to the site of the Work:

**Available Upon Request**

- B. The information is provided for offeror investigation. OWNER does not warrant the accuracy or completeness thereof. Offeror is responsible for conducting all tests, investigations, sampling, and/or inquiries to ascertain all actual conditions that may affect the Work.

1.04 AVAILABILITY

- A. Copies of these reports, assessments, drawings and other information may be examined at the Owner's Meadows Operations Center, 5720 Northfield Boulevard, College Park, Georgia 30349.

END OF SECTION



**SECTION 00310  
PROJECT DIRECTORY**

## 1.01 GENERAL

- A. This Section provides contact information relative to the Work of the Project.

## 1.02 SPECIFIC

- A. Name of Project: Chattahoochee HS - Band Suite Addition  
Solicitation Number: **RFP RFP 413-11**  
Project Description:
- B. Location(s): 5230 Taylor Road  
Johns Creek, GA 30022
- C. OWNER: Fulton County Board of Education  
c/o Fulton County Schools  
786 Cleveland Avenue, SW  
Atlanta, Georgia 30315
- D. Owner Representative Chad Byars  
The Meadows Operations Center  
5270 Northfield Boulevard  
College Park, GA 30349  
Phone: 404-765-7146  
Fax: (404)-669-8989  
Email: chad.byars@parsons.com
- E. All Pre-Submisiion Requests for Information shall be directed to: Angela R. Young,  
Meadows Operations Center  
(404) 669-8970
- F. OWNER Consultants: N/A
- G. ARCHITECT: BRPH Architects - Engineers, Inc.  
Barry L. Sallas, AIA  
2727 Paces Ferry Road, Bldg One, Suite 1802  
Atlanta, GA 30341  
Phone: 678-784-5832  
Fax: 770-933-9246  
Email: bsallas@brph.com
- H. ARCHITECT Consultants Southern Civil Engineering  
Bob Vance  
3010 Royal Boulevard South, Suite 100  
Alpharetta, GA 30022  
Phone: (770) 619-4280  
Fax: (770) 619-4270  
[bvance@sce-atlanta.com](mailto:bvance@sce-atlanta.com)  
Willet Engineering Company

Mac Willett  
3528 Habersham at Northlake  
Tucker, GA 30084  
Phone: (770) 270-9484  
Fax: (770) 270-5126  
mwillett@willettengineering.com

Spencer Bristol Engineering, Inc.  
Doug Bristol  
5880 Live Oak Parkway, Suite 140  
Norcross, GA 30093  
Phone: (770) 414-1628  
Fax: (770) 414-6024  
morelys@spencerbristol.com

- I. Distribution of Bidding Documents/  
Prequalification/  
Bid Protest/  
Addenda /  
Notices to Proceed/  
Contract Closeout/  
Submittals/Substitution  
of securities in lieu of  
retention

Capital Program Contracts Department  
The Meadows Operations Center  
5270 Northfield Boulevard  
College Park, Georgia 30349  
Business Hours: 7:30 A.M – 4:30 P.M  
Phone: (404) 669-8974  
Fax: (404) 305-2167

Drawings and Specs

Available from Architect

- J. Filing of Claims

Fulton County Board of Education  
Cindy Loe, Superintendent  
c/o Fulton County Schools  
786 Cleveland Avenue, SW  
Atlanta, Georgia 30315

With Copies to:

OR as listed in item D. above.

D. Glenn Brock, Esq.  
Brock, Clay Calhoun & Rogers, P.C.  
49 Atlanta Street  
Marietta, GA 30060

Capital Program Contracts Department  
The Meadows Operations Center  
5270 Northfield Boulevard  
College Park, Georgia 30349

END OF SECTION

**SECTION 00325  
PRE-PROPOSAL CONFERENCE**

## 1.01 GENERAL

- A. Offerors are encouraged to attend the pre-proposal conference for comprehensive scope delineation of the Work and/or Project.
- B. Offerors shall visit the Project sites prior to the proposal submission date. This site visit is "NOT" Mandatory in order to determine the conditions normally encountered and generally recognized as inherent in the Work; take measurements, perform and/or cause to be performed all quantitative tests; observe and gather all information necessary in order to determine a comprehensive bid amount.
- C. Visits to the Project site(s) shall be coordinated through the Owner Representative.

## 1.02 PRE-PROPOSAL CONFERENCE

- A. A pre-proposal conference will occur in the administrative office as listed below:
  - 1. School: Meadows Operations Center
  - 2. Street: 5270 Northfield Boulevard
  - 3. City: College Park, Georgia
  - 4. Time: **11:00 a.m.**
  - 5. Day: **Monday**
  - 6. Date: **November 15, 2010**
- B. A sign-in sheet will be provided for issuing any changes to the Proposal Documents. Offeror must print their name legibly, sign their name, submit business cards for identification purposes, and comply with all requirements of the sign-in sheet.
- C. The offeror is responsible for ensuring that they have complete Proposal Documents including all Addenda provided by the OWNER, prior to the bid due date.

END OF SECTION



**SECTION 00330  
PRE-PROPOSAL REQUEST FOR INFORMATION**

1.01 GENERAL

A. This section addresses Requests for Information of the Proposal Documents.

1.02 SPECIFIC

A. Each Request for Information shall be submitted in writing to only the person and/or firm designated in Section 00310 – Project Directory, Item E.

B. Clarifications, interpretations, corrections, and changes to the Proposal Documents will be made by Addendum as provided in Section 00900. Clarifications, interpretations, corrections, and changes to the Proposal Documents made in any other manner shall not be binding and the offeror shall not rely upon them.

C. Each transmitted request shall contain the name of the person and/or firm filing the request, address, telephone and fax number, Specifications and/or Drawing number. The offeror is responsible for the legibility of hand written requests. Pre-proposal information requests shall be directed to Angela R. Young, Capital Program Contracts Department via facsimile at (404) 305-2167 or emailed to [cpcontracts@fulton.k12.ga.us](mailto:cpcontracts@fulton.k12.ga.us). Only questions received prior to **4:30 p.m., Friday, November 19, 2010** and Substitutions submitted not less than ten (10) business days prior to proposal submission (as per the Contracting Department time clock will be considered or responded to. A written response to timely pre-proposal information requests will be made by Addendum issued by Fulton County Schools Contracting Department not less than three (3) days prior to proposal submission.

D. DATE: \_\_\_\_\_  
PROJECT NAME: Chattahoochee HS - Band Suite Addition  
PROJECT NUMBER: LN-7004321; SA-7004301  
PROPOSAL NUMBER: **RFP 413-11**  
TO: Angela R. Young  
FAX NUMBER: 404-305-2167  
FROM: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
TELEPHONE & FAX NUMBER: \_\_\_\_\_  
DOCUMENT/DIVISION NUMBER: \_\_\_\_\_ DRAWING NUMBER: \_\_\_\_\_

REQUESTED INFORMATION \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Attach additional numbered sheets as necessary; however, only one (1) request shall be contained on each submitted form.

END OF SECTION





FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE

Update: 7/08/10

**DOCUMENT 00400  
OFFER AND ACCEPTANCE FORM**

**Chattahoochee HS - Band Suite Addition  
RFP 413-11**

Offeror Name: \_\_\_\_\_

1.01 PROPOSAL SUBMISSION INSTRUCTIONS

Submit this form, in a sealed envelope, plainly showing offeror's business license name and number, description of the Work and the proposal submission date; and deposit with **Fulton County Schools Contracting Department** located at 5270 Northfield Boulevard, College Park, Georgia.

- A. Offerors shall keep the Proposal Acceptance Form intact and return all pages when submitting the PROPOSAL.
- B. Failure to submit the complete Proposal Acceptance Form may invalidate the PROPOSAL.

1.02 PROPOSAL DUE DATE: Before: **2:30 p.m. on Tuesday, December 7, 2010**

1.03 PROJECT IDENTIFICATION:

- A. The undersigned is familiar with the terms of the Contract, the local conditions affecting performance of Contract, the cost of the Work at the place where the Work is to be done, and with the Drawings, Specifications and all other PROPOSAL Documents. The undersigned hereby proposes and agrees to perform, within the Contract Time stipulated, the Work including all of its component parts; and to provide and furnish any and all of the labor, materials, tools, apparatus, facilities, expendable equipment, and all utility and transportation services necessary to perform the Work in accordance with the Contract and complete all Work in a workmanlike manner for:

**Chattahoochee HS - Band Suite Addition RFP 413-11**

In strict conformity with the Drawings and Specifications issued by:

Fulton County Schools  
Fulton County, Georgia

1.04 Offeror acknowledges receipt of the following Addendum:

Number Number Number Number Number Number Number Number Number Number Number

\_\_\_\_\_

1.05 BASE OFFER (MUST BE FULLY COMPLETED BY OFFEROR)

- A. Offeror will complete the Work in accordance with the Contract Documents for the following base **OFFER** amount **which includes all allowances (including both specified and unit cost allowances)**

FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE



FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE

Update: 7/08/10

**TOTAL OFFER AMOUNT**

\_\_\_\_\_ \$ \_\_\_\_\_  
(Use words) (Figures)

- B. The base OFFER amount shall include **ALL** applicable taxes and does not include Federal Excise Tax as set forth in Article 6.37 of the General Conditions.
- C. The base OFFER amount shall includes **ALL** Contract Allowances, if any, as set forth in the Specifications or as described in Section 01025 -Allowances.
  - 1. SPECIFIED ALLOWANCES: N/A  
(Total Specified Allowances shall be included in Contractor total OFFER amount listed at 1.05 A. Base OFFER Amount above)

**TOTAL ALLOWANCE: N/A**

- 2. UNIT COST ALLOWANCE: N/A  
(Total Unit Cost Allowances shall be included in Contractor total OFFER amount listed at 1.05 A. Base OFFER Amount above)

**TOTAL UNIT COST: N/A**

1.06 ALTERNATES (MUST BE FULLY COMPLETED BY OFFEROR)

1.09 BASIS OF AWARD OF CONTRACT:

- A. The **best value** responsive and responsible OFFER shall be determined by the **best value** OFFER amount including the allowances, unit costs, and any selected alternates for the base OFFER.
- B. **OWNER RESERVES THE RIGHT TO REJECT ANY AND ALL PROPOSALS.**

**Article 1 - Scope of Work**

The CONTRACTOR shall perform, within the time stipulated in the Contract Documents, all of which are incorporated herein and shall provide all labor, materials, equipment, tools, utility services, transportation and everything else necessary to complete in a workmanlike manner, and in exact compliance with the terms of the Contract Documents, all of the Work required in connection with the following titled Project:

**Chattahoochee HS - Band Suite Addition RFP 413-11**

\_\_\_\_\_  
**[Proposal Number/Project Number(s) – to be filled in by Facilities Construction Contracts**

FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE



FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE

Update: 7/08/10

### **Article 2 - Time for Completion**

The Work shall be commenced on the date stated in the OWNER Notice to Proceed. The time period for Substantial Completion of the Work shall be set forth in the Notice to Proceed issued by the OWNER and 01010 Exhibit A Milestone Schedule document.

TIME IS OF THE ESSENCE.

### **Article 3 - Hold Harmless, Defense and Indemnification**

The CONTRACTOR, even if it is without fault itself, shall indemnify, defend and hold harmless the OWNER, the Board and its and their respective officers, employees, program administrators, representatives, agents

and consultants, from every liability, claim, loss, cause of action, action, demand, penalty, cost, expense (including without limitation, attorneys' fees) related to or arising from:

1. Any injury to person or property sustained by the CONTRACTOR or by any person, firm, or corporation, employed directly or indirectly by it upon or in connection with the Work;
2. Any injury to person or property sustained by any person, firm, or corporation, caused by any act, neglect, default, or omission of the CONTRACTOR or any person, firm, or corporation, directly or indirectly employed by it upon or in connection with the Work, whether the injury or damage occurs upon or adjacent to the Work;
3. The furnishing or use of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance under the Contract Documents; and
4. As otherwise provided in the Contract Documents.

The CONTRACTOR at its own cost, expense, and risk, shall defend all legal proceedings that may be brought against all such potential indemnities for any such liability, claim, loss, cause of action, action, demand, penalty, cost and expense, and satisfy any resulting judgment that may be rendered against any of them whether or not the liability, claim, loss, cause of action, action, demand, penalty, cost and expense (including without limitation, attorneys' fees) was actually or allegedly caused wholly or in part through the negligence or other tortious conduct of any of them. OWNER shall have the right to approve counsel proposed for any such defense and shall be consulted with regard to any proposed settlement. This Article 3 is not meant to require the CONTRACTOR to defend, indemnify or hold harmless the potential indemnities from their own active negligence.

### **Article 4 - Insurance**

CONTRACTOR will provide its own insurance coverage as to all types of insurance relevant to the Project in amounts of coverage and by carriers approved by the OWNER.

### **Article 5 - Bonding**

If the amount of original award of the Contract exceeds **FIFTY THOUSAND DOLLARS (\$50,000.00)**, the CONTRACTOR shall furnish to the OWNER a Payment Bond (Material and Labor). CONTRACTOR shall also provide a Performance Bond. Both Bonds shall be for 100% of the Contract Amount and contain the terms and conditions required by Articles 5.10 and 5.11 of the General Conditions.

FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE



FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE

Update: 7/08/10

**Article 6 - Provisions Required by Law Deemed Inserted**

Each and every provision of law and clause required by law to be inserted in the Contract Documents shall be deemed to be inserted and the Contract Documents shall be read and enforced as though it were included in the Contract Documents. If through mistake or otherwise any such provision is not inserted, or is not correctly inserted, upon application of either party the Contract Documents shall forthwith be physically amended to make such insertion or correction.

PROPOSAL DATE: \_\_\_\_\_, 20\_\_\_\_\_

By \_\_\_\_\_  
(Firm Name as it appears on Business License)

\_\_\_\_\_  
(Signature of authorized person to sign Proposal)

\_\_\_\_\_  
(Print Name of authorized person to sign Proposal)

Business Address:  
\_\_\_\_\_  
\_\_\_\_\_

Phone No. \_\_\_\_\_

Fax No. \_\_\_\_\_

Federal Tax ID: \_\_\_\_\_

Email Address: \_\_\_\_\_

1.10 ACCEPTANCE

This Agreement is made and entered into on the date set forth on Page 4 of this Agreement, by and between the Fulton County Board of Education, by and through its Board of Education (hereinafter the "OWNER"), and

\_\_\_\_\_  
{Name as it appears on Contractor's Business License – to be filled in by OWNER /Contracting Department}

\_\_\_\_\_  
{sole ownership, partnership, corporation, joint venture, or other}

This Agreement is for the purpose of constructing that Project identified as

**Chattahoochee HS - Band Suite Addition RFP 413-11**

FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE





FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE

Update: 7/08/10

CONTRACTOR is the lowest responsive and responsible offeror in response to a Request for Proposal issued by the OWNER and represents that it is qualified to perform all of the terms, covenants, promises and conditions of this Contract.

**Article 7 - Contract Amount**

The OWNER shall pay, and the CONTRACTOR shall accept, in full payment for performance as required by the Contract Documents, the sum of

\_\_\_\_\_  
(To be filled in by OWNER / Contracting Department)

(\$ \_\_\_\_\_), subject to any additions or deductions, if any, as provided in the Contract Documents. It is understood and agreed that all applicable taxes are included in the Contract Amount and that the Federal Excise Tax, from which the OWNER is exempt, is not included. The OWNER, upon request, will furnish the CONTRACTOR such Tax Exemption Certificates as may be required by the Manufacturer or Dealer.

All of the above-named Contract Documents are intended to be complementary. Work required by one of the above-named Contract Documents and not by others shall be done as if required by all.

Executed on \_\_\_\_\_, 20\_\_\_\_ at Atlanta, Georgia.

FULTON COUNTY BOARD OF EDUCATION

By \_\_\_\_\_  
Superintendent

**BLUE INK SIGNATURE REQUESTED**  
**FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM**  
**SHALL RENDER THE PROPOSAL NON-RESPONSIVE**

END OF DOCUMENT

FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM MAY RENDER THE PROPOSAL NON-RESPONSIVE



Update 3-25-10

DOCUMENT 00410  
OFFER SECURITY FORM

Bond Number \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
Surety  
Offeror

FULTON COUNTY BOARD OF EDUCATION..... OWNER/Obligee  
FIVE PERCENT (5%) OF THE AMOUNT OF THE BASE OFFER ATTACHED .....Amount of Bond

Project Description: Chattahoochee HS - Band Suite Addition  
Date of Proposal Submission:  
Project Number: LN-7004321; SA-7004301  
Proposal Number: **RFP 413-11**

WHEREAS, the offeror is herewith submitting to OWNER the above described offer, which is attached hereto and made part thereof.

NOW, THEREFORE, the Surety and the offeror are firmly held and bound, jointly and severally, to OWNER in the amount set forth above, lawful money of the United States, for which payment we bind ourselves, our heirs, executors, administrators, and assigns, jointly and severally, by these presents.

If the offeror or any part of the offer shall be accepted and a contract awarded to the offeror by OWNER, and if the offeror shall well, truly and fully perform all the terms, conditions, and obligations to be kept and performed on the part of the offeror, and shall within the required time enter into a written contract and shall furnish bond(s) as required by the contract and specifications, or the call for offers, or by law, with a surety acceptable to OWNER, then this obligation shall be void; otherwise it shall remain in full force and effect for a minimum period of 90 days from the date of the offer, or longer if required by law, or longer through mutual agreement of the OWNER and offeror.

This instrument and the amount of money set forth above shall be applied toward, but shall not be considered a limitation upon, any damages which may be sustained by OWNER if the offeror fails to execute a written contract, or fails to secure the necessary bond(s), or fails to comply with all the terms, conditions and obligations to be kept and performed on the part of the offeror.

The maximum amount of Surety's liability claimable and recoverable under this instrument shall be and hereby is expressly limited to the amount of money set forth above. In addition to the liability of the Surety under this bond, the Court shall award to the prevailing party in any suit brought on this bond reasonable attorneys' fees and costs, even if such amounts exceed the penal sum of this bond.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_

ACKNOWLEDGMENT BY AN ATTORNEY-IN-FACT

\_\_\_\_\_  
OFFEROR

State of \_\_\_\_\_ SS

By (signed) \_\_\_\_\_  
*Signature of Authorized Person*

County of \_\_\_\_\_  
On \_\_\_\_\_, before me,  
\_\_\_\_\_, a Notary Public

Title \_\_\_\_\_

Personally appeared \_\_\_\_\_  
Personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to this instrument and acknowledged to me that he/she executed the same in his/her authorized capacity and that by his/her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.  
WITNESS my hand and official seal.

\_\_\_\_\_  
SURETY  
By (signed) \_\_\_\_\_  
*Signature of Attorney-In-Fact*

(Notary Seal)

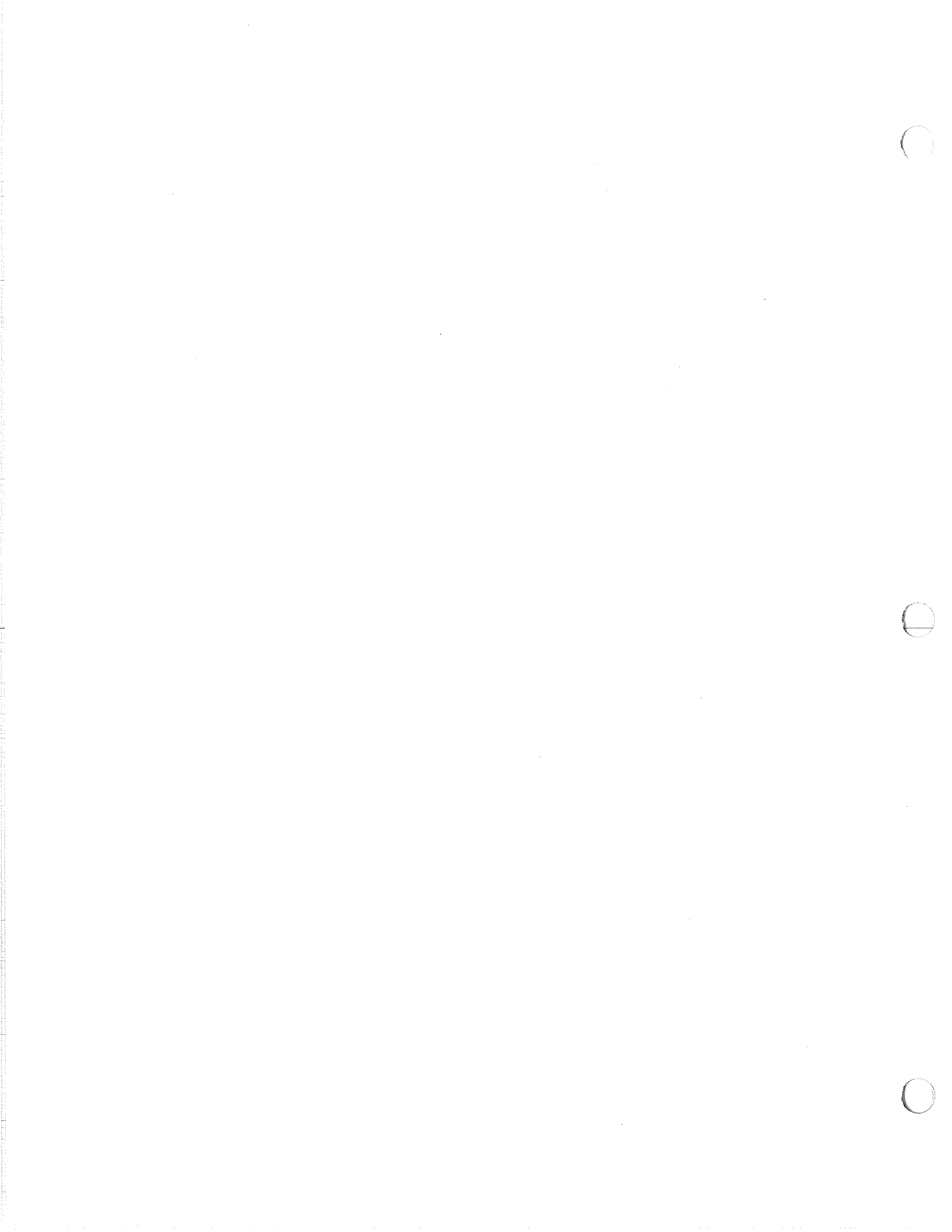
Address \_\_\_\_\_

City, State \_\_\_\_\_

Telephone \_\_\_\_\_

\_\_\_\_\_  
*Signature of Notary*

**ATTACH CERTIFIED COPY OF POWER OF ATTORNEY AND ALL-PURPOSE ACKNOWLEDGMENT.**  
**(THIS DOCUMENT CANNOT BE ALTERED, MODIFIED, OR CHANGED.)**  
[If you do not submit a certified or cashier's check, failure to submit this form shall render your proposal non-responsive]  
**END OF DOCUMENT**



**FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM SHALL RENDER THE PROPOSAL NON-RESPONSIVE**

DOCUMENT 00480  
NON-COLLUSION AFFIDAVIT

1.01 GENERAL

- A. The Non-Collusion Affidavit shall be executed by offeror and submitted with the proposal.
- B. Failure to submit this affidavit, filled out and signed in its entirety, shall result in the proposal being deemed non-responsive.

State of Georgia  
County of \_\_\_\_\_ SS

\_\_\_\_\_, being first duly sworn, deposes and says that he or she  
(Name of person signing Offer)  
of \_\_\_\_\_ is the party making  
the (Title of Signer) of \_\_\_\_\_ (Name of Licensee Proposing)

foregoing proposal, the proposal is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; the offer is genuine and not collusive or sham; the offeror has not directly or indirectly induced or solicited any other offeror to put in a false or sham offer, and has not directly or indirectly colluded, conspired, connived, or agreed with any offeror or anyone else to put in a sham offer, or anyone shall refrain from proposing; that the offeror has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the price of the offeror or any other offeror, or to fix any overhead, profit, or cost element of the proposal price, or of that any other offeror, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the proposal are true; and, further, the offeror has not, directly or indirectly, submitted his or her proposal price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, offer depository, or to any member or agent thereof to effectuate a collusive or sham offeror.

Offeror Name \_\_\_\_\_  
Name as it appears on Business License

Check One:

IRS Employers Identification Number: \_\_\_\_\_

Sole Ownership \_\_\_\_\_

Partnership \_\_\_\_\_

Corporation \_\_\_\_\_

Address \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Fax (\_\_\_\_) \_\_\_\_\_

"The signature below binds offeror to all the stated conditions and offeror certifies under penalty of perjury under the laws of the State of Georgia the foregoing is true and correct."

By \_\_\_\_\_  
Print Name Signature and Title

(Affidavit shall be signed in cursive by offeror or an authorized representative of offeror. Do not type or use rubber stamp.)

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_

**(THIS DOCUMENT CANNOT BE ALTERED, MODIFIED, OR CHANGED.)**  
**[Failure to submit this form shall render the proposal non-responsive]**

END OF DOCUMENT

**FAILURE TO SUBMIT THIS FORM OR ANY MODIFICATION(S) TO THIS FORM SHALL RENDER THE PROPOSAL NON-RESPONSIVE**



DOCUMENT 00600

PAYMENT BOND  
(LABOR AND MATERIAL)

WHEREAS, FULTON COUNTY BOARD OF EDUCATION,

hereinafter called the OWNER, and \_\_\_\_\_

hereinafter called the CONTRACTOR, have entered into a Contract

dated \_\_\_\_\_

for \_\_\_\_\_

Contract Amount \_\_\_\_\_

NOW, THEREFORE, the CONTRACTOR, as Principal, and the following named Surety,

are held and firmly bound to the OWNER in the amount set forth under the bond, for the payment whereof in the manner specified, the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns jointly and severally, firmly by these presents:

PAYMENT BOND

In an amount equal to One Hundred Percent (100%) of the above Contract Amount. The condition of this obligation is that if the Contractor or his Subcontractors, fail to pay for any materials, provisions, provender or other supplies, or teams, used in, upon, for or about the performance of the Work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance with respect to such work or labor, or for any amounts required to be deducted, withheld, and paid over from the wages of employees of the CONTRACTOR and his Subcontractors, with respect to such work and labor that the surety will pay for the same, in an amount not exceeding the sum specified above, and also, in case suit is brought upon the bond, a reasonable attorney's fee, to be fixed by the court.

This bond is executed in accordance with the requirements of the Georgia Local Government Public Works Construction Law, O.C.G.A. § 36-91-1 et seq. and acts amendatory thereof; and shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under and by virtue of the provisions of O.C.G.A. § 36-91-93 and acts amendatory thereof, or to their assigns.

The 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 the Work to be performed there under shall in anywise affect its obligations on the above bonds, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Documents.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_

CONTRACTOR/PRINCIPAL

SURETY

By \_\_\_\_\_

Attorney-in-Fact

By \_\_\_\_\_

Address \_\_\_\_\_

Title \_\_\_\_\_

Telephone Number \_\_\_\_\_

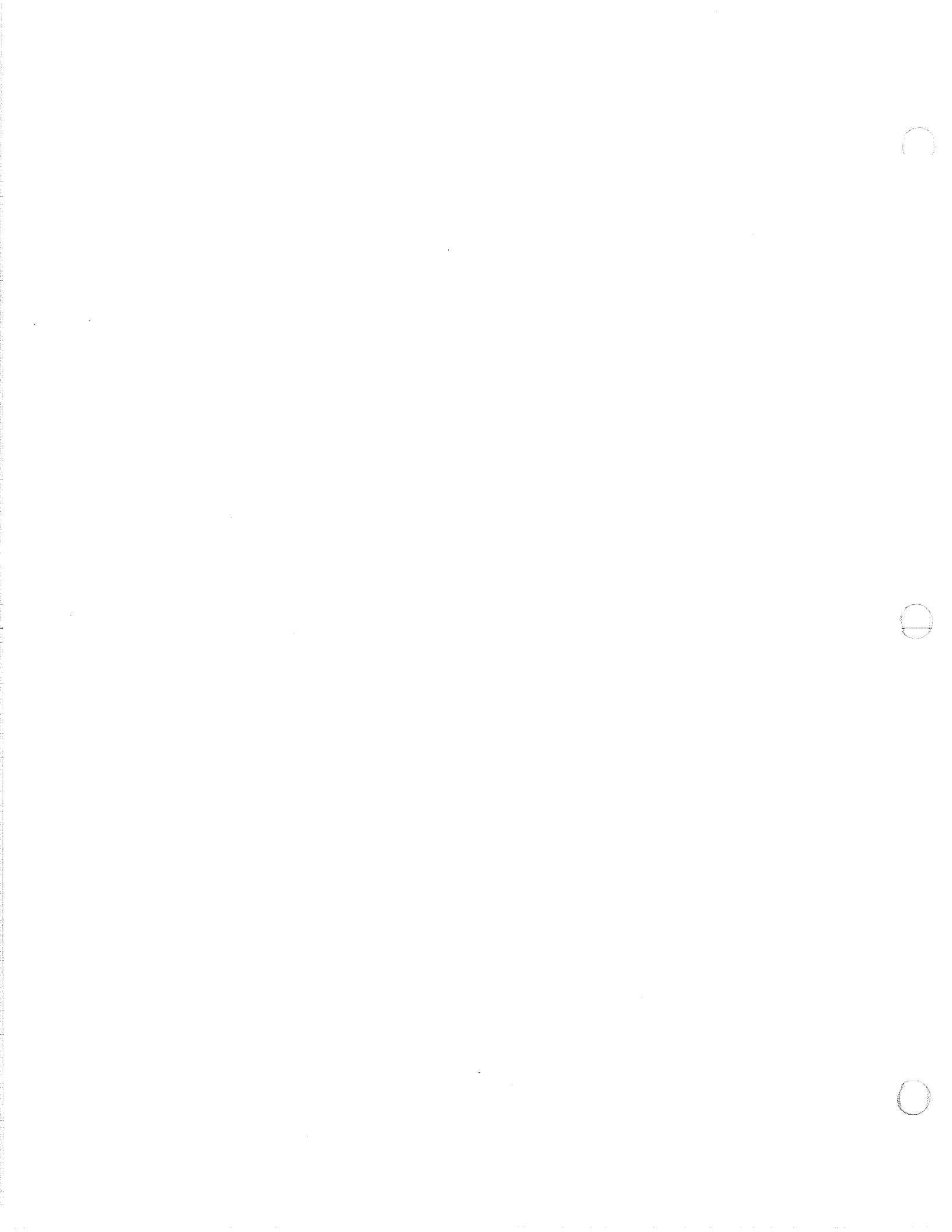
Bond Number \_\_\_\_\_

OWNER will verify this bond by:

VERIFICATION BY FUTON COUNTY CONTRACTING DEPARTMENT

1. Verify the Surety is currently certified by the State Insurance Commissioner as an admitted Surety Insurer and such authority is in full force and effect.
2. Verify the Surety is solvent by confirming its rating with A.M. Best.
3. Validate that the Surety Company issued this bond to the assigned company in 100 percent of the contract amount.

**(THIS DOCUMENT CANNOT BE ALTERED, MODIFIED, OR CHANGED)**  
END OF DOCUMENT





DOCUMENT 00605  
PERFORMANCE BOND

WHEREAS, FULTON COUNTY BOARD OF EDUCATION,

hereinafter called OWNER, and \_\_\_\_\_

hereinafter called CONTRACTOR, have entered into a Contract, which is incorporated by reference herein in its entirety,

dated: \_\_\_\_\_

for: \_\_\_\_\_

Contract  
Amount: \_\_\_\_\_

NOW, THEREFORE, CONTRACTOR, as Principal, and \_\_\_\_\_,  
as Surety; are held and firmly bound to OWNER in the amount set forth under the bond, for the payment whereof in the manner  
specified, the CONTRACTOR and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly  
and severally, firmly by these presents:

PERFORMANCE BOND

In an amount equal to One Hundred Percent (100%) of the above  
Contract Amount. The condition of this obligation is that if the  
CONTRACTOR shall in a workmanlike manner promptly,  
competently, and faithfully perform all of the terms and conditions of  
the Contract in strict conformity therewith, then this obligation shall  
be null and void, otherwise it shall remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that no adjustment to the Contract Amount and or Contract Times,  
alteration, additions and/or deletions to the terms of the Contract, or to the Work to be performed there under, shall in anyway  
affect its obligations on the above bond, and it does hereby waive notice of any such change, adjustment, alteration, addition or  
deletion to the terms of the Contract Documents.

In case any suit is brought upon this bond, reasonable attorneys' fees shall be awarded to the prevailing party, only the amount  
thereof being within the Court's discretion. Attorneys' fees awarded against the Surety can exceed the penal sum of this bond.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_

CONTRACTOR

SURETY

By \_\_\_\_\_  
Attorney-in-Fact

By \_\_\_\_\_ Address \_\_\_\_\_

Title \_\_\_\_\_ Telephone Number \_\_\_\_\_

Bond Number \_\_\_\_\_

OWNER will verify this bond by:

VERIFICATION BY FUTON COUNTY CONTRACTING DEPARTMENT

1. Verify the Surety is currently certified by the State Insurance Commissioner as an admitted Surety Insurer and such authority is in full force and effect.
2. Verify the Surety is solvent by confirming its rating with A.M. Best.
3. Validate that the Surety Company issued this bond to the assigned company in 100 percent of the contract amount.

**(THIS DOCUMENT CANNOT BE ALTERED, MODIFIED, OR CHANGED)**  
END OF DOCUMENT



DOCUMENT 00620  
**CERTIFICATE OF INSURANCE FOR HAZARDOUS MATERIALS**  
**FOR MATTERS NOT OTHERWISE COVERED BY THE OWNER CONTROLLED INSURANCE PROGRAM (OCIP)**

This is to certify that policies of insurance as described below have been issued to the Insured named below (CONTRACTOR) and are in force for the period indicated for operations in Georgia.  
 See below for Cancellation Clause.

Name and Address of Insured (Contractor)			Certificate Holder (OWNER) FULTON COUNTY BOARD OF EDUCATION 786 Cleveland Avenue, SW, Atlanta, Georgia 30315 (Attn: Fulton County Schools)		
Coverage	Carrier and Policy Number	Effective Date	Expiration Date	Limits of Liability	
WORKERS' COMPENSATION				Statutory in compliance with the compensation laws of the State of Georgia	
COMPREHENSIVE GENERAL LIABILITY Combined Single Limit (Bodily Injury and/or Property Damage)				\$1,000,000.00 each Occurrence	
AUTOMOBILE LIABILITY (Includes all OWNED, NONOWNED and HIRED)				\$1,000,000.00 each Occurrence	
HAZARDOUS MATERIALS (Includes Asbestos Abatement)				\$1,000,000.00 each Occurrence	
Name of school where Work is being performed:					

The Comprehensive General Liability policy includes coverage designated below:

- a. Contractual Assumed Liability, relating to Contract(s) between the Named Insured and the Fulton County Board of Education (OWNER).
- b. Contractors Protective (Contingency) Liability, when Subcontractors are engaged.
- c. Products Liability or Completed Operations.
- d. Hazardous Materials (including Asbestos) when Named Insured has a Contract with the OWNER that involves the removal of these materials.

This certificate of insurance is not an insurance policy and of itself does not amend, extend or alter the coverage afforded by the policies listed herein. Notwithstanding any conditions of any Contract(s) with respect to which this certificate is issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies.

**THE LIABILITY POLICY(IES) REFERENCED ABOVE HAS/HAVE BEEN ENDORSED TO NAME THE OWNER AS AN ADDITIONAL INSURED AND TO PROVIDE SPECIFICALLY THAT ANY INSURANCE CARRIED BY THE DISTRICT WHICH MAY BE APPLICABLE TO ANY CLAIM OR LOSS RELATING TO CONTRACT(S) BETWEEN CONTRACTOR AND OWNER SHALL BE DEEMED EXCESS AND THE ABOVE CONTRACTOR'S INSURANCE PRIMARY DESPITE ANY CONFLICTING PROVISIONS TO THE CONTRARY WHICH MAY HAVE APPEARED IN THE POLICY(IES) PRIOR TO EXECUTION OF SAID ENDORSEMENT.**

**CANCELLATION CLAUSE: THE ABOVE-NAMED CERTIFICATE HOLDER SHALL BE NOTIFIED BY MAIL AT LEAST THIRTY (30) DAYS IN ADVANCE OF THE EFFECTIVE DATE OF CANCELLATION OR ANY MATERIAL CHANGE IN THE POLICY.**

Dated at: \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
 Insurance Company

\_\_\_\_\_  
 Number and Street

\_\_\_\_\_  
 City and State

By: (signed) \_\_\_\_\_  
 Signature of Authorized Representative or Insurer

\_\_\_\_\_  
 Name (typed)

\_\_\_\_\_  
 Organization

\_\_\_\_\_  
 Address

\_\_\_\_\_  
 Telephone

**(THIS DOCUMENT CANNOT BE ALTERED, MODIFIED, OR CHANGED.)**  
**END OF DOCUMENT**



SECTION 00700

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GENERAL CONDITIONS



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## GENERAL CONDITIONS

### ARTICLE I – DEFINITIONS

The terms used in these General Conditions and within the Contract Documents have the following meanings assigned to them applicable in both the singular and plural tense. Certain terms are fully capitalized for no other reason than ease of reading.

- 1.1 Addenda – Additional written or graphical instructions issued prior to the opening of bids, which clarify, modify, correct, amend, add, delete and/or otherwise change the Division 00 - Bidding Requirements or other Contract Documents.
- 1.2 Application for Payment – The OWNER approved invoice form along with other supportive documentation as specified in the Contract Documents to be certified and submitted by CONTRACTOR, using Expedition Software provided by the OWNER, to request progress and/or final payment.
- 1.3 ARCHITECT – The person, firm, corporation or entity licensed to practice architecture as identified in the Bidding Documents.
- 1.4 ARCHITECT Consultant – The person, firm, corporation or entity having a contract with ARCHITECT to furnish independent consulting services relative to the Work.
- 1.5 Asbestos Containing Construction Material – Any manufactured construction material containing more than 0.1% asbestos by weight.
- 1.6 Bidding Documents – All of the Division 00 Requirements and the proposed Contract Documents.
- 1.7 Change Order Proposal – A written instrument prepared and issued by CONTRACTOR using Expedition Software provided by the OWNER, setting forth proposed adjustments to the Contract Amount, Milestones and/or Contract Time, if any, in response to a directed and/or proposed addition, deletion or revision in the Work.
- 1.8 Construction Directive – A written directive prepared on Expedition Software issued by OR, on or after the Effective Date of the Contract, directing CONTRACTOR to proceed regarding an issue of dispute, or requiring CONTRACTOR to take a specified action regarding the Work, Project and/or Contract. A Construction Directive may, but not always will, result in an addition, deletion, and/or revision in the Work, and may contain a proposed basis for adjustments to, if any, the Contract Amount, Milestones and/or Contract Time.
- 1.9 Contract – The Contract is comprised of all of the Contract Documents. The Contract represents the entire, integrated agreement between CONTRACTOR and OWNER and supersedes all prior negotiations, representations, or agreements, written or oral. The Contract can only be amended by a written Change Order. The Contract is made solely for the benefit of CONTRACTOR and OWNER and no others. The Contract shall not create a contractual relationship of any kind between CONTRACTOR and ARCHITECT, or between OWNER and any Subcontractor, supplier or anyone other than CONTRACTOR.

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- 1.10** Contract Amount – The dollar amount stated in the agreement payable by OWNER to CONTRACTOR. The Contract Amount may be increased or decreased only by Change Order.
- 1.11** Contract Documents - The Bid and Acceptance Form, Addenda, documentation accompanying the bid and any post bid documentation submitted after the Notice of Intent to Award, the Notice to Proceed, the bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings, together with all Change Orders, Construction Directives, and ARCHITECT written interpretations and clarifications issued pursuant to General Condition Article 9.4.
- Reports, drawings and/or other documents referenced in Section 00300, Product Data and Sample submittals reviewed relative to Article 6.50 and 6.51 are not Contract Documents. In addition, Shop Drawings are not Contract Documents unless they bear the signature and seal of the Project Architect of Record.
- 1.12** Contract Time - As stated in the Contract, the Contract Time is the original duration of the Contract plus Change Order adjustments.
- 1.13** CONTRACTOR - The person, firm, corporation or entity with whom the OWNER has entered into the Contract.
- 1.14** Day - Means calendar day in every case.
- 1.15** Defective - When proceeding the term Work, it references Work deemed to be unacceptable, faulty, unsuitable, unsightly or otherwise not in compliance with the Contract Documents including any inspection, standard, test, submittal, and/or approvals required by the Contract Documents.
- 1.16** Deferred Approval - Those portions of the design, if any, requiring CONTRACTOR preparation and submittal, within the specified time, to the ARCHITECT and/or other approval authorities.
- 1.17** Drawings - Pictorial or graphical portions of the Contract Documents, prepared by or on behalf of the ARCHITECT, denoting the scope, design, extent, location, character, and dimensions of the Work to be performed and may include plans, elevations, sections, details, schedules and diagrams, etc., however, Shop Drawings are not Drawings as so defined herein.
- 1.18** Effective Date of the Contract – The date on which OWNER Board of Education approves and/or ratifies the Contract or if OWNER Board of Education has delegated such authority in writing to an OWNER employee, then the date on which the designated OWNER employee signs the Contract.
- 1.19** Final Completion – When, in fact, all Contract requirements of the CONTRACTOR have been met.
- 1.20** GDOE – Georgia Department of Education
- 1.21** General Requirements – Division 01 Sections of the Specifications.
- 1.22** Inspector – Authority having jurisdiction to inspect the work.
- 1.23** Lead Containing Paint – Means paint or other surface coatings that contain an amount of lead equal to or greater than .06% lead dry weight (600 parts per million).
- 1.24** Milestones – Designated dates, if any, as set forth in the Detailed Construction Schedule in which Work or portions thereof are required to be started and/or completed in accordance with the Contract Documents.

- 1.25 Notice of Intent to Award – The notice issued by OWNER to the successful bidder advising of OWNER intent to execute and deliver Contract to bidder contingent upon timely completion of and compliance with terms and conditions specified in said notice.
- 1.26 Notice of Completion – A notice by OWNER recorded with the County Recorder upon Final Completion.
- 1.27 Notice to Proceed – A notice issued by OWNER to CONTRACTOR establishing the (1) date of Contract Time commencement, (2) date CONTRACTOR is authorized to commence performance of CONTRACTOR obligations in accordance with the Contract Documents.
- 1.28 OWNER – Fulton County Board of Education.
- 1.29 OWNER Consultant – The person, firm or corporation having a Contract with OWNER to furnish independent professional services relative to the Work and/or Project.
- 1.30 OWNER forces – Is defined as Work undertaken by force account and/or Contract executed with other CONTRACTOR(S) to complete portions of the project.
- 1.31 OWNER Representative (OR) – The designated authorized representative of OWNER who shall provide administration of the Contract relative to the Project, Work, or any part thereof. OR shall be synonymous with the term OWNER.
- 1.32 Partial Use or Occupancy – Use or occupancy by OWNER of a partially completed portion, part, space or area of the Work, prior to Substantial Completion of the Work.
- 1.33 Product Data – CONTRACTOR furnished literature, illustrations, standard schedules, performance charts, instructions, brochures, diagrams, catalog cuts, color charts, templates, installation and maintenance instructions, test data, agency or regulatory approvals, or other required product information furnished by CONTRACTOR relative to the Work.
- 1.34 Project – The term Project is used to refer to the Work of this Contract and it may also refer to Work by OWNER, Separate Work Contract and/or other entities with whom CONTRACTOR must coordinate the Work of this Contract.
- 1.35 Request for Information – A written instrument prepared by CONTRACTOR using Expedition Software and provided by the OWNER and issued to ARCHITECT requesting clarification of the Contract Documents.
- 1.36 Request for Proposal – A written instrument prepared on Expedition Software issued by OR directing CONTRACTOR submission of a written estimate detailing the proposed changes to the Contract Amount, Milestones and/or Contract Time in response to the proposed Work contained therein.
- 1.37 Samples – CONTRACTOR furnished physical specimens such as swatches, natural materials, materials, fabricated items, equipment, devices, appliances, cuts, containers, color Boards, textures, fabrications, finishes, or other required samples furnished by CONTRACTOR relative to the Work.
- 1.38 SBC – Standard Building Code including any State of Georgia Amendments.

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- 1.39 Schedule of Values – An OWNER Expedition Software form issued to CONTRACTOR directing CONTRACTOR to certify and subdivide the quantities and costs aggregating the total Contract Amount into sufficiently detailed component parts in order to serve as the basis for progress payments during construction.
- 1.40 Separate Work Contract – OWNER contract with a separate contractor to perform work or provide services in conjunction with the Project and/or Work of this Contract.
- 1.41 Shop Drawings – CONTRACTOR furnished original drawings such as illustrations, diagrams, schedules, fabrications, erection, coordination, layout, setting, details, standards, performance charts or curves, installation, routing, isometric, wiring, control, piping, or other required shop drawings furnished by CONTRACTOR relative to the Work.
- 1.42 Specifications – Those portions of the Contract Documents consisting of the written technical and/or administrative descriptions of materials, equipment, systems, codes, regulations, procedures, standards, workmanship, services, facilities, supplies, instructions, transportation, quality, etc., as applied to the Work.
- 1.43 Subcontractor – The person, firm, corporation or entity executing a direct contract with CONTRACTOR or with any subcontractor for the performance of a portion of the Work.
- 1.44 Substantial Completion – The stage in the progress of the Work when all of the requirements of the Contract are substantially performed and completed so OWNER can have beneficial use and occupancy of the Work as intended under the Contract, subject only to remaining minor and trivial defective Work, if any.
- 1.45 Subsurface Facility – All underground or below grade facilities and/or improvements, including but not limited to, any and/or all encasements such as pipelines, wells, conduits, raceways, duct banks, ducts, cables, conductors, sensors, manholes, valve boxes, metering devices or other such facilities which collect, furnish, supply, distribute, and/or transport to this or any other site or property electricity, telephone, data, steam, gases, petroleum, cable or satellite signals, sewage, signal systems, water, storm drainage, traffic signals, or other control systems.
- 1.46 Supplementary Conditions – The Contract Document section amending and/or supplementing these General Conditions.
- 1.47 Work – All of the terms and conditions set forth in the Contract Documents, including the various separately identifiable parts thereof to be furnished thereunder. The Work shall include, without limitation, all labor, materials, apparatus, supplies, services, facilities, utilities, transportation, manuals, warranties, training, and the like, necessary for the CONTRACTOR to faithfully perform and complete all of its obligations under the Contract.
- 1.48 Unit Price Work - Work which is measured and paid for by OWNER to CONTRACTOR on a unit price basis.

## ARTICLE 2 – PRIOR TO CONSTRUCTION

### 2.1 *Furnishing of Contract Documents*

After the Effective Date of the Contract, CONTRACTOR will be furnished such copies of the Contract Documents as set forth in the Instructions to Bidders.



**2.2 Notice to Proceed and Contract Time Commencement**

The Contract Time will commence on the date specified in the Notice to Proceed.

**2.3 No Commencement of Work without Insurance and Bonds**

CONTRACTOR shall not commence Work on the Project site or elsewhere before the effective date of the insurance and bonds CONTRACTOR is required to obtain by the Contract Documents. The established date of commencement of the Contract Time will not be changed by the effective date of such insurance and/or bonds.

**2.4 Before Starting Construction of the Work**

In addition to all pre-bid obligations of the CONTRACTOR, and prior to commencing any and each portion of the Work, CONTRACTOR shall carefully examine all of the Contract Documents and any other information available to CONTRACTOR relative to materials and methods of construction of the Work and/or Project requirements. CONTRACTOR shall file any needed Request for Information within a reasonable time prior to the commencement of any Work for any perceived or alleged error, inconsistency, ambiguity, or lack of detail or explanation of the intent of the Contract Documents. If CONTRACTOR performs, permits, or causes the performance of any portion of the Work under the Contract Documents, which in the exercise of reasonable care should have known to be in error, inconsistent, ambiguous, or not sufficiently detailed or explained, CONTRACTOR shall bear any and all costs arising there from including, without limitation, the cost of correction thereof without any corresponding adjustment to the Contract Amount, Milestones and/or the Contract Time

**2.5 Preliminary Matters**

Within ten (10) days after the Effective Date of the Contract CONTRACTOR shall submit to ARCHITECT and OR for review:

**2.5.1** in accordance with applicable Division 01 Requirements and Georgia Law, a certified Schedule of Values which includes a detailed breakdown of the Contract Amount for the Work, Contract and/or Project site in sufficient detail to serve as the basis for construction progress payments during the first 30 days following the date established in the Notice to Proceed. CONTRACTOR shall certify the accuracy of the Schedule of Values, including, without limitation, the applicable provisions of the Division 01 General Requirements;

**2.5.2** a cash flow schedule of estimated monthly payment requests due CONTRACTOR estimating the values and construction time of the various portions of the Work to be performed by CONTRACTOR, Subcontractors, and/or material and equipment suppliers;

**2.5.3** the name, address, telephone number, fax number, license number, and classification of all Subcontractors and of all other parties furnishing labor, material, or equipment to CONTRACTOR, along with the amount of each such subcontract or the total price of such labor, material, and equipment needed for each Subcontractors total portion of the Work;

**2.5.4** in accordance with applicable Division 01 Requirements, a Preliminary Construction Schedule with milestones based upon Section 01010 Appendix A, indicating the duration in days of starting and completing the Work, including but not limited to, any and all Milestone dates specified in the Contract Documents;

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2.5.5 in accordance with applicable Division 01 Requirements and in conjunction with the Preliminary Construction Schedule as specified in Article 2.5.4, a preliminary schedule of Shop Drawing, Material List, Product Data and Sample submittals setting forth the scheduled durations for submission, review and processing.

## 2.6 **Job Start Meeting**

Within twenty (20) days after the Effective Date of the Contract, but prior to the issuance of the Notice to Proceed, CONTRACTOR and all Subcontractors listed in bid documents of CONTRACTOR are required to attend a mandatory job start meeting conducted by OR and further attended by, but not limited to, ARCHITECT. Such proceedings shall be electronically recorded with the following, but not limited to, topics discussed:

2.6.1 OR and ARCHITECT shall review, discuss, and recommend corrections to CONTRACTOR Preliminary Construction Schedule as referenced in Articles 2.5.4, 2.5.5 and the Schedule of Values as referenced in Article 2.5.1. OR, ARCHITECT and CONTRACTOR, shall review required procedures for handling submittals, processing of Applications for Payment, identification of Owner Representative as per Article 8.1, and the roles, duties and limitations of OR, ARCHITECT and CONTRACTOR.

2.6.2 Other related items as specified in, but not limited to, the Division 01 General Requirements and/or Contract Documents.

## 2.7 **Survey of Existing Conditions**

In addition to all pre-bid obligations of the CONTRACTOR, and prior to the commencement of any Work, CONTRACTOR shall perform a thorough survey that shall include but is not limited to photographing and otherwise memorializing any and all existing conditions, defects and improvements of the Project site, adjacent sites, utilities and public right of way approaches thereon ("existing conditions survey"). The existing conditions survey shall be filed with OR with copies transmitted to ARCHITECT. The CONTRACTOR shall notify the OR in writing within three (3) days of becoming aware of any change and/or damage to the Project site, adjacent sites, utilities and public right of way approaches thereon, that occur after commencement of any Work. The notification shall include documentation showing the changes to the existing conditions survey and the individual(s) responsible for the changes and/or damages.

## 2.8 **Detailed Construction Schedule**

Unless otherwise noted in the Contract Documents, and within thirty (30) days after the Notice to Proceed, CONTRACTOR shall submit a Detailed Construction Schedule, using Primavera Engineering and Construction Software provided by OWNER, based on the corrected Preliminary Construction Schedule described in Article 2.6.2 and in full compliance with related Sections of the Division 01 General Requirements.

2.9 OWNER shall provide an integrated project control system utilizing Primavera Engineering and Construction Software for construction scheduling and document management and control software system, type and versions designated by OWNER, which shall be accessible by CONTRACTOR, ARCHITECT/ENGINEER and OWNER through a web-based program. CONTRACTOR shall use the designated software to prepare and maintain the Preliminary and Detailed Construction Schedules for the Project, and the CONTRACTOR, ARCHITECT/ENGINEER and OWNER shall use the designated document management and control software system to track and control all construction project documentation on generated forms that shall include, but not be limited to, Contact Directory, Request for Information, Request for Proposal, Change Order Proposal,

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Construction Directive, Change Orders, Minutes of Meetings, Pay Requests, Schedules and all OWNER and CONTRACTOR communications such as Correspondence, Transmittals, Insurance Certificates, Telephone Records, Submittals, Action Items, Daily Reports and Punch Lists required under any Contract Documents and this Contract. However, any notice required under Article 16 of the Contract shall conform to the requirements stated therein.

## ARTICLE 3 – THE CONTRACT DOCUMENTS

### 3.1 ***Contract Documents Complementary and Inclusive***

The Contract Documents are complementary and are intended to include all items required for the proper execution and completion of the Work. Any item of Work mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be the responsibility of the CONTRACTOR to incorporate into the Work and perform as if shown or mentioned in both.

### 3.2 ***Intent of the Drawings and Specifications***

The intent of the Drawings and Specifications is to describe the Work to be performed by CONTRACTOR. The Specifications describe Work which cannot be readily indicated on the Drawings such as quality of materials, workmanship, and execution whereas the Drawings generally describe dimensions, elevations and general layout of the Work. It is not the intent to specify every item of the Work in the Specifications, which is shown on the Drawings, or to show on the Drawings all items of the Work described or specified in the Specifications even if such items could have been shown and/or specified. All aspects of the Work, on the Drawings or in the Specifications, or which are reasonably inferable there from as being necessary to complete the Work, shall be incorporated into the Work and performed by CONTRACTOR whether or not such aspects of the Work are expressly covered in the Drawings or the Specifications. It is intended the Work be of sound, quality construction, and CONTRACTOR is responsible for the inclusion of all direct and indirect costs and expenses to cover all items indicated, described, or implied in the Work to be performed.

### 3.3 ***Ambiguity, Conflict, Difference or Discrepancy***

In the event there is an ambiguity, conflict, difference or discrepancy between the various Contract Documents, then the priorities listed in Article 3.14 shall govern unless noted otherwise in this Article. Without limiting CONTRACTOR obligation to identify conflicts for resolution, it is intended the more stringent, higher level of quality, greater quantity and/or higher level of workmanlike manner shall prevail and control. If discrepancies in the Contract Documents are not corrected by Addenda during the bid period, CONTRACTOR represents and warrants the scope and amount of its bid includes all materials, supplies, equipment, services, facilities, apparatus, and methods of construction that provides for the higher cost, quantity and quality.

### 3.4 ***Conformance with Laws***

In addition to all pre-bid obligations of the CONTRACTOR, and before commencing any portion of the Work, CONTRACTOR shall exercise reasonable care to review the Contract Documents from a construction standpoint for conformance and compliance with laws, ordinances, codes, rules and regulations of all governmental authorities and public utilities affecting the construction portion of the Project. In the event CONTRACTOR observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with any such restrictions or special requirements of the Contract Documents, CONTRACTOR shall provide notice to ARCHITECT and OR. Unless specifically stated otherwise in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any violation and/or inconsistency between the provisions of the Contract

Documents and the provisions of any laws, ordinances, codes, rules and regulations applicable to the Work, unless such application of the provisions of the Contract Documents would directly result in a violation of such laws, ordinances, codes, rules, and/or regulations. In the event the requirements of Article 3.4 or the written interpretation or clarifications of ARCHITECT do not resolve the violation or inconsistency the decisions and directives of OR shall be final for the purpose of proceeding with the Work. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

**3.5 Priority of Addenda**

In addition to the priorities listed in Article 3.14, Addenda shall govern over all other Contract Documents to the extent there is a conflict. Subsequent Addenda issued shall govern over prior Addenda only to the extent specified and only to the extent there is a conflict.

**3.6 Division of Contract Documents**

The Contract Documents, including, without limitation, the Specifications, are divided into titled sections for convenience only and not to dictate or determine the trade or craft involved.

**3.7 Similar Words of Import:**

Where "as shown," "as indicated," "as detailed," or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where "provide," "furnish," "install," "complete," or words of similar import are used, it shall mean to put in place for the intended use or operation. Where "as directed," "as required," "as permitted," "as authorized," "as accepted," "as selected," or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance, or selection by ARCHITECT and/or OR is intended unless otherwise stated.

**3.8 General Conditions, Supplementary Conditions and General Requirements**

The General Conditions, Supplementary Conditions and Division 01 General Requirements are a part of each and every section of the Contract Documents.

**3.9 Brevity in Abbreviations**

The Contract Documents are written in an abbreviated form and may not include complete sentences.

**3.10 Singular and Plural Tense**

Words in the singular shall include the plural whenever applicable or the context so indicates or requires.

**3.11 Metric Units of Measurement**

The Contract Documents may indicate metric units of measurement as a supplement to U.S. customary units. When indicated thus: 1 " (25 mm), the U. S. customary unit is specific, and the metric unit is nonspecific. When not shown with parentheses, the unit is specific. The metric units correspond to the "International System of Units" (SI) and generally follow ASTM E 380, "Standard for Metric Practice."

**3.12 Standard Technical Specifications of Societies, Institutes, Associations, Etc.**

Any reference to standard technical specifications of any society, institute, association, or governmental authority is a reference to the respective organization's standard technical specifications, which are in effect on the date of bid submission for the Work. If applicable standard technical specifications are revised before completion of any part of the Work, CONTRACTOR may, if acceptable to ARCHITECT and OR, perform such Work in accordance with the revised standard technical specifications. The standard technical specifications, except as modified in the Contract Documents, shall have full force and effect as though printed in the Contract Documents. Before commencing any portion of the Work, CONTRACTOR shall check and review the Contract Documents from a construction standpoint for conformance and compliance with the provisions of all standard technical specifications, listed or otherwise. In the event CONTRACTOR observes a conflict, ambiguity or discrepancy between the provisions of the Contract Documents and standard technical specifications, CONTRACTOR shall provide notice to ARCHITECT and OR and shall ensure such conflict, ambiguity or discrepancy is corrected in the prescribed manner prior to the commencement of said portion of the Work. Unless stated otherwise in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, ambiguity or discrepancy between the provisions of the Contract Documents and standard technical specifications. In the event the requirements of Article 3.12 or the written interpretation or clarifications of ARCHITECT do not resolve the conflict, ambiguity or discrepancy the decisions and directives of OR shall be final for the purpose of proceeding with the Work. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within 10 days of the date of issue of the Construction Directive.

**3.13 Absence of Modifiers**

[Intentionally left blank].

**3.14 Rules of Contract Document Interpretation**

**3.14.1** In the event of conflict between the various sections of the Contract Documents, the following order of priority shall govern:

**3.14.1.1** Bid and Acceptance Form as set forth in Section 00400;

**3.14.1.2** Addenda as specified in Article 3.5;

**3.14.1.3** Supplementary General Conditions;

**3.14.1.4** General Conditions;

**3.14.1.5** Division 01 General Requirements;

**3.14.1.6** Divisions 02-16;

**3.14.2** Where applicable, the requirements approved by other authorities having jurisdiction over any item submitted as a Deferred Approval shall take precedence over any previously issued Addenda, Drawing or Specification.

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- 3.14.3** In the event of conflict between the Drawings and Specifications, the Specifications shall generally govern as to quality of materials, workmanship, and execution whereas Drawings generally govern dimensions, elevations and layout of the Work. In case of conflict between the Drawings and Specifications, a conflict in the Drawings or a conflict in the Specifications, it is the intent of the Contract Documents to require the CONTRACTOR to provide the more stringent, higher quality of material and/or workmanship, and/or greater quantities into the Work.
- 3.14.4** In the event the written clarifications or interpretations of ARCHITECT create a conflict within the Contract Documents, the decision and directives of OR shall be final for the purpose of proceeding with the Work. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

**3.15 *Ownership and Use of ARCHITECT Drawings, Specifications and Other Documents:***

The Drawings, Specifications, and the other Contract Documents prepared on behalf of OWNER are instruments of the services of ARCHITECT and prepared for OWNER. Neither CONTRACTOR, Subcontractor, or Material or Equipment Supplier shall own or claim a copyright in the Drawings, Specifications, and other Contract Documents prepared by ARCHITECT, and unless otherwise indicated, ARCHITECT shall be deemed the author of them all. All copies of them, except CONTRACTOR record document set, shall be returned or suitably accounted for to ARCHITECT upon completion of the Work. Drawings, Specifications, and other Contract Documents prepared by ARCHITECT, and copies thereof furnished to CONTRACTOR, are for use solely with respect to the Work. They are not to be used by CONTRACTOR, Subcontractor, or material or equipment supplier on other Work or for additions to the Work outside the scope of this Work without the specific written consent of OWNER. CONTRACTOR, Subcontractors, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of Drawings, Specifications, and other Contract Documents prepared by ARCHITECT appropriate to and for use in the execution of their Work under the Contract Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Work is not to be construed as publication in derogation of any property interest or other reserved right.

**3.16 *Contract Document Amendment and Supplements:***

**3.16.1** After the Effective Date of the Contract the Contract Documents may be changed, altered, modified, amended and/or supplemented at any time and from time to time in order to add, delete and/or otherwise revise the Work and/or to modify the terms and conditions contained therein. The Contract Documents shall be amended and/or supplemented by one or more of the following ways:

**3.16.1.1** a Change Order;

**3.16.1.2** a Construction Directive.

**3.16.2** In addition, supplements to the requirements of the Contract Documents and/or minor deviations and/or variations in the Work may be authorized and accomplished in one of the following ways:

**3.16.2.1** ARCHITECT review of a Shop Drawing, Product Data or Sample subject to

the provisions of Articles 6.50 and 6.51;

3.16.2.2 ARCHITECT written interpretation or clarification;

3.16.2.3 OR written interpretation or directive.

#### ARTICLE 4 - LAND AVAILABILITY, PHYSICAL AND SUBSURFACE CONDITIONS AND REFERENCES

##### 4.1 **Availability and Access to Lands:**

OWNER shall, as indicated in the Contract Documents, secure and pay for easements and right of ways to the lands and/or to the Project site where the Work is to be performed. OWNER shall identify any encumbrances or restrictions not of general application but specifically related to use of lands so furnished with which CONTRACTOR will have to comply in performing the Work. Easements for permanent structures or permanent changes in existing facilities, if any, shall be secured by and paid for by OWNER. CONTRACTOR is responsible for providing any additional lands and access to such lands required by CONTRACTOR for temporary storage of equipment and materials, temporary construction facilities, staging of equipment or materials or parking of vehicles.

##### 4.2 **Physical and Subsurface Conditions:**

4.2.1 **Reports, drawings, data and assessments:** Reference is made to Section 00300 Information Available to Bidders for identification of:

4.2.1.1 **Subsurface Conditions:** Those reports, drawings, data and/or assessments of tests and/or exploration of subsurface conditions at or contiguous to the Project site that were utilized in preparing the Bidding Documents.

4.2.1.2 **Physical Conditions:** Those drawings, descriptions, photographs, reports, assessments and/or mapping of physical conditions, other than Subsurface Facility, relating to existing surface and/or subsurface structures at or contiguous to the Project site that were utilized in preparing Bid Documents.

4.2.2 **Differing Subsurface or Physical Conditions:** If CONTRACTOR believes any subsurface or physical condition uncovered, revealed or otherwise exposed at the Project site is:

4.2.2.1 of such a character and/or nature as to require a change in the Contract Documents;

4.2.2.2 materially different from that shown, indicated or described in the Bidding Documents;

4.2.2.3 of an unusual nature materially different from conditions normally encountered and generally recognized as inherent in Work of the character provided for in the Bidding Documents, then;

4.2.2.4 CONTRACTOR shall, upon discovery, and before further disturbance of conditions or performing Work in connection with, provide notice to OR and ARCHITECT setting forth a description of such conditions. CONTRACTOR shall not further disturb such conditions until directed to do so by OR or ARCHITECT and;

4.2.2.5 OR and ARCHITECT shall review the described conditions and shall determine the necessity to secure additional explorations and/or tests and shall provide notice to CONTRACTOR of the findings and conclusions.

4.2.3 **Possible Change in Contract Documents:** If OR and ARCHITECT determine a change in the Contract Documents is warranted as a result of a differing subsurface or physical condition as noted in Articles 4.2.2.1 through 4.2.2.3 a Construction Directive may be issued to reflect and document the change.

4.2.4 **Contract Amount, Milestones and Contract Time Adjustments:** Adjustment of the Contract Amount, Milestones and/or Contract Time will be allowed to the extent the existence of such revealed conditions directly causes an increase in CONTRACTOR cost and/or time of performance of the Work subject to the following:

4.2.4.1 the condition must meet one or more of the limitations as set forth in Articles 4.2.2.1 through 4.2.2.3, inclusive;

4.2.4.2 a change in the Contract Documents as set forth in Article 4.2.3 shall not serve as an entitlement to any adjustments to the Contract Amount, Milestones and/or Contract Time;

4.2.4.3 in respect to Work which is paid on a Unit Price basis, any adjustment to the Contract Amount shall be as set forth in Articles 9.10 and 11 .11 through 11 .12;

4.2.4.4 CONTRACTOR shall not be entitled to an adjustment in the Contract Amount, Milestones and/or Contract time if:

4.2.4.4.1 CONTRACTOR was aware of the condition at the time of bid;

4.2.4.4.2 the existence or discovery of the condition would have been apparent as a result of any examination, investigation, exploration, test and/or examination of the Project site and areas adjoining the Project site as required by the Bidding Documents prior to CONTRACTOR submission of bid;

4.2.4.4.3 CONTRACTOR failed to provide notice in accordance with Article 4.2.2.4. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

#### 4.3 **Physical Conditions - Subsurface Facility:**

4.3.1 **Shown or Indicated in Bidding Documents:** The information shown or indicated in the Bidding Documents in respect to existing Subsurface Facility at or adjacent to the Project site is based on information provided to OWNER, OWNER Consultant, ARCHITECT or ARCHITECT Consultant by the owners of such facility or by others. Unless it is specifically expressed otherwise in the Contract Documents:



4.3.1.1 OWNER, OR, OWNER Consultant, ARCHITECT and ARCHITECT Consultant shall not be responsible for the accuracy and completeness of any information or data by others and not shown or included in the Contract Documents;

4.3.1.2 the costs to perform all of the following shall be included in the Contract Amount and CONTRACTOR shall be responsible for: reviewing, checking and verifying all such information and data; locating all Subsurface Facility shown, indicated and/or described in the Bidding Documents; coordination and construction of the Work in conjunction with the owners of all such Subsurface Facility; the continuous operation of all existing Subsurface Facility; the furnishing and maintenance of all temporary in kind and place Subsurface Facility; the safety and protection of all such Subsurface Facility as provided for in Article 6.44.4 and the repair and/or replacement of any damaged Subsurface Facility resulting from the Work.

4.3.2 **Not Indicated or Shown:** If CONTRACTOR reveals and/or uncovers any Subsurface Facility not shown or indicated in the Bidding Documents, CONTRACTOR shall, upon discovery and before further disturbance of such Subsurface Facility, identify the owner of such Subsurface Facility and provide notice to the owner of such Subsurface Facility, OR and ARCHITECT. OR and ARCHITECT shall review the Subsurface Facility and determine the extent of any change to the Contract Documents. If ARCHITECT determines a change in the Contract Documents is required a Construction Directive may be issued and CONTRACTOR shall be responsible for the safety and protection of such Subsurface Facility as set forth in Article 6.44.4. CONTRACTOR shall only be entitled to an adjustment in the Contract Amount, Milestones and/or Contract Time to the extent they are directly related to the existence of any Subsurface Facility which was not shown and/or indicated in the Bidding Documents. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

#### 4.4 Reference Points and Elevations:

When required by the scope of the Work, OWNER will furnish at its expense, an engineering survey of the Project site, giving as applicable, benchmark elevation points, property lines and corners. CONTRACTOR shall layout the Work and shall be responsible for the preservation of all established benchmark elevation points, property lines and corners and shall not demolish, relocate and/or change the location of any benchmark elevation point, property line or corner without the prior written approval of OR. CONTRACTOR shall, upon the loss, destruction and/or relocation of any benchmark elevation points, property line or corner promptly notify ARCHITECT and OR prior to such replacement and/or relocation of benchmark elevation point, property line or corner. CONTRACTOR shall, at expense of CONTRACTOR, engage the services of State of Georgia licensed surveyor to replace and/or relocate benchmark elevation points, property line or corners lost, destroyed and/or relocated.

#### 4.5 **Asbestos, PCB's & Mercury Waste, Lead Based Paint and/or Petroleum:**

4.5.1 OWNER shall be responsible for any asbestos, polychlorinated biphenyl's (PCB's), mercury waste, lead based paint and petroleum discovered, uncovered and/or otherwise revealed at the Project site which were not identified, described, shown or indicated in

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the Bidding Documents to be within the scope of the Work. OWNER is not responsible for any such materials brought to the Project site by CONTRACTOR, Subcontractor, material supplier or anyone else CONTRACTOR is directly or indirectly responsible for. The provisions as set forth in Articles 4.2 and 4.3 are not intended to apply to asbestos, PCB's and mercury waste, lead based paint and petroleum uncovered, revealed and/or otherwise exposed at the Project site.

**4.5.2 Asbestos:** If, during construction of the Work in areas where CONTRACTOR is required to perform Work, CONTRACTOR discovers, uncovers and/or otherwise reveals a material reasonably believed to be asbestos, which was not identified, described, shown or indicated in the Bidding Documents to be within the scope of the Work, CONTRACTOR shall immediately stop Work in the affected area and provide notice, as set forth in Article 12.4, to OR and ARCHITECT, advising of the circumstances of such discovery, Work stoppage and whether or not such material was generated by CONTRACTOR or OWNER. CONTRACTOR shall also immediately provide notice to Fulton County Schools Environmental Services Division of Facilities Services Department. OWNER shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. If test results indicate and/or otherwise confirm the material as an asbestos material requiring treatment and/or removal, OR may issue a Construction Directive for the legal treatment and/or removal and disposal thereof. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive. After treatment and/or removal, the independent testing laboratory shall test and certify the asbestos material has been removed and/or controlled to within legal limits and requirements. Upon receipt of such test results, OR will provide notice, as set forth in Article 12.5, to CONTRACTOR to proceed with construction in affected Work areas. If CONTRACTOR contends the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, then CONTRACTOR shall proceed as required by Article 12.6.

**4.5.2.1** CONTRACTOR shall be listed on or shall utilize OWNER approved asbestos abatement Subcontractors.

**4.5.3 PCB'S & Mercury Waste:** If, during construction of the Work in areas where CONTRACTOR is required to perform Work, CONTRACTOR discovers, uncovers and/or otherwise reveals a material reasonably believed to be PCB's or mercury waste, which were not identified, described, shown or indicated in the Bidding Documents to be within the scope of the Work, CONTRACTOR shall immediately stop Work in the affected area and provide notice, as set forth in Article 12.4, to OR and ARCHITECT, advising of the circumstances of such discovery, Work stoppage and whether or not such material was generated by CONTRACTOR or OWNER. OWNER shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. If test results indicate and/or otherwise confirm the material as PCB's or mercury waste requiring treatment and/or removal, OR may issue a Construction Directive for the legal treatment and/or removal and disposal thereof. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive. After treatment and/or removal, the independent testing laboratory shall test and certify the

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PCB's or mercury waste has been removed and/or controlled to within legal limits and requirements. Upon receipt of such test results, OR will provide notice, as set forth in Article 12.5, to CONTRACTOR to proceed with construction in affected Work areas. If CONTRACTOR contends the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, then CONTRACTOR shall proceed as required by Article 12.6.

**4.5.4 Lead Based Paint:** If, during construction of the Work in areas where CONTRACTOR is required to perform Work, CONTRACTOR discovers, uncovers and/or otherwise reveals a material reasonably believed to be lead based paint, which was not identified, described, shown or indicated in the Bidding Documents to be within the scope of the Work, CONTRACTOR shall immediately stop Work in the affected area and provide notice, as set forth in Article 12.4, to OR and ARCHITECT, advising of the circumstances of such discovery, Work stoppage and whether or not such material was generated by CONTRACTOR or OWNER. OWNER shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. If test results indicate and/or otherwise confirm the material as lead based paint requiring treatment and/or removal, OR may issue a Construction Directive for the legal treatment and/or removal and disposal thereof. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive. After treatment and/or removal, the independent testing laboratory shall test and certify the lead based paint has been removed and/or controlled to within legal limits and requirements. Upon receipt of such test results, OR will provide notice, as set forth in Article 12.5, to CONTRACTOR to proceed with construction in affected Work areas. If CONTRACTOR contends the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, then CONTRACTOR shall proceed as required by Article 12.6.

**4.5.4 Petroleum:** If, during construction of the Work in areas where CONTRACTOR is required to perform Work, CONTRACTOR discovers, uncovers and/or otherwise reveals a material reasonably believed to be petroleum, which was not identified, described, shown or indicated in the Bidding Documents to be within the scope of the Work, CONTRACTOR shall immediately stop Work in the affected area and provide notice, as set forth in Article 12.4, to OR and ARCHITECT, advising of the circumstances of such discovery, Work stoppage and whether or not such material was generated by CONTRACTOR or OWNER. OWNER shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. If test results indicate and/or otherwise confirm the material as petroleum requiring treatment and/or removal, OR may issue a Construction Directive for the legal treatment and/or removal and disposal thereof. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive. After treatment and/or removal, the independent testing laboratory shall test and certify the lead based paint has been removed and/or controlled to within legal limits and requirements. Upon receipt of such test results, OR will provide notice, as set forth in Article 12.5, to CONTRACTOR to proceed with construction in affected Work areas. If CONTRACTOR contends the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, then CONTRACTOR shall proceed

as required by Article 12.6.

**4.6 Hazardous Material, Hazardous Substance, Hazardous Waste and/or Radioactive Materials:**

**4.6.1** OWNER shall be responsible for any hazardous material, hazardous substance, hazardous waste or radioactive materials discovered, uncovered and/or otherwise revealed at the Project site which were not identified, described, shown or indicated in the Bidding Documents to be within the scope of the Work. OWNER is not responsible for any such materials brought to the Project site by CONTRACTOR, Subcontractor, material supplier or anyone else CONTRACTOR is directly or indirectly responsible for. The provisions as set forth in Articles 4.2 and 4.3 are not intended to apply to hazardous material, hazardous substance, hazardous waste and/or radioactive material uncovered, revealed and/or otherwise exposed at the Project site.

**4.6.2 Hazardous Material:** If, during construction of the Work in areas where CONTRACTOR is required to perform Work, CONTRACTOR discovers, uncovers and/or otherwise reveals a material reasonably believed to be a hazardous material, which is not identified, described, shown or indicated in the Bidding Documents to be within the scope of the Work, CONTRACTOR shall immediately stop Work in the affected area and provide notice, as set forth in Article 12.4, to OR and ARCHITECT, advising of the circumstances of such discovery, Work stoppage and whether or not such material was generated by CONTRACTOR or OWNER. OWNER shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. If test results indicate and/or otherwise confirm the material as a hazardous material requiring treatment and/or removal, OR may issue a Construction Directive for the legal treatment and/or removal and disposal thereof. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive. After treatment and/or removal, the independent testing laboratory shall test and certify the hazardous material has been removed and/or controlled to within legal limits and requirements. Upon receipt of such test results, OR will provide notice, as set forth in Article 12.5, to CONTRACTOR to proceed with construction in affected Work areas. If CONTRACTOR contends the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, the CONTRACTOR shall proceed as required by Article 12.6.

**4.6.3 Hazardous Substance:** If, during construction of the Work in areas where CONTRACTOR is required to perform Work, CONTRACTOR discovers, uncovers and/or otherwise reveals a material reasonably believed to be a hazardous substance, which was not identified, described, shown or indicated in the Bidding Documents to be within the scope of the Work, CONTRACTOR shall immediately stop Work in the affected area and provide notice, as set forth in Article 12.4, to OR and ARCHITECT, advising of the circumstances of such discovery, Work stoppage and whether or not such material was generated by CONTRACTOR or OWNER. OWNER shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. If test results indicate and/or otherwise confirm the material as a hazardous substance requiring treatment and/or

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removal, OR may issue a Construction Directive for the legal treatment and/or removal and disposal thereof. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive. After treatment and/or removal, the independent testing laboratory shall test and certify the hazardous substance has been removed and/or controlled to within legal limits and requirements. Upon receipt of such test results, OR will provide notice, as set forth in Article 12.5, to CONTRACTOR to proceed with construction in affected Work areas. If CONTRACTOR contends the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, the CONTRACTOR shall proceed as required by Article 12.6.

**4.6.4 Hazardous Waste:** If, during construction of the Work in areas where CONTRACTOR is required to perform Work, CONTRACTOR discovers, uncovers and/or otherwise reveals a material reasonably believed to be a hazardous waste, which was not identified, described, shown or indicated in the Bidding Documents to be within the scope of the Work, CONTRACTOR shall immediately stop Work in the affected area and provide notice, as set forth in Article 12.4, to OR and ARCHITECT, advising of the circumstances of such discovery, Work stoppage and whether or not such material was generated by CONTRACTOR or OWNER. OWNER shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. If test results indicate and/or otherwise confirm the material as a hazardous waste requiring treatment and/or removal, OR may issue a Construction Directive for the legal treatment and/or removal and disposal thereof. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive. After treatment and/or removal, the independent testing laboratory shall test and certify the hazardous substance has been removed and/or controlled to within legal limits and requirements. Upon receipt of such test results, OR will provide notice, as set forth in Article 12.5, to CONTRACTOR to proceed with construction in affected Work areas. If CONTRACTOR contends the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, the CONTRACTOR shall proceed as required by Article 12.6.

**4.6.5 Radioactive Materials:** If, during construction of the Work in areas where CONTRACTOR is required to perform Work, CONTRACTOR discovers, uncovers and/or otherwise reveals a material reasonably believed to be a radioactive material, which was not identified, described, shown or indicated in the Bidding Documents to be within the scope of the Work, CONTRACTOR shall immediately stop Work in the affected area and provide notice, as set forth in Article 12.4, to OR and ARCHITECT, advising of the circumstances of such discovery, Work stoppage and whether or not such material was generated by CONTRACTOR or OWNER. OWNER shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. If test results indicate and/or otherwise confirm the material as a radioactive material requiring treatment and/or removal, OR may issue a Construction Directive for the legal treatment and/or removal and disposal thereof. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive. After

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treatment and/or removal, the independent testing laboratory shall test and certify the radioactive material has been removed and/or controlled to within legal limits and requirements. Upon receipt of such test results, OR will provide notice, as set forth in Article 12.5, to CONTRACTOR to proceed with construction in affected Work areas. If CONTRACTOR contends the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, the CONTRACTOR shall proceed as required by Article 12.6.

**4.7 Materials Not Caused by CONTRACTOR**

In the event the presence of the materials as set forth in Articles 4.5 and 4.6 is not caused by CONTRACTOR or some person or entity directly or indirectly performing under CONTRACTOR or its Subcontractors, OWNER shall pay for all costs of testing and remediation, if any.

**4.8 Indemnification by CONTRACTOR for Material Caused by CONTRACTOR**

In the event the presence of the materials as set forth in Articles 4.5 and 4.6 are caused by CONTRACTOR, Subcontractors, Suppliers, or anyone else who would otherwise be a "claimant," CONTRACTOR shall pay for all costs of testing and remediation, if any, and shall indemnify and hold OWNER harmless from and against such costs. In addition, CONTRACTOR shall defend, indemnify and hold harmless OWNER, OR, OWNER Consultant, ARCHITECT, ARCHITECT Consultant, Insurance Carriers and/or their respective agents, officers, representatives, consultants, and employees from and against any and all claims, actions, damages, losses, costs, penalties and expenses incurred in connection with, arising out of, or relating to, the presence of such materials. The OWNER shall have the right to assess any and all costs against Contract funds, the CONTRACTOR, and/or the performance bond.

**4.9 Survival of Provisions**

The terms of these material provisions as set forth in Articles 4.7 and 4.8 shall survive Final Completion and/or any termination of this Contract.

**ARTICLE 5 - INSURANCE AND BONDS**

**5.1 General**

**5.1.1 Basic Insurance Requirements:** Prior to commencing Work and until final acceptance, CONTRACTOR and each of its Subcontractors shall procure and maintain insurance at their own cost and expense against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work by the CONTRACTOR, its agents, representatives, employees or Subcontractors.

**5.1.1.1** Without in any way affecting the indemnity provided in or by the CONTRACTOR shall secure before commencement of the Work the types and amounts of insurance specified in this section.

**5.1.1.2** Insurance is to be placed with insurers admitted to do business in the State of Georgia and approved by OWNER with an AM Best Rating of A VIII.

**5.1.1.3** Each insurance coverage required by the Minimum Limits of Insurance shall be endorsed to state that coverage shall not be canceled or modified except after thirty (30) days prior written notice by certified mail, return receipt

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requested, has been received by Owner in accordance with the notice provisions of this Agreement.

**5.1.2 Minimum Limits of Insurance:** CONTRACTOR and each of its Subcontractors shall obtain insurance of the types and in the amounts described below:

**5.1.2.1** Commercial General Liability Insurance including Premises Liability with Elevator Liability, Completed Operations and Products Liability in effect for two (2) years after final payment, Personal Injury Liability, Property Damage Liability and Contractual Liability. Coverage shall be written on an occurrence basis in the amount of a combined single of \$1,000,000.

**5.1.2.2** Business Automobile Liability Insurance including personal injury and property damage to cover owned automobiles, automobiles under long-term lease, hired automobiles, employers' non-ownership liability, medical payments and uninsured motorists in the amount of a combined single limit of \$1,000,000.

**5.1.2.3** Workers' Compensation Insurance and Employees Liability insurance with statutory limits as required by law, including Maritime coverage, if appropriate, and Employer's Liability limits of not less than \$1,000,000 each accident/\$1,000,000 each employee/\$1,000,000 policy limit.

**5.1.2.4.1** On all Projects where the Contract Amount is greater than \$1,000,000, OWNER shall procure Builder's Risk Insurance including coverage for the Work, on a replacement cost basis, providing the perils included on a Special Form property policy, including, but not limited to, the perils of fire, lightning, explosion, windstorm, flood and earthquake (including sinkholes and subsidence), strike, riot, civil commotion, vandalism and malicious mischief, insuring the buildings, structures, machinery, equipment, facilities, fixtures and other properties constituting a part of the Work and property of Others.

In connection with any claims made under the Builder's Risk Insurance provided under this Subparagraph, CONTRACTOR shall reimburse OWNER for the first \$10,000.00 (in the aggregate) paid by OWNER as a deductible under the policy. Should CONTRACTOR fail to reimburse OWNER for any such amounts within thirty (30) days of OWNER's request, OWNER may withhold such amounts from any payments owed to CONTRACTOR.

**5.1.2.4.2** On all Projects where the Contract Amount is less than \$1,000,000.00, CONTRACTOR shall provide Builder's Risk Insurance including coverage for the Work, on a replacement cost basis, providing the perils included on a Special Form property policy, including, but not limited to, the perils of fire, lightning, explosion, windstorm, flood and earthquake (including sinkholes and subsidence), strike, riot, civil commotion, vandalism and malicious mischief, insuring the buildings, structures, machinery, equipment, facilities, fixtures

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and other properties constituting a part of the Work and property of Others for which CONTRACTOR has responsibility to insure. Coverage shall be written on an occurrence basis in the amount of contract award, with a deductible of not more than \$25,000.00

**5.1.3** Other Insurance Provisions: All policies required by this Agreement are to contain, or be endorsed to contain, the following provisions:

**5.1.3.1** OWNER, Board of Education, and any other person or entity specified by OWNER.

**5.1.3.2.** For any claims related to this Project, insurance coverage provided by the CONTRACTOR shall be primary as to OWNER, Board of Education, and any other person or entity specified by OWNER to be named as additional insured. Any insurance or self-insurance maintained by OWNER, its officers, officials, employees or volunteers shall be in excess of insurance required by this Agreement and shall not contribute with it.

## **5.2 Waiver of Subrogation**

CONTRACTOR hereby waives all rights of recovery under subrogation because of deductible clauses, inadequacy of limits of any insurance policy, limitations or exclusions of coverage, or any other reason against OR, OWNER, the Board, its or their officers, agents, or employees, and any other contractor or subcontractor performing Work or rendering services on behalf of OWNER in connection with the planning, development and construction of the Work. CONTRACTOR shall also require that all CONTRACTOR maintained insurance coverage related to the Work include clauses providing that each insurer shall waive all of its rights of recovery by subrogation against CONTRACTOR. CONTRACTOR shall require similar written express waivers and insurance clauses from each of its Subcontractors. A waiver of subrogation shall be effective as to any individual or entity even if such individual or entity:

**5.2.1** would otherwise have a duty of indemnification, contractual or otherwise;

**5.2.2** did not pay the insurance premium directly or indirectly;

**5.2.3** whether or not such individual or entity has an insurable interest in the property damaged.

## **5.3. Lapse in Coverage**

If CONTRACTOR or any Subcontractor, for any reason, fails to maintain insurance coverage which is required pursuant to this Contract, the same shall be deemed a material breach of Contract. OWNER, at its sole option, may terminate this Contract and recover all damages from CONTRACTOR resulting from said breach. Alternatively, OWNER may purchase such coverage (but has no obligation to do so), without further notice to CONTRACTOR, and deduct from sums due to CONTRACTOR any premium costs advanced by OWNER for such insurance.

## **5.4 Verification of Insurance**

CONTRACTOR shall furnish OWNER with original certificates and amendatory endorsements effecting and evidencing coverage required by this Section. The certificates and endorsements for each policy are to be signed by a person authorized by the insurer to bind coverage on its behalf. The certificates and endorsements shall be on forms acceptable to OWNER. All certificates and endorsements are to be received and approved by OWNER before Work by CONTRACTOR under



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this Contract commences. OWNER reserves the right to require complete, certified copies of all required insurance policies at any time, including endorsements (and policies, if requested) affecting the coverage required by these specifications.

**5.5 Duration of Coverage**

The insurance coverages required by Article 5 shall be maintained without interruption, for a period of two (2) years after Final Completion of the Project, unless otherwise stated herein.

**5.6 Reserved Rights**

OWNER reserves the right to adjust monetary limits of insurance coverage at any time if deemed necessary in its reasonable judgment and shall be responsible for the direct cost of any increase in premiums as a result.

**5.7 Subcontractors**

Unless otherwise approved by OWNER in writing, CONTRACTOR shall include all Subcontractors as insured under its policies or shall furnish separate certificates and endorsements for each Subcontractor. In addition, Subcontractors shall be required to maintain insurance on the same terms and with the same coverages as required of CONTRACTOR under this Contract.

**5.8 Audits**

In addition to OWNER rights under Article 6.55, CONTRACTOR agrees OWNER may audit CONTRACTOR or any of its Subcontractors payroll records, books and records, insurance coverage's, insurance cost information, or any other information CONTRACTOR provides to OWNER to confirm their accuracy.

**5.9 Safety**

CONTRACTOR shall be solely responsible for safety of the Work of this Contract. CONTRACTOR shall establish a safety program that, at a minimum, complies with all local, state and federal safety standards, and any safety standards established by OWNER for the Project, including, but not limited to, the OSHA Construction Safety Standards.

**5.10 Bond Requirements**

CONTRACTOR shall apply for and furnish to OWNER separate payment and performance bonds for the Work. The performance bond shall be in a monetary amount equal to 100% of the original Contract Amount guaranteeing the prompt, competent and faithful performance of all terms and conditions of the Contract. The payment bond shall be for 100% of the Contract Amount and guarantee, without limitation, the payment in full of all claims for labor, services, materials, supplies, and the like, for the Work. A corporate surety authorized and admitted to transact business in Georgia shall provide the bonds. CONTRACTOR shall supply OWNER with documentation establishing the necessary requirements of the surety consistent with Georgia law. To the extent, if any, the Contract Amount is increased in accordance with the Contract Documents, CONTRACTOR shall, upon request of OWNER, cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to OWNER. The bonds shall further provide no change or alteration of the Contract Documents (including, without limitation, an increase in the Contract Amount, as referred to above), adjustment to the Milestones and/or Contract Time, or modifications of the time, terms, or conditions of payment to the CONTRACTOR will release the

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sureties. If CONTRACTOR fails to furnish the required bonds, or fails to keep such bonds in full force and effect up through such times that such bonds are otherwise obligated to be in force and effect under the law, OWNER may terminate CONTRACTOR right to proceed with the Work and/or terminate the Contract for cause. The performance bond shall be in the form and contain the content shown in Document 00605. The payment bond shall be in the form and contain the content shown in Document 00600. Nothing set forth herein shall relieve the CONTRACTOR from compliance with all requirements prescribed by Georgia law, including but not limited to the legal obligations set forth in Georgia Local Government Public Works Construction Law, O.C.G.A. section 36-91-1, et. seq.

#### 5.11 Surety Qualification

Only bonds executed by admitted surety insurers shall be accepted. Surety must be a Georgia-admitted surety, listed by the U.S. Treasury with a bonding capacity in excess of the Contract Amount and a Best's bond rating of not less than A VIII.

#### 5.12 Subcontractor Payment and Performance Bonds

For each Subcontractor having a Subcontract of \$100,000.00 or more for roofing, HVAC, plumbing, sprinkler system and electrical work, the Subcontractor shall procure payment and performance bonds for one hundred percent (100%) of the Subcontract amount. The Subcontractor's bonds shall be written by a surety having the qualifications set forth Section 5.11. The Subcontractor's bonds shall be presented to Owner prior to the Contractor billing for or receiving payment for amounts under the applicable Subcontracts.

### ARTICLE 6 - CONTRACTOR DUTIES AND REPONSIBILITIES

#### *Management and Superintendence of the Work*

- 6.1 CONTRACTOR shall supervise and direct all aspects of the Work using the best skill, attention, and efforts of CONTRACTOR. CONTRACTOR shall be solely responsible for and exercise full control over construction means, methods, techniques, sequences, procedures, and coordinating all portions of the Work, unless the Contract Documents provides other specific instructions concerning these matters.
- 6.2 CONTRACTOR shall provide a competent full time English speaking superintendent and assistants as necessary that shall supervise and superintend the Work and be physically present at the Project site while any aspect of the Work is being performed.
- 6.3 CONTRACTOR shall provide a competent English speaking project manager and assistants as necessary that shall administer and manage the Work. The project manager shall represent CONTRACTOR, and communications given to the project manager shall be as binding as if given to CONTRACTOR. In the event the Contract Amount is equal to or exceeds ten million dollars (\$10,000,000) the project manager shall be assigned to the Work on a full time basis and shall be present at the Project site while any aspect of the Work is being performed.
- 6.4 CONTRACTOR shall furnish and ensure competent adequate staff necessary to properly administer, coordinate, purchase, expedite, and/or organize the procurement of all materials and equipment so the materials and equipment will be procured and delivered at the time they are required to be incorporated into the Work and to furnish and maintain an adequate force of skilled workers on the Project site to complete the Work in accordance with the Contract Documents.

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- 6.5 CONTRACTOR shall enforce strict discipline and good order among employees and other persons carrying out the Work including, but not limited to, Subcontractors, and/or material and/or equipment suppliers retained for the Work. CONTRACTOR shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. CONTRACTOR shall ensure all employees and other persons carrying out the Work abide by all regulations pertaining to, but not limited to, smoking, consumption of alcohol, illegal substances, profanity or inappropriate attire and prohibited verbal and physical contact with students and faculty.
- 6.6 CONTRACTOR shall be responsible to OWNER for acts and omissions of CONTRACTOR employees, Subcontractors, material and equipment suppliers, and their agents, employees, invitees, and other persons performing portions of the Work under direct or indirect contract with CONTRACTOR or any of its Subcontractors.

***Labor, Materials and Equipment of the Work***

- 6.7 Unless otherwise specified in the Contract Documents, CONTRACTOR shall provide and furnish qualified personnel to proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work, including without limitation, all labor, material, equipment, apparatus, tools, construction equipment and machinery, appliances, fuel, power, light, heat, ventilation, telephone, sanitary facilities, water, gas, utilities, transportation, and all other incidental facilities and services for the furnishing, performance, testing, start up, and completion of the Work.
- 6.8 Unless otherwise specified in the Contract Documents, all materials and equipment to be permanently installed in the Work shall be new and shall be of such quality as required by the Contract Documents. All warranties and guarantees required by the Contract Documents shall be expressly issued to the benefit of OWNER. CONTRACTOR shall, if requested by ARCHITECT, furnish satisfactory evidence in the form of reports of required tests as to kind and quality of all materials and equipment. All equipment, appliances, and fixtures shall be installed, erected, connected, tested, started and conditioned in accordance with applicable manufacturer's instructions and the Contract Documents.
- 6.8.1 The furnishing, use or installation of Lead Containing Paint or Asbestos Containing Construction Materials into the Work, Project or onto OWNER property is not permitted.
- 6.9 CONTRACTOR shall, upon approval of applicable submittals, promptly place orders for materials and equipment so delivery of materials and equipment can be incorporated into the Work without delay. CONTRACTOR, upon receipt of notice from OR shall furnish documentary evidence from CONTRACTOR, Subcontractor, distributor and/or manufacturer verifying placement of orders and/or scheduled delivery dates.

***Delivery and Storage of Products, Equipment, Fabrications and Materials***

- 6.10 Products, equipment, fabrications and applicable materials shall be delivered with an identification tag or label specifying name of manufacturer, model number, type and other pertinent data described on such tag or label as required for complete identification. If products, equipment, fabrications and applicable materials are not so identified then CONTRACTOR shall provide an invoice and/or other supporting identification of products, equipment, fabrications or applicable materials. CONTRACTOR shall be responsible for the safety and proper storage of all products, equipment, fabrications and applicable materials delivered to the Project site.
- 6.11 Materials specified to be tested, which are delivered to and are to be tested on the Project site, shall be stored in separate areas in order to segregate untested materials or materials undergoing testing

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from materials previously tested and approved. CONTRACTOR shall have on the Project site at all times a sufficient quantity of tested and approved materials for timely integration into and completion of the Work in accordance with the approved Detailed Construction Schedule.

**6.12 Construction Schedule**

Given time is of the essence, CONTRACTOR shall expeditiously proceed in accordance with the Detailed Construction Schedule established pursuant to Article 2.8, related Division 01 Sections, and as amended from time to time, and shall furnish and maintain adequate forces in order to achieve all Milestones as set forth in the Detailed Construction Schedule. If requested by the ARCHITECT and/or OR, CONTRACTOR shall submit, in accordance with applicable Division 01 Requirements, proposed adjustments to the Detailed Construction Schedule, which does not change or amend either the Milestones and/or Contract Time. Proposed adjustments to the Detailed Construction Schedule which change and/or amend the Contract Amount, Milestones and/or Contract Time shall be submitted by CONTRACTOR in accordance with the applicable requirements of Articles 10 through 12.

**6.13 Sufficient Forces**

CONTRACTOR shall furnish and maintain sufficient forces to ensure completion of all Work in accordance with each and every approved Detailed Construction Schedule.

**6.14 "Or Equal" and Substitutions**

When an item of material or equipment is specified by the use of a proprietary name, make, trade name, or catalog number the intent of the Specification is to establish the type, function and quality required. Unless the Specification or description contains or is followed by words reading that no like or no substitution is permitted, other items of material or equipment or material or equipment of other suppliers may be accepted by OR in accordance with the following sections.

**Ten days after the date established in the Notice to Proceed**

**6.14.1** CONTRACTOR may submit a list to the OR of proposed substitutions and substantiating data setting forth any "or equal" item of material or equipment CONTRACTOR believes to be functionally equal to and sufficiently similar to those specified in the Contract Documents. Any substitutions submitted by CONTRACTOR under this subsection shall be done in a timely manner so as not to materially impact the Construction Schedule or delay the Work.

**6.14.2** The substantiating data shall include a CONTRACTOR certification stating that the proposed " or equal "will be readily available, perform the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. All variations of the proposed 'or equal 'from that specified shall be identified in the proposal and all available maintenance, repair and replacement services shall be submitted. In addition, the following items shall be addressed in the substantiating data as to whether or not:

**6.14.2.1** acceptance of the " or equal 'for use in the Work will require a change in any of the Contract Documents or in the provisions of any other Separate Work Contract on the Project or to adapt the design to the proposed "or equal';

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- 6.14.2.2 the proposed 'or equal' is subject to payment of any license fee or royalty;
  - 6.14.2.3 the proposed "or equal "is equal to in quality and serviceability to the specified item;
  - 6.14.2.4 is acceptable in consideration of the required design and artistic effect;
  - 6.14.2.5 will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts.
- 6.14.3 **CONTRACTOR Expense:** All data to be provided by CONTRACTOR in support of any proposed "or equal " will be at expense of CONTRACTOR.
- 6.14.4 **Evaluation:** ARCHITECT and OR shall be allowed a reasonable time to evaluate each submittal made pursuant to Articles 6.14.1 and 6.14.2 with OR as the final judge of acceptability. No proposed 'or-equal' will be ordered, installed or utilized without OR prior written acceptance as evidenced by a Construction Directive and/or Change Order. ARCHITECT may condition its approval of the " or equal' upon delivery to OWNER of an extended warranty or other assurances of adequate performance of the" or equal'. All risks of damage, of any kind, including, without limitation, all costs associated with any delay, disruption and/or acceleration due to obtaining approval from the Division of the State Architect, or any other governmental agency having jurisdiction of an approved " or equal " shall be the responsibility of CONTRACTOR.

***Eleven Days after the date Established in the Notice to Proceed***

- 6.14.5 A specified item of material or equipment, which is no longer manufactured and/or cannot be acquired from existing inventories, will be considered a basis for a proposed substitute item. Proposed substitutions of materials or equipment other than those specified must be made on the substitution request form available from OWNER in a timely manner so as not to materially impact the Construction Schedule or delay completion of the Work. Substitution requests will not be submitted to ARCHITECT by anyone else other than CONTRACTOR. A substitution request form shall certify the proposed substitution will be readily available, perform adequately the functions and achieve the results called for by the design concept, be similar in substance to that specified, and be suited to the same use as that specified. All variations of the proposed substitute from that specified will be identified in the substitution request and available maintenance, repair and replacement service will be indicated. The substitution request will also contain an itemized estimate of all costs or credits directly or indirectly resulting from acceptance of such substitute, including costs of redesign and of Subcontractors affected by the resulting change, all of which shall be considered by ARCHITECT in evaluating the proposed substitute. In addition, the following items shall be considered:
- 6.14.5.1 the extent, if any, to which the time required to evaluate and consider accepting a proposed substitution will jeopardize timely compliance with any Milestones;
  - 6.14.5.2 whether or not acceptance of the proposed substitution for use in the Work will require a change in any of the Contract Documents or in the provisions of any other Work by Separate Work Contract on the Project to adapt the design to the proposed substitute;
  - 6.14.5.3 whether or not the proposed substitute is subject to payment of any license fee or royalty;

- 6.14.5.4 the proposed substitution is equal in quality and serviceability to the specified item;
  - 6.14.5.5 is acceptable in consideration of the required design and artistic effect;
  - 6.14.5.6 will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts.
- 6.14.6 **CONTRACTOR Expense:** All data to be provided by CONTRACTOR in support of any proposed substitute item will be at expense of CONTRACTOR.
- 6.14.7 **Evaluation:** ARCHITECT and OR shall be allowed a reasonable time within which to evaluate each proposal for or submittal made pursuant to Article 6.14.5. ARCHITECT shall make a written recommendation to OR regarding the acceptability of the proposed substitution. No substitution will be ordered, installed or utilized without OR prior written acceptance as evidenced by a Construction Directive and/or Change Order. ARCHITECT may condition its approval of the substitution upon delivery to OWNER of an extended warranty or other assurances of adequate performance of the substitution. All risks of damage, of any kind, including, without limitation, all costs associated with any delay, disruption and/or acceleration due to obtaining approval from the Division of the State Architect, or any other governmental agency having jurisdiction, of a requested substitution shall be the responsibility of CONTRACTOR. ARCHITECT shall record the time of ARCHITECT and ARCHITECT Consultants in evaluating substitutions proposed or submitted by CONTRACTOR pursuant to Article 6.14.5, seeking any approvals required by governing agencies, and in making any changes in the Contract Documents or in the provisions of any other Separate Work Contract on the Project. Whether or not OR accepts a substitution so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for ARCHITECT and ARCHITECT Consultant fees in evaluating each such proposed substitution. The OWNER shall have the right to assess any and all costs against Contract funds, the CONTRACTOR, and/or the performance bond.

**6.15 Additional Professional Services**

If OR, prior to recordation of the Notice of Completion, is required to provide or secure additional professional services for any reason by any acts of CONTRACTOR or its Subcontractors, CONTRACTOR may be responsible for the cost and expense thereof. Upon notice to CONTRACTOR, OWNER shall retain and provide additional professional services and may, by assessment, recover all incurred costs for any additional professional services. Additional services shall include.

- 6.15.1 all services made necessary by termination of CONTRACTOR for cause;
- 6.15.2 all services made necessary due to defective Work of CONTRACTOR;
- 6.15.3 all services required by failure of CONTRACTOR to perform Work according to any provision of the Contract Documents;
- 6.15.4 all services in connection with evaluating CONTRACTOR substitutions of materials or equipment and making subsequent revisions to drawings, specifications, and providing other documentation required;
- 6.15.5 all services required by failure of CONTRACTOR to prosecute the Work in compliance

with the Detailed Construction Schedule;

- 6.15.6 all services required by failure of CONTRACTOR to pass or receive approval of any required test, inspection, observation or approval;
- 6.15.7 all services required in performing excessive reviews of CONTRACTOR punch list Work;
- 6.15.8 all services in performing excessive reviews of CONTRACTOR Shop Drawings, material lists, Product Data, and Samples;
- 6.15.9 all services made necessary by OWNER exercising its options under Articles 15.5.15 and/or 15.5.16.

***Relative to Subcontractors, Suppliers and others***

- 6.16 CONTRACTOR whose bid is accepted shall provide written notification to OWNER of any proposed substitute of person or entity as a Subcontractor in place of the Subcontractor designated in the original bid. OWNER shall have five (5) business days from receipt of written notice of substitution to object to any substitution stating the grounds for such objection. If OWNER fails to object to substitution within the time period, the substitution shall be deemed accepted and approved to by the OWNER. However, CONTRACTOR shall not make any assignment or substitution where OWNER objects within the time period. All substitutions shall be void, and the assignees shall acquire no rights in the purported subcontract and/or Contract where CONTRACTOR fails to notify OWNER or OWNER objects to the assignment or substitution. Any consent, if given, shall not relieve CONTRACTOR or its Subcontractors from their obligations under the terms of the Contract Documents.
- 6.17 CONTRACTOR shall be responsible for all unreasonable and unforeseeable delays in the Milestones and/or Contract Time arising from substitutions approved by the OWNER. Any substitution shall not result in an adjustment to the Contract Amount.
- 6.18 CONTRACTOR shall be responsible to OWNER for all acts and omissions of Subcontractors, suppliers and all others in furnishing and/or performance of the Work either by direct or indirect contract to CONTRACTOR. No provisions of the Contract Document shall serve to create and/or establish any contractual relationship between OWNER and/or ARCHITECT with any Subcontractor, supplier, or others in the furnishing and performance of the Work.
- 6.19 CONTRACTOR shall be responsible for the scheduling and coordination of all Work of Subcontractors, suppliers and all others in furnishing and/or performance of the Work by direct and/or indirect contract to CONTRACTOR. CONTRACTOR shall require all Subcontractors, suppliers and all others furnishing and/or performing any of the Work to communicate with ARCHITECT, OR or OWNER through CONTRACTOR.
- 6.20 CONTRACTOR shall not be limited by the divisions of the Specifications or the identification of Drawings in apportioning the Work amongst Subcontractors or suppliers unless otherwise required by applicable law, regulation or statute.
- 6.21 By appropriate subcontract agreement CONTRACTOR shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to CONTRACTOR by terms of the Contract Documents, and to assume toward CONTRACTOR all obligations and responsibilities, which CONTRACTOR, by the Contract Documents, assumes toward OWNER. Each subcontract agreement shall preserve and protect the rights of OWNER under the Contract Documents with respect to the Work to be performed by the Subcontractor so the subcontracting

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thereof will not prejudice such rights. All subcontracts regarding the Work under the Contract shall contain an assignment clause running in favor of OWNER and/or an entity designated by OWNER. That clause is subject to the option of OWNER to exercise it. CONTRACTOR shall also require each Subcontractor to enter into similar subcontracts with sub-Subcontractors. CONTRACTOR shall make available to each proposed Subcontractor, before the execution of the subcontract agreement, the Contract Documents to which the Subcontractor will be bound. Subcontractors shall similarly make the Contract Documents available to their respective sub-Subcontractors.

- 6.22** Each subcontract agreement for a portion of the Work is assigned by CONTRACTOR to OWNER provided that: (1) the assignment is effective only after termination of the Contract or after CONTRACTOR right to proceed with the Work has been terminated under Article 15.5.16; (2) and only for those subcontract agreements which OWNER accepts by specifically notifying the Subcontractor in writing; (3) and the assignment is subject to the prior rights of the surety, if any, obligated under any bond relating to the Contract.
- 6.23** CONTRACTOR shall ensure by subcontract agreement each Subcontractor has the responsibility for participating in, and enforcing, the safety and loss prevention programs established by CONTRACTOR for the Work and/or Project, which will cover all Work performed by CONTRACTOR and its Subcontractors. Each Subcontractor shall designate a competent person whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs. All Subcontractors and material or equipment suppliers shall cooperate fully with CONTRACTOR, OR, the OWNER, and all insurance carriers and loss prevention engineers.
- 6.24** CONTRACTOR shall ensure by subcontract agreement each Subcontractor shall promptly report in writing to CONTRACTOR all incidents and/or accidents whatsoever arising out of, or in connection with, the performance of the Work, whether on or off the Project site, and whether or not they caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger. CONTRACTOR shall thereafter promptly report the facts in writing to OR and ARCHITECT giving full details of the accident.
- 6.25** CONTRACTOR shall ensure by subcontract agreement each Subcontractor shall prepare and submit to CONTRACTOR within ten (10) days of execution of each subcontract agreement, comprehensive material lists, as set forth in Article 6.48.3, of the manufacturers and products proposed for the Work including information on materials, equipment, and fixtures required by the Contract Documents, as may be required for CONTRACTOR or ARCHITECT preliminary approval. Approval of such material lists of products shall not be construed as a substitute for the Shop Drawings, Product Data, manufacturers descriptive data, Samples, or a substitution request, which are required by the Contract Documents, but rather as a base from which more detailed submittals shall be developed for the final review of CONTRACTOR and ARCHITECT.
- 6.26** No later than ten (10) days after receipt of payment, CONTRACTOR shall pay to each Subcontractor, out of the amount paid to CONTRACTOR on account of such Subcontractors portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to CONTRACTOR on account of such Subcontractors portion of the Work. CONTRACTOR shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to sub-Subcontractors in a similar manner.
- 6.27** OWNER shall, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by CONTRACTOR, and action taken thereon by OWNER, on account of portions of the Work completed by such Subcontractor.



- 6.28 OWNER shall have no obligation to pay, or to see to the payment of monies to a Subcontractor except as may otherwise be required by law.
- 6.29 Payment to material or equipment suppliers shall be treated in a manner similar to that provided for in Articles 6.26, 6.27 and 6.28.
- 6.30 CONTRACTOR shall not use in any way as part of its bid, and shall not use to perform any portion of the Work, a Subcontractor, contractor or subcontractor who is ineligible to bid and/or work on a work of public improvements.

6.31 ***Patent Fees and Royalties***

CONTRACTOR shall be financially responsible for payment of all royalties and license fees and shall assume all incidental costs in the performance of and/or incorporation into the Work of any invention, process, design, product or device subject to the patent and/or copyrights held by others. CONTRACTOR shall defend all suits or claims of infringement of patent and/or copyrights rights and shall hold OWNER, ARCHITECT and ARCHITECT Consultant harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process, or product of a particular manufacturer is required by the terms and conditions of the Contract Documents. If CONTRACTOR has reason to believe the required invention, process, design, product or device is an infringement of a patent and/or copyright, CONTRACTOR shall be responsible for such loss unless such information is furnished to ARCHITECT prior to the use and/or incorporation into the Work. ARCHITECT review of any method of construction, invention, appliance, process, article, device, or material of any kind shall be for its adequacy for the Work and shall not be an approval for CONTRACTOR use in violation of any patent or other rights of any

person or entity. CONTRACTOR shall defend all suits or claims of infringement of patent and/or copyrights and shall hold OWNER, ARCHITECT and ARCHITECT Consultant harmless from loss when the terms and conditions of Contract Documents do not require particular invention, process, design, or product.

6.32 ***Permits and Fees***

CONTRACTOR shall obtain all permits and be financially responsible for all governmental fees, licenses and inspections necessary for proper execution and completion of the Work that are customarily secured after the Effective Date of the Contract and are required by any authority having legal jurisdiction over the Work and/or Project. In cases where a local government does not issue permit for the Project and requires independent permitting and inspections, OWNER shall be responsible for all independent project reviews, inspections, especially Certificate of Occupancy Inspections and all on site Project testing and inspection within the distance limitations set forth in Article 13.15.5, unless a different distance limitation is specified in the Contract Documents.

***Laws and Regulations***

- 6.33 CONTRACTOR shall comply with all laws and regulations and shall give all notices required by any law, ordinance, rule, regulation, and lawful order of public authorities having jurisdiction relative to the furnishing of or performance of the Work.
- 6.34 If CONTRACTOR performs Work contrary to any law, statute, ordinance, building code, rule or regulation, CONTRACTOR shall be responsible for all the direct and indirect costs, fees, expenses, losses and damages in connection with replacement thereof.

6.35 [Intentionally left blank]

6.36 If the Work involves any excavation of any trench or trenches five (5) feet or more in depth, CONTRACTOR shall, in advance of excavation, submit to OR or a registered civil or structural engineer employed by OWNER, a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches. No excavation of such trench or trenches shall be commenced until said plan has been reviewed by the person to whom authority to review has been delegated to by OWNER. Nothing in this Article 6.36 shall impose tort liability upon OWNER or any of its employees.

6.37 **Sales, Consumer, Use and Similar Taxes**

CONTRACTOR is financially responsible for applicable federal, state, and local taxes on all items, including, without limitation, materials, labor, equipment, supplies and services furnished by CONTRACTOR, and all taxes arising from operations of CONTRACTOR pursuant to the Contract Documents. OWNER is exempt from federal excise tax, and a certificate of exemption shall be provided upon request of CONTRACTOR. CONTRACTOR is financially responsible for applicable charges and fees for all insurance and bonds required by the Contract..

**Use of Project Site and Premises**

6.38 During progress of the Work, CONTRACTOR shall maintain the Work, Project site and surrounding areas free from accumulation of debris, waste material or rubbish caused by CONTRACTOR operations. All crates, cartons, paper, and other flammable waste materials shall be removed from all areas of the Work and/or Project site and shall be properly disposed of at the end of each day. CONTRACTOR shall remove from all areas of the Work and/or Project site all excess materials, tools, construction equipment, machinery, and temporary facilities no longer required for the Work.

6.39 CONTRACTOR shall restrict all construction equipment, material storage and worker operations to the Project site, lands, and/or areas identified in the Contract Documents and to other lands and areas allowed by permits, right of ways, easements and/or laws and regulations. CONTRACTOR is strictly liable and assumes full responsibility for any damage to any such land, area, occupant and/or property of OWNER and any adjacent land, area, right of way, property, occupant and/or pedestrian thereof.

6.40 CONTRACTOR shall not cause, permit or allow structural loading in excess of safe limits or where such loading may induce stresses and/or pressures endangering:

6.40.1 any part of the Work under construction, completed Work or existing improvements on the Project site;

6.40.2 any part of the Work under construction, completed Work or existing improvements adjacent to the Project site.

6.41 **Project Record Documents**

CONTRACTOR shall prepare and maintain on the Project site, a current, accurate and complete set of all Drawings, Specifications, Addenda, Change Orders, Construction Directives, ARCHITECT written interpretations and clarification, Shop Drawings, Product Data and Samples, Construction Schedules, denoted and annotated to reflect all changes, revisions, and substitutions during construction of the Work, including, without limitation, field changes and the final location of all mechanical equipment, utility lines, ducts, outlets, structural members, walls, partitions, and other significant features. A copy of such project record documents will be transmitted to OR in

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accordance with related sections of the Contract Documents. CONTRACTOR will update the record documents on a weekly basis. Project record documents shall be made available for inspection and use by, but not limited to, OR, ARCHITECT and all authorities having jurisdiction. Upon completion of the Work and before application for final payment, CONTRACTOR shall submit, in accordance with related provisions of the Contract Documents, one complete set of project record documents to the ARCHITECT, certifying them to be a complete and accurate reflection of the actual construction conditions of the Work.

**Safety and Protection:**

- 6.42** Within ten (10) days of the effective date of the Contract, the CONTRACTOR shall submit its Safety Program that, at a minimum, complies with all local, state and federal safety standards, and any safety standards that may be established by the OWNER. The CONTRACTOR shall have responsibility for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. CONTRACTOR shall designate a competent person trained and certified in the OSHA Construction Outreach 10-30 hour programs; trained and certified in first aid and CPR and who shall have the responsibility and full authority to enforce the CONTRACTOR's Safety Program including stopping the Work when safety problems are identified and implementing corrective actions.. This competent person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the CONTRACTOR's Safety Programs.
- 6.43** CONTRACTOR shall provide and maintain at the Project site adequate first-aid supplies for minor injuries and for posting emergency "What to Do" information at the Project.
- 6.44** CONTRACTOR shall take all reasonable safety precautions related to the Work of this Contract, and shall provide reasonable protection to prevent damage, injury, or loss to:
- 6.44.1** employees or personnel related to the Work on the Project site and other persons who may be affected thereby;
  - 6.44.2** the Work, material, and equipment to be incorporated therein, whether in storage on or off the Project site, under the care, custody, or control of CONTRACTOR or Subcontractors;
  - 6.44.3** other property at the Project site or adjacent thereto such as trees, shrubs, lawns, walks, pavement, roadways, structures, and utilities not designated for removal, relocation or replacement in the course of the Work. CONTRACTOR shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on the safety of persons or property or their protection from damage, injury, or loss;
  - 6.44.4** CONTRACTOR shall erect and maintain, as required by existing Project site conditions and performance of the Work, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities;
  - 6.44.5** CONTRACTOR and Subcontractors shall continuously protect the Work, and every portion thereof, OWNER property, and the property of others, from damage, injury, or loss arising from weather conditions, vandals, and/or in connection with the Project and/or in connection with any Work of the Contract Documents;
  - 6.44.6** CONTRACTOR and Subcontractors shall make good any such damage, injury, or loss, except such as may be solely due to, or caused by, agents or employees of OWNER;

- 6.44.7 CONTRACTOR will remove all mud, water, or other elements required for the proper protection and safe prosecution of the Work;
- 6.44.8 CONTRACTOR shall at all times provide heat, coverings, and enclosures necessary to maintain adequate protection against weather so as to preserve the Work, materials, equipment, apparatus, and fixtures free from injury, loss and/or damage;
- 6.44.9 CONTRACTOR shall promptly provide notice to OR and other designated OWNER representatives of all accidents arising out of or in connection with the Work, causing death, personal injury, or property damage, full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to OR and other designated OWNER representatives.

**6.45 Hazard Communication Plan**

CONTRACTOR is responsible for identifying, coordinating, maintaining and any exchange of material data safety sheets or other hazard information requiring dissemination or distribution between CONTRACTOR, Subcontractor, and/or others.

**6.46 Emergencies**

In an emergency affecting the safety or protection of persons or property of OWNER or adjacent to OWNER, CONTRACTOR, without special instructions or authorization from OR or ARCHITECT, is obligated to act to prevent threatened damage, injury or loss due to, but not limited to, occurrences such as fire, flood, earthquake, or other soil and/or geological movements. CONTRACTOR shall provide notice to ARCHITECT and OR if CONTRACTOR believes any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ARCHITECT and OR determine a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Construction Directive may be issued to document the consequences of such action. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

**6.47 Shop Drawings, Samples, Product Data and Material Lists**

**6.47.1 Shop Drawings:** CONTRACTOR shall prepare and/or cause to be prepared and shall submit all required Shop Drawings to ARCHITECT, with concurrent copy to the OR, for ARCHITECT review and approval in accordance with the OR accepted schedule of Shop Drawings and Sample submittals. All Shop Drawing submittals shall be identified and shall be submitted in accordance with the applicable requirements of related Division 01 General Requirements. Shop Drawings will be complete in respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ARCHITECT the materials and equipment CONTRACTOR proposes to provide and to enable ARCHITECT to review the information for the limited purposes as set forth in Articles 6.50 and 6.51.

**6.47.2 Samples:** CONTRACTOR shall prepare and/or cause to be prepared and shall submit all required Samples to ARCHITECT, with concurrent copy to the OR, for ARCHITECT review and approval in accordance with the OR accepted schedule of Shop Drawings and Sample submittals. All Sample submittals shall be identified and shall be submitted in accordance

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with the applicable requirements of related Division 01 General Requirements. Each Sample will be clearly identified as to material, supplier, pertinent data such as catalog number, and the use for which intended and otherwise as ARCHITECT may require to enable ARCHITECT to review the submittal for the limited purposes required by Articles 6.50 and 6.51.

- 6.47.3 Product Data and Material Lists:** CONTRACTOR shall prepare and/or cause to be prepared and shall submit all required Product Data and material lists to ARCHITECT, with concurrent copy to the OR, for ARCHITECT review and approval in accordance with the OR accepted schedule of Shop Drawings and Sample submittals. All Product Data and material lists shall be identified and shall be submitted in accordance with the applicable requirements of related Division 01 General Requirements. Each Product Data and material list will be complete with respect to manufacture's data, supplier, installation instructions, color charts, compliance with recognized codes and standards, performance characteristics, diagrams and templates, catalog cuts, schedules, illustrations, materials, specified performance and design criteria, and similar data to show ARCHITECT the use for which intended and otherwise as ARCHITECT may require to enable ARCHITECT to review the information for the limited purposes required by Articles 6.50 and 6.51.

#### **Submittal Procedures**

- 6.48** Prior to the submission of each Shop Drawing, Sample, Product Data and/or material list CONTRACTOR shall have determined and verified:
- 6.48.1** all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;
  - 6.48.2** all materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work;
  - 6.48.3** all information relative to the sole responsibility of CONTRACTOR in respect to means methods, techniques, sequences, and procedure of construction and safety precautions and programs incident thereto.
- 6.49** Each submittal shall bear a stamp or specific written indication signifying CONTRACTOR has satisfied CONTRACTOR obligations under the Contract Documents with respect to CONTRACTOR review, coordination and approval of that submittal. Each submittal shall bear written identification of all Specification section numbers and/or Drawing title block references the submittal is intended to address.
- 6.50** At the time of each submission, CONTRACTOR shall give ARCHITECT specific written notice of such variations, if any, that the Shop Drawings, Samples, Product Data and material lists submitted have from the requirements of the Contract Documents. Such notice shall be in a communication separate from, but included with each submittal, and in addition, CONTRACTOR shall cause a specific notation to be made on each Shop Drawing, Sample, Product Data and material list submitted to ARCHITECT for review and approval of each such variation.
- 6.51** ARCHITECT will review and approve Shop Drawings, Samples, Product Data and material lists in accordance with the OR accepted Construction Schedule of Shop Drawings and Sample submittals. ARCHITECT review of and approval will be only to determine if the items covered by the submittals will, after installation or incorporation into 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. ARCHITECT review and approval will not extend to

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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 out 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. CONTRACTOR shall make and/or cause to be made corrections required by ARCHITECT, and shall return the required number of corrected copies of Shop Drawings, Product Data and material lists and shall 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 ARCHITECT on previous submittals.

**6.52** ARCHITECT review of and approval of Shop Drawings, Samples, Product Data and material lists shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ARCHITECT attention to each variation at the time of submission as required by Article 6.49.3 and ARCHITECT has given written approval of each variation by specific written notation thereof incorporated in or accompanying the Shop Drawing, Sample, Product Data and material list approval; nor will any approval by ARCHITECT relieve CONTRACTOR from responsibility for complying with the requirements of Article 6.49.

**6.53** Where a Shop Drawing, Sample, Product Data and material list is required to be submitted by the Contract Documents or the Detailed Construction Schedule of Shop Drawings and Sample submissions accepted by OR, any related Work performed prior to ARCHITECT review and approval of the pertinent submittal will be at the sole expense, risk, and responsibility of CONTRACTOR.

**6.54** ***Continuing the Work***

CONTRACTOR acknowledges that all time deadlines under the Contract are of the essence. The school facilities being built for OWNER under this Contract are critically needed to provide seats, classrooms and other facilities for the children of Fulton County Schools. If CONTRACTOR stops, delays, postpones and/or otherwise suspends the Work or any portion thereof, except in cases of emergency or encountering those conditions as set forth in Articles 4.2, 4.3, 4.5 and 4.6, CONTRACTOR will cause irreparable harm; including without limitation the renting and/or leasing of temporary classroom and support facilities, the busing of students to temporary alternative educational facilities, and the providing of temporary nutrition services. Accordingly, at all times, CONTRACTOR shall continue to perform the Work in accordance with the Detailed Construction Schedule and/or as otherwise directed in writing by a Construction Directive. CONTRACTOR shall proceed with the Work even if CONTRACTOR contends OWNER, and/or anyone OWNER is legally responsible for, has materially and/or otherwise breached the Contract; and even if there exists a dispute; disagreement, or a proceeding and/or Claim is pending subject to OWNER'S continuing obligation to pay CONTRACTOR in accordance with the terms of the Contract Documents. CONTRACTOR acknowledges that it shall not suffer any irreparable harm by continuing to perform the Work and/or any disputed Work as there is a fair and reasonable method of full compensation provided for under this Contract, as found in, but without limitation, Articles 10, 11, 12, 14 and 16 of these General Conditions. CONTRACTOR and OWNER agree that the measure of damages for breach of Contract shall be the sole measure of damage used in any dispute, proceeding, arbitration and/or litigation and in every and all disagreements between them, unless expressly stated otherwise in this Contract. The Work, portions thereof, and/or disputed Work shall not be stopped, delayed, postponed and/or otherwise suspended pending the resolution of any dispute, Claim, proceeding and/or disagreement of every kind. This provision constitutes an advance waiver by CONTRACTOR of any right, if any, whenever acquired, to rescind this Contract.

**6.55 Right to Audit**

The OWNER shall have the right to review, obtain, inspect, audit and copy all the written and electronically stored records of CONTRACTOR pertaining to the Contract and/or Work and any Claim in connection with any of the foregoing. CONTRACTOR agrees to maintain such records and allow such audits for a period of up to four (4) years following the date the Notice of Completion is recorded. This provision applies equally to electronic records of the CONTRACTOR, including any records under its possession, custody or control. The audits may be performed by employees of OWNER and/or by an outside representative engaged by the OWNER. CONTRACTOR records as referred to in this Contract shall include, without limitation, any and all information, materials and data of every kind and character, such as, but not limited to, records, books, papers, documents, subscriptions, recordings, agreements, purchase orders, leases, contracts, commitments, arrangements, notes, daily diaries, superintendent reports, drawings, receipts, vouchers, memoranda, shipping invoices and/or tickets, delivery tickets, bills of lading and cost reports. Such records may also include, written policies and/or procedures, time sheets, equipment and/or material inventories, payroll registers, payroll records, cancelled payroll checks, subcontract files (including proposals and/or bids of successful and unsuccessful bidders, bid recaps, etc.), original estimates, estimating worksheets, correspondence, Change Order/Change Order Proposal! and/or Change Order request files (including documentation covering negotiated settlements), backcharge logs and supporting documentation, invoices and related payment documentation, general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends, and any other CONTRACTOR records which may have a bearing on matters of interest to the OWNER in connection with the CONTRACTOR dealings with the OWNER. CONTRACTOR shall require all of its payees (e.g., Subcontractors, suppliers, materialmen, employees, officers, directors and others) to comply with the provisions of this Article 6.55 by expressly including the requirements hereof in all written contracts with all such payees. Such requirements are to include that these flow-down right to audit provisions shall be included by such payees in all of their contracts with their Subcontractors, sub-Subcontractors, materialmen, etc.

**6.56 General Warranty and Guarantee**

**6.56.1** CONTRACTOR warrants and guarantees to OWNER, ARCHITECT, and ARCHITECT Consultants all Work shall be in accordance with the Contract Documents and will not be defective. CONTRACTOR warranty and guarantee hereunder excludes defects and/or damages caused by:

**6.56.1.1** abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or suppliers;

**6.56.1.2** normal wear and tear under normal usage.

**6.56.2** CONTRACTOR obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following shall constitute acceptance of Work not in accordance with the Contract Documents or shall serve as a release of CONTRACTOR obligations to perform the Work in accordance with the Contract Documents:

**6.56.2.1** observation by ARCHITECT or ARCHITECT Consultant;

**6.56.2.2** recommendation of any progress and/or final payment by ARCHITECT;

**6.56.2.3** issuance of a certificate of Substantial Completion, Partial Use or Occupancy or any payment by OWNER to CONTRACTOR under the Contract Documents;

- 6.56.2.4 any acceptance by OWNER or any failure to do so;
- 6.56.2.5 any review and approval of a Shop Drawing, Sample, Product Data or material list submittal or the issuance of a notice of acceptability by ARCHITECT pursuant to Article 14.12;
- 6.56.2.6 any inspection, test and/or approval by others;
- 6.56.2.7 any correction of defective Work by OWNER.

**6.57 Indemnification**

In addition to Article 6.60 and any other part of the Contract Documents, and to the fullest extent permitted by law, CONTRACTOR and its performance bond surety, shall defend, indemnify, and hold harmless OWNER, OR, OWNER employees, representatives and/or agents, OWNER Consultants from and against claims, actions, damages, losses, penalties, costs and expenses (including, but not limited to attorneys' fees and costs including fees of consultants) arising out of or resulting from performance of the Work, including but not limited to, CONTRACTOR or its Subcontractors use of the Project site; CONTRACTOR failure to pay Subcontractors and/or others; CONTRACTOR or its Subcontractors construction of the Work, or failure to construct the Work, or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnities; or any act, omission, negligence, or willful misconduct of CONTRACTOR or its Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees whether caused by the acts or omissions of CONTRACTOR, its Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether the allegations underlying such claims, action, damage, loss, penalty, cost or expense are with or without merit, true or false and whether or not caused in part by a party indemnified hereunder. Such obligations shall not be construed to negate, abridge, or reduce other rights or obligations of defense and/or indemnity, which would otherwise exist as to a party, person, or entity described herein. Nothing set forth in this Article 6.57 is intended to provide indemnification for those situations precluded by law.

**6.58 Indemnification by Subcontractors and Their Sureties**

In addition to Articles 6.57 and 6.60 and any other part of the Contract Documents, CONTRACTOR shall ensure by subcontract agreement that each Subcontractor, and each performance bond of, if any, a Subcontractor, shall defend, indemnify, and hold harmless OWNER, OR, OWNER employees, representatives and/or agents, including, without limitation, and OWNER Consultants from and against claims, actions, damages, losses, penalties, costs and expenses, including, but not limited to, attorneys' fees and costs, including consultants arising out of or resulting from: performance of the Work including but not limited to; Subcontractors use of the Project site; Subcontractors failure to pay suppliers or others; Subcontractors construction of the Work or failure to construct the Work or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment, including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the indemnities; or any act, omission, negligence, or willful misconduct of Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees whether caused by the acts or omissions of Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether the Subcontractor itself is free from fault or the allegations underlying such claim, action, damage, loss, penalty, cost or expense are with or without merit, true or false, and whether or not caused in part



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by a party indemnified hereunder. Such obligations shall not be construed to negate, abridge, or reduce other rights or obligations of defense and/or indemnity, which would otherwise exist as to a party, person, or entity described herein. Nothing set forth in this Article 6.58 is intended to provide indemnification for those situations precluded by law.

**6.59 Joint and Several Liability**

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**6.60 No Limitation on Obligations to Indemnify**

CONTRACTOR and each Subcontractor obligation to indemnify, hold harmless and defend the indemnitees under Articles 6.57 and 6.58 and shall also include, without limitation, any and all claims, actions, damages, losses, penalties, expenses and costs: for injury to persons and property and death of any person; for breach of any warranty and/or guarantees, express or implied; for failure of CONTRACTOR or Subcontractors to comply with any applicable governmental law, rule, regulation, or other requirement; and for products installed in or used in connection with the Work, except as may be precluded by statute. These obligations shall survive final payment, Final Completion, acceptance of the Work, any termination of the Contract and/or any termination of CONTRACTOR right to proceed with the Work in whole and/or in part.

**ARTICLE 7 – CONSTRUCTION BY OWNER OR BY SEPARATE WORK CONTRACT**

**7.1 OWNER Right**

OWNER reserves the right to perform the Work, portions thereof and other Work related to the Project with OWNER forces and/or to award Separate Work Contract to perform Work relative to utilities, Work and/or the Project.

**7.2 Work Not Identified in Bidding Documents**

In the event the Work is not identified in the Bidding Documents and upon the election to perform Work with OWNER forces or by Separate Work Contract, OR shall provide notice to CONTRACTOR prior to commencing any such Work. If CONTRACTOR believes the performance thereof justifies an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall provide notice to ARCHITECT and OR who shall promptly investigate. OR may, in consideration of, but not limited to, the recommendation of ARCHITECT, issue a Construction Directive. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

**7.3 Work Identified in Contract Documents:**

If the Work or a portion thereof is identified in the Contract Documents and upon OWNER election to perform the Work or a portion thereof with OWNER forces or Separate Work Contract, OWNER may, in addition to the OWNER rights as set forth in Article 10, proceed in accordance with, but not limited to, Articles 15.2 through 15.4.

**7.4 CONTRACTOR Duties and Responsibilities**

CONTRACTOR duties and responsibilities are to:

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- 7.4.1 CONTRACTOR shall make any revisions necessary to the Preliminary and Detailed Construction Schedules to coordinate, sequence and schedule Work activities associated with the Project, including but not limited to Work by the CONTRACTOR, OWNER forces and/or Separate Work Contract(s).
- 7.4.2 Allow the delivery and storage of materials and/or equipment of OWNER forces and/or Separate Work Contract.
- 7.4.3 Not hinder or otherwise delay any Work associated with the Project.
- 7.4.4 Subject to the provisions of Section 7.4.6 or as provided otherwise in the Contract Documents and in order to fully integrate the Work of OWNER forces and/or Separate Work Contract, CONTRACTOR shall perform all cutting, fitting, patching and connecting of the Work with and to the Work of OWNER forces and/or Separate Work Contract. CONTRACTOR shall seek, and not be subject to unreasonable withholding of written consent from ARCHITECT and/or Separate Work Contract prior to cutting, excavating, and/or otherwise altering Work of OWNER forces and/or Separate Work Contract.
- 7.4.5 If the Contract Documents specify cutting, fitting, patching and connecting of the Work is performed by OWNER forces and/or Separate Work Contract, CONTRACTOR shall not unreasonably withhold consent to cutting, fitting, patching or otherwise altering Work of CONTRACTOR.
- 7.4.6 If any part of the Project depends upon Work of OWNER forces and/or Separate Work Contract, CONTRACTOR shall examine and immediately provide notice to ARCHITECT and OR of any defective Work in the Work of OWNER forces and/or Separate Work Contract rendering it unsuitable for the proper execution of subsequent CONTRACTOR Work. Failure of CONTRACTOR to provide notice shall constitute acceptance of preceding Work as fit and proper for execution of subsequent Work. ARCHITECT and OR shall promptly investigate and the OR may, in consideration of, but not limited to, the recommendation of ARCHITECT, issue a Construction Directive to CONTRACTOR, OWNER forces and/or Separate Work Contract. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.
- 7.4.7 [Intentionally left blank]
- 7.4.8 CONTRACTOR shall not damage or otherwise endanger the Work and/or property of OWNER forces and/or Separate Work Contract. In the event CONTRACTOR causes damage or is deemed responsible by the OR for the cause of damage to Work and/or property of OWNER forces and/or Separate Work Contract, OR may issue a Construction Directive to immediately remedy such damage. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.
- 7.4.9 CONTRACTOR shall be completely responsible for, and shall provide all means, methods and materials to fully protect and/or otherwise prevent damage to the Work until Substantial Completion.

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7.4.10 If OWNER elects to perform any portion of the Work as per Articles 7.2 and/or 7.3, CONTRACTOR shall perform and/or otherwise continue to perform the remaining portions of the Work and shall fully comply with CONTRACTOR obligations as set forth in Article 6.54.

#### 7.5 **OWNER Roles**

OWNER roles are to:

7.5.1 participate in, or cause participation in, the coordination, sequencing and scheduling of CONTRACTOR activities relative to the Work, Work of OWNER forces and/or Separate Work Contract;

7.5.2 [Intentionally left blank]

7.5.3 relative to the Work, Work of OWNER forces and/or Separate Work Contract;

7.5.4 not hinder or otherwise delay the Work of CONTRACTOR, OWNER forces and/or Separate Work Contract.

### ARTICLE 8 - OWNER DUTIES, RIGHTS AND RESPONSIBILITIES

#### 8.1 **OWNER Representative**

OWNER Representative (OR) is the OWNER representative during the Work, or any portion thereof, who will be identified at the initial job start meeting as provided in Article 2.6.2. The duties, responsibilities and authority limits of the OWNER Representative are as set forth in the Contract Documents.

8.8.1 OWNER shall be represented by the OR. OR is the OWNER's Representatives in providing the services required to manage the Contract between OWNER and CONTRACTOR, and the agreement between ARCHITECT and OWNER. CONTRACTOR shall ensure: (i) that all changes in CONTRACTOR services or Work to be performed shall only be allowed pursuant to written agreement or direction; (ii) that all contractually binding communications with OWNER shall be through OR; and (iii) that in the event CONTRACTOR receives any communication from an employee or other representative of OWNER, CONTRACTOR will immediately advise OR of the content of said communication after receipt of said communication by CONTRACTOR.

8.8.2 In providing the services required to manage the Contract between OWNER and CONTRACTOR and the agreement between the ARCHITECT and OWNER, OR shall endeavor to maintain a working relationship with the ARCHITECT and CONTRACTOR on behalf of OWNER. However, nothing herein should be construed to mean or imply that OR or OWNER assumes any of the responsibilities or duties of the ARCHITECT or CONTRACTOR or that the OWNER waives any rights to strictly enforce the obligations of the ARCHITECT or CONTRACTOR under the applicable contracts. The ARCHITECT shall be solely and exclusively responsible for the design aspects of the Project. The ARCHITECT shall design and inspect the Project in accordance with the agreement between the ARCHITECT and OWNER. CONTRACTOR shall be solely and exclusively responsible for the construction aspects of the Project, including all means, methods, techniques, sequences and procedures used in construction of the Project in accordance with the Contract between CONTRACTOR and OWNER.

**8.2 Communication by OWNER**

Unless noted otherwise, OWNER shall issue all OWNER communications to CONTRACTOR, ARCHITECT, and/or others, through the OR.

**8.3 ARCHITECT Replacement**

In case of termination and/or replacement of ARCHITECT, OWNER has the right to engage the professional services of an ARCHITECT or may perform ARCHITECT duties and responsibilities with ARCHITECT of direct OWNER employment. The status of the replacement ARCHITECT shall be as of original ARCHITECT as defined within the Contract Documents.

**8.4 Removal of Staff**

OWNER shall have the right, but not the obligation, to require the removal from the Work any superintendent, staff member, agent, or employee of CONTRACTOR, Subcontractor, vendor, and material or equipment supplier for cause.

**8.5 Access to Lands, Reference and Reports**

OWNER duties in respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Article 4.4.

**8.6 Hazardous Materials, Substances, Wastes, Lead Based Paint and Petroleum**

OWNER responsibility in respect of undisclosed Asbestos, PCB's, Petroleum, Hazardous Materials, Hazardous Substances, Hazardous Wastes, Lead Based Paint, Radioactive Materials uncovered, revealed and/or exposed at the Project site are as set forth in Articles 4.5 and 4.6.

**8.7 Insurance**

OWNER may provide additional insurance as it deems necessary. However, nothing stated in this Agreement shall require OWNER to carry insurance or in any manner waive its right to assert sovereign immunity.

**8.8 Right to Audit**

OWNER right to audit as set forth in Article 6.55.

**8.9 Safety Precautions and Programs**

OWNER has no duty, responsibility or obligation for any and/or all safety precautions and/or programs as specified in Article 6 except which is expressly called out in the Contract Documents.

**8.10 Right to Perform Work**

OWNER rights to perform the Work or portions thereof are as set forth in Articles 7 and 15.

**8.11 Direct Additions, Deletions or Revisions to the Work**

OWNER rights to direct additions, deletions and/or revisions to the Work are as set forth in Article

10.

**8.12 Provide Tests and Inspections**

OWNER responsibility in providing certain tests, inspection and approvals are as set forth in Article 13.

**8.13 Furnish Data, Information and Services**

OWNER shall promptly furnish all data, information and services required of OWNER under the Contract Documents and shall make payments to CONTRACTOR promptly when they are due as set forth in Article 14.

**8.14 Suspend, Delay, Interrupt, Disrupt, Re-sequence Work**

OWNER right to suspend the Work is as set forth in Article 15.

**8.15 Terminate Right to Proceed with the Work**

OWNER right to terminate CONTRACTOR right to proceed with the Work is as set forth in Article 15.

**8.16 Terminate Contract for Convenience**

OWNER right to terminate Contract for OWNER convenience is as set forth in Article 15.

**8.17 Assess Costs, Expenses and/or Damage**

OWNER has the right to assess costs, expenses and/or damages against Contract funds, the CONTRACTOR, and/or the performance bond.

**8.18 Means, Methods and Techniques**

OWNER has no duty, responsibility or obligation to supervise, direct, control or have authority over, CONTRACTOR means, methods, techniques, sequences, and/or procedures of construction unless otherwise specified in the Contract Documents.

**8.19 Laws and Regulations**

OWNER has no duty, responsibility or obligation for CONTRACTOR failure to comply with applicable laws and regulations in furnishing of or performance of the Work.

**8.20 Furnishing and Performance of Work**

OWNER has no duty, responsibility or obligation for CONTRACTOR failure in furnishing of or performance of the Work in strict accordance with the Contract Documents.

**8.21 Safety Evaluation and a Contractor Performance Evaluation**

OWNER has the right to perform and complete a Safety Evaluation and a Contractor Performance Evaluation at the end of the Project and at any time during the course of the Project.

**8.22 Other OWNER Rights**

Other OWNER rights, duties and responsibilities not expressly set forth in this Article.

## **ARTICLE 9 - ARCHITECT ROLE DURING CONSTRUCTION**

### **9.1 ARCHITECT - General**

The authority and limitations of ARCHITECT during construction of the Work are as set forth in the Contract Documents and shall not be extended, waived, altered or diminished without written consent of ARCHITECT and OR. ARCHITECT has the responsibilities and authority established by law.

### **9.2 Periodic Site Visits**

ARCHITECT will periodically visit the Project site as determined by OR in order to observe and witness the general progress and quality of the Work of CONTRACTOR. ARCHITECT periodic observation of the Work on behalf of OWNER is to provide general determinations if the Work is proceeding in accordance with the Contract Documents. ARCHITECT is not obligated to perform continuous on site Project inspections in order to determine the quality of materials and/or quantities of Work. Based on such periodic visits and observations, ARCHITECT shall provide written communications to the OR detailing the overall progress of the Work and any observed defective Work of CONTRACTOR. ARCHITECT visits and on site Project observations are subject to all limitations on ARCHITECT authority and responsibility as set forth in Articles 9.12 through 9.16, and particularly, but without limitation, during or as a result of ARCHITECT on site visits or observations of Work of CONTRACTOR, ARCHITECT will not supervise, direct, control or have authority over or be responsible for CONTRACTOR 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 furnishing or performance of the Work.

### **9.3 ARCHITECT Project Representative**

If OR and ARCHITECT agree to, ARCHITECT shall furnish an on site ARCHITECT project representative or other staff representatives who shall provide more continuous observation of the Work, Project or portion thereof. The levels and limitations of authority, duties and responsibilities of ARCHITECT project representative and related staff shall be as set forth, but not limited to, this Article. However, nothing in this paragraph shall require OWNER to provide an on-site ARCHITECT project representative.

### **9.4 Request for Information of the Contract Documents**

**9.4.1** ARCHITECT shall provide the OR, within a reasonable time, clarifications and/or interpretations of the Contract Documents binding on CONTRACTOR and OWNER for the purposes of proceeding with the Work. Clarifications and/or interpretations may be in the form of drawings and/or other written instruments as determined by ARCHITECT, which will be reasonably inferable from and consistent with the intent of the Contract Documents.

**9.4.2** A Request for Information shall be prepared by CONTRACTOR and submitted by CONTRACTOR to ARCHITECT with concurrent copy to OR. A Request for Information shall be submitted:

**9.4.2.1** a minimum of nine (9) days prior to commencement of any Work indicated in the Detailed Construction Schedule, in order to clarify the intent of the Contract

Documents relative to the Work;

**9.4.2.2** upon discovery of minor conflicts or discrepancies in the Work discovered during actual performance of the Work.

**9.4.3** A Request for Information shall be prepared on an OWNER supplied form and shall reference all the applicable Contract Documents including division and/or Specification section, detail number, Drawing and/or plan designation. ARCHITECT shall provide the OR with a response to a Request for Information within seven (7) days after receiving a request pursuant to Articles 9.4.2.1 and 9.4.2.2., and OR shall provide a response to the CONTRACTOR within nine (9) days after receipt of a Request for Information pursuant to Articles 9.4.2.1 and 9.4.2.2.

**9.4.4** Responses completed within the time limits as specified in Article 9.4.3 shall not give rise to or establish the basis for any Claim seeking adjustment to the Contract Amount, Milestones and/or Contract Time based on, but without limitation, for any damages due to delay, acceleration, disruption, hindrance or similar causes.

**9.4.5** A Request for Information submitted by CONTRACTOR outside the time limits as specified in Article 9.4.2.1 shall not give rise to or establish the basis for any Claim seeking adjustment to the Contract Amount, Milestones and/or Contract Time based on, but without limitation, delay, acceleration, disruption, hindrance and/or similar causes.

**9.4.6** In the event CONTRACTOR believes the information and/or interpretations as provided in the response to the Request for Information establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, the directives of the OR shall be final for the purpose of proceeding with the Work. If CONTRACTOR believes a Construction Directive and/or a response as provided in the Request for Information establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of receipt of the response to the Request for Clarification.

**9.5 *Authorized Minor Variations in the Work***

ARCHITECT may direct and OR may authorize minor variations in the technical aspects of the Work from the requirements of the Contract Documents. Authorized minor variations in the Work shall be consistent with the overall intent of the design concept of providing a complete functioning Project. Minor variations in the Work directed by ARCHITECT and authorized by OR may be accomplished by issuance of a Construction Directive. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

**9.6 *Disapproval or Rejection of Defective Work***

ARCHITECT has authority to recommend to OR disapproval of and/or rejection of Work deemed defective or Work ARCHITECT deems will not result in a complete Project as indicated in the Contract Documents. ARCHITECT has authority to require additional testing and/or special inspection of the Work as set forth in Article 13.9, whether or not such Work is fabricated, installed and/or completed.

***Shop Drawings, Change Order Proposals, Construction Directive and Payments***

- 9.7 In regards to ARCHITECT duties relative to Shop Drawings, Product Data, material lists and Samples reference is made to the provisions of Article 6.
- 9.8 In regards to ARCHITECT duties relative to Request for Proposals, Change Order Proposals, Construction Directive and Change Order, reference is made to Articles 10, 11, and 12.
- 9.9 In regards to ARCHITECT duties relative to Applications for Payment reference is made to Article 14.

9.10 **Unit Prices:**

ARCHITECT will review and make recommendations to OR of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR.

9.11 **Disputes, Disagreements and other Matters**

ARCHITECT shall serve as the initial interpreter of the requirements of the Contract Documents, acceptability of the Work thereunder and proposed adjustments to the Contract Amount, Milestones and/or Contract Time. Disputes, disagreements and other matters relating to the acceptability of Work, interpretations of the Contract Documents pertaining to the performance of and furnishing of the Work or proposed adjustments to the Contract Amount, Milestones and/or Contract Time will be referred initially to ARCHITECT with concurrent copy to OR, ARCHITECT shall render a formal recommendation to OR whose decision shall be final and binding on CONTRACTOR for the purpose of proceeding with the Work. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

**Limitations of ARCHITECT Duty and Authority**

- 9.12 Neither ARCHITECT authority, nor a recommendation made in good faith either to exercise or not to exercise such authority, shall give rise to a duty or responsibility of ARCHITECT to CONTRACTOR, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.
- 9.13 ARCHITECT will not supervise, direct, control, have authority over or in any way be responsible for the means, methods, techniques, sequences and/or procedures of CONTRACTOR, or the safety precautions and programs of CONTRACTOR, or for any failure by CONTRACTOR to comply with laws and regulations applicable to the furnishing of or performance of the Work. ARCHITECT shall not be responsible for the failure of CONTRACTOR to furnish and/or perform the Work in accordance with the Contract Documents.
- 9.14 ARCHITECT shall not be responsible for acts and/or omissions of CONTRACTOR, Subcontractor, supplier or of any other persons and/or organizations furnishing and/or performing any of the Work.
- 9.15 ARCHITECT review of the application for final payment and accompanying documentation and all maintenance and operation manuals, project record documents, Detailed Construction Schedule, certificates and test results, approvals, guarantees and warranties, and other documentation required to be delivered as per Article 14.19 will only be to generally determine the content complies with the requirements of, and in case of tests, approvals and certificates of inspection, the results certified indicate compliance with the Contract Documents.



- 9.16 The limitations of authority and responsibility as set forth in Articles 9.12 through 9.15 shall also apply to ARCHITECT Consultant, ARCHITECT project representative and assistants.

## ARTICLE 10 - CHANGES IN THE WORK

### 10.1 ***OWNER Right to Add, Delete or Revise the Work***

Without negating the Contract or providing notice to any surety, and at any time and/or times, OR has the right to direct additions, deletions, and/or revisions in the Work. A Change Order or Construction Directive shall serve to authorize additions, deletions and/or revisions in the Work. CONTRACTOR, upon receipt of any such document shall immediately proceed with the Work to be performed under the applicable conditions of the Contract Documents.

### 10.2 ***CONTRACTOR not Entitled to Change in Contract Amount, Milestones and/or Contract Time***

CONTRACTOR shall not be entitled to an increase in the Contract Amount, Milestones and/or Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in Articles 3.16.1 and 3.16.2 except in case of emergency as set forth in Article 6.46 or in the case of uncovering Work as set forth in Article 13.17.2.

### 10.3 ***Request for Proposal***

A Request for Proposal may be issued to CONTRACTOR along with any necessary Drawings and Specifications as determined by ARCHITECT. CONTRACTOR shall, within the specified time periods, provide a Change Order Proposal which contains proposed adjustments to the Contract Amount, Milestones and/or Contract Time reflective of the Work specified in the Request for Proposal.

### ***Construction Directive***

- 10.4 A Construction Directive shall not adjust the Contract Amount, Milestones and/or Contract Time but may lead to a Change Order Proposal.

- 10.5 Upon OR issuance of a Construction Directive, CONTRACTOR shall promptly comply with the directives set forth herein.

- 10.6 If CONTRACTOR believes an OWNER issued Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

### ***Change Order Proposal***

- 10.7 A Change Order Proposal shall include all estimates, breakdowns, and costs, data and/or information required in order to validate a proposed adjustment in the Contract Amount, Milestones and/or Contract Time. CONTRACTOR shall not be entitled to any adjustment in the Contract Amount, Milestones and/or Contract Time for preparing a Change Order Proposal whether ultimately accepted or not.

- 10.8 ARCHITECT shall serve as the initial interpreter of proposed adjustments to the Contract Amount, Milestones and/or Contract Time. ARCHITECT shall review labor, material and equipment costs and proposed adjustments to the Milestones and/or Contract Time and shall render a

recommendation to OR whose decision shall be final for the purpose of proceeding with the Work.

- 10.9 If CONTRACTOR and OR agree on all the proposed adjustments, if any, in the Contract Amount, Milestones and/or Contract Time contained within an additive and/or deductive Change Order Proposal, OR shall direct issuance of a Change Order for mutual execution by the parties.
- 10.10 If CONTRACTOR and OR are only able to achieve partial agreement on the proposed adjustments in the Contract Amount, Milestones and/or Contract Time contained within an additive Change Order Proposal, then OR shall direct issuance of a Change Order for mutual execution by the parties setting forth those undisputed adjustments in the Contract Amount, Milestones and/or Contract Time. CONTRACTOR shall, within ten (10) days of OR issuance of the Change Order, file a Claim as set forth in Article 16 for any remaining disputed portions of the Change Order Proposal.
- 10.11 If OR rejects an additive Change Order Proposal in its entirety, CONTRACTOR shall, within ten (10) days of OR issuance of the written rejection of the Change Order Proposal, file a Claim as provided for in Article 16.
- 10.12 If CONTRACTOR proposes no adjustments to the Contract Amount, Milestones and/or Contract Time or if OR believes the CONTRACTOR proposed adjustments to the Contract Amount, Milestones and/or Contract Time are insufficient, OR shall file a Claim as set forth in Article 16.

**Change Order**

- 10.13 A Change Order shall not have any reservation of rights and/or qualifying language placed on any Change Order.
- 10.14 OR and CONTRACTOR shall execute appropriate Change Orders covering:
  - 10.14.1 changes in the Work ordered pursuant to, but not limited to, Article 10.1;
  - 10.14.2 changes in the Contract Amount, Milestones and/or Contract Time which are agreed to by the parties;
  - 10.14.3 changes in the Contract Amount, Milestones and/or Contract Time which embody the substance of any decision rendered pursuant to Article 16. However, if CONTRACTOR fails or refuses to execute a Change Order within ten (10) days of OR issuance, CONTRACTOR shall file a written Claim in accordance with Article 16. Notwithstanding the filing of such a Claim, CONTRACTOR shall proceed with the Work as set forth in Article 6.54.

**ARTICLE 11 - CHANGE OF CONTRACT AMOUNT**

**11.1 Contract Amount**

The Contract Amount constitutes the total compensation, subject to authorized adjustments, payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR under the Contract shall be at expense of CONTRACTOR without change in the Contract Amount.

**11.2 Change of Contract Amount**

The Contract Amount can only be changed by Change Order to the Contract.

**11.3 Cost of Work Relative to Contract Amount, Milestones and/or Contract Time**

The Cost of the Work for any adjustment to the Contract Amount relative to Article 12.6 shall be determined in accordance with the requirements of Articles 11.5, 11.6, and 11.7.

**11.4 Value of the Work**

The value of any Work covered by a Change Order Proposal or a Change Order shall be determined as follows:

**11.4.1** where the Work involved is covered by unit prices contained within the Contract Documents, by application of such unit prices to the quantities of the items involved, subject to the provisions of Articles 11.9 through 11.12 inclusive;

**11.4.2** where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum based on the Cost of the Work as determined by Articles 11.5 and 11.6 plus a CONTRACTOR fee for overhead and profit as determined in Article 11.7;

**11.4.3** where the Work involved is not covered by unit prices contained in the Contract Documents and agreement is not reached under Article 11.4.2, on the basis of Cost of the Work as set forth in Article 11.8 and determined by Articles 11.5 and 11.6 plus a CONTRACTOR fee for overhead and profit as determined in Article 11.7;

**11.4.4** as determined in accordance with the applicable provisions of Article 16.

**11.5 Cost of the Work**

The term 'Cost of the Work' means the sum of all direct and indirect costs necessarily incurred and paid for by CONTRACTOR in the proper furnishing and/or performance of the Work, Except as otherwise may be agreed to by OR, such costs shall be in amounts no higher than those prevailing in the locality of the Work and/or Project and shall only include the following items and shall not include any of the costs in Article 11.6:

**11.5.1** the actual payroll costs for employees in direct employ of CONTRACTOR in the performance of Work. Such employees shall include project managers, superintendents, foreman and other personnel employed full time at the Project site. Payroll costs for project managers not employed full time on the Work shall be apportioned on the basis of their time spent on the Project site. Payroll costs shall include salaries and wages, costs of fringe benefits including social security contributions, unemployment insurance, excise and payroll taxes, old age, and fringe benefits required by agreement. The expenses of performing Work after regular hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OR;

**11.5.2** cost of all materials and equipment furnished and incorporated into the Work, including costs of transportation, loading and unloading, storage and the cost of supplier's field services in connection therewith. All cash discounts, trade discounts, rebates and refunds and returns from sale of surplus materials and/or equipment shall accrue to OWNER and CONTRACTOR shall make provisions so they may be obtained by OWNER;

**11.5.3** payments made by CONTRACTOR to Subcontractors for Work furnished and/or performed by Subcontractors. If required by OR, CONTRACTOR shall obtain competitive bids from Subcontractors and shall deliver such bids to OR. OR shall, upon

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recommendation of ARCHITECT, determine which bid shall be accepted. Subcontractor Cost of the Work and fee shall be determined in the same manner as for CONTRACTOR Cost of the Work and fee as provided for in Articles 11. 5, 11.6, and 11.7. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable;

- 11.5.4 costs of consultants such as surveyors, testing agencies, engineers, architects, attorneys, and accountants employed for services specifically related to the Work.
- 11.5.5 Supplemental costs including the following:
  - 11.5.5.1 cost, including transportation, delivery and storage of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the Project site and hand tools not owned by the workers which are consumed in the performance of the Work;
  - 11.5.5.2 rentals of all construction equipment and machinery whether rented by CONTRACTOR or others in accordance with rental agreements approved by OR, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof, all in accordance with the terms of said rental agreements. The rental of any such equipment, machinery shall cease when the use thereof is no longer required for the Work;
  - 11.5.5.3 sales, consumer, use and/or similar taxes related to the Work, and for which CONTRACTOR is responsible for as imposed by laws and regulations;
  - 11.5.5.4 royalty payments and fees for permits and licenses;
  - 11.5.5.5 the cost of utilities, fuel and sanitary facilities at the Project site;
  - 11.5.5.6 minor expenses such as telegrams, long distance phones calls, and telephone service at the Project site;
  - 11.5.5.7 cost of premiums for additional bonds required because of changes in the Work.

#### **11.6 Cost of the Work to Exclude**

The term Cost of the Work shall not include any of the following:

- 11.6.1 payroll costs and other compensation of CONTRACTOR officers, executives, principals, owners, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR for general administration of the Work all of which are considered to be administrative costs covered by the CONTRACTOR fee;
- 11.6.2 expenses of CONTRACTOR principal and branch offices of other than CONTRACTOR office located at the Project site;
- 11.6.3 any part of CONTRACTOR capital expenses, including interest on CONTRACTOR capital employed for the Work and charges against CONTRACTOR for delinquent payments;
- 11.6.4 cost of premiums for all bonds and for all insurance of CONTRACTOR that is not directly required for the Work being performed under the Contract Documents or the cost of premiums covered by Article 11.5.5.7;

- 11.6.5 costs due to negligence of CONTRACTOR, any Subcontractor, or anyone else 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 furnished in error and the repair and/or replacement of any damage to property;
- 11.6.6 other overhead or general expense costs of any kind and the costs of any item not specifically and expressly set forth in Article 11.5.

**11.7 CONTRACTOR Fee**

The CONTRACTOR fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

- 11.7.1 a fee based on the following percentages of the various portions of the Work;
  - 11.7.1.1 for costs incurred under Articles 11.5.1 and 11.5.2 the CONTRACTOR fee shall be fifteen (15) percent;
  - 11.7.1.2 where one or more tiers of Subcontractors are included in the change the intent of Articles 11.5.1, 11.5.2, 11.5.3 and 11.7.1 is that the Subcontractor who actually performs or furnishes the Work, at whatever tier, will be paid a fee of fifteen (15) percent of the costs incurred by such Subcontractor under Articles 11.5.1 and 11.5.2 and that any higher Subcontractor and CONTRACTOR will each be paid a fee of five (5) percent of the amount paid to the next lower tier Subcontractor;
  - 11.7.1.3 no fee shall be payable on the basis of costs itemized under Articles 11.5.4, 11.5.5 and 11.6,
  - 11.7.1.4 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 the CONTRACTOR fee by an amount equal to five (5) percent of such net decrease;
  - 11.7.1.5 when both additions and credits are involved in any one change, the adjustment in CONTRACTOR fee shall be calculated on the basis of the net change in accordance with Articles 11.7.1.1 through 11.7.1.4 inclusive.

**11.8 Time and Material**

Whenever the Cost of the Work is to be determined in accordance with Article 11.4.3, CONTRACTOR shall maintain records thereof in accordance with generally accepted accounting practices and shall submit the itemized cost breakdown to OR in the following form:

**11.8.1 Daily Time and Material Record:**

At the close of each work day, CONTRACTOR shall submit a daily time and material record, on a form prescribed by OWNER, to the OR , together with applicable delivery tickets, listing all labor, employees names, hours worked, wage classifications, materials, quantities, equipment size, type and identification number, and supplies involved for said work day, the location of the affected portion of the Work, for services and expenditures as authorized under Articles 11.5 and 11.7. An attempt shall be made to reconcile the daily

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time and material record, and the OR and the CONTRACTOR shall sign it. In the event of disagreement, each party to explain points, which cannot be resolved immediately, shall enter pertinent notes. Each party shall retain a signed copy of the daily time and material record. Daily time and material records of Subcontractors or others shall only be submitted through the CONTRACTOR.

### **Unit Prices**

- 11.9** Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, the initial Contract Amount shall be deemed to include 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 each item as indicated in the Bidding Documents. 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 Amount. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by OR in accordance with Article 9.10.
- 11.10** Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to fully cover all overhead and profit for each separately identified item.
- 11.11** OR or CONTRACTOR may request, by appropriate Change Order Proposal, an adjustment in the Contract Amount if:
- 11.11.1** 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 Contract;
  - 11.11.2** there is no corresponding adjustment with respect to any other item of Work;
  - 11.11.3** if CONTRACTOR believes CONTRACTOR is entitled to an increase in the Contract Amount as a result of having incurred additional expense or OR believes that OWNER is entitled to a decrease in the Contract Amount.
- 11.12** If CONTRACTOR or OR cannot agree on terms of a Change Order Proposal as set forth in Article 11.11, CONTRACTOR and OR shall proceed in accordance with Articles 10.10, 10.11 or 10.12.

## **ARTICLE 12 – CHANGE OF CONTRACT TIME**

### **12.1 General**

All time limits stated in the Contract are of the essence of the Contract. The Contract Time and/or Milestones can only be changed by a Change Order.

### **12.2 Non-Compensable Delays/Disruptions/interferences/Hindrances/Accelerations**

CONTRACTOR and OWNER shall each be entitled to a non-compensable adjustment in the Milestones and/or Contract Time for any unreasonable delays, disruptions, interferences, hindrances, and/or accelerations in the Work due to any issues, events, conditions, circumstances and/or causes beyond their respective control, including but not restricted to, acts of god, acts of public enemy, acts of governmental entities, fires, floods, epidemics, quarantine restrictions, strikes, unusually severe weather as defined in the Division 01 General Requirements, the discovery of any archeological findings, or acts or neglect of utility companies. In addition to whatever the law may

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define as non-compensable delays, disruptions, interferences, hindrances, and/or accelerations, the parties also define these force majeure type events, and all such similar events, whether referred to herein or not, as "non-compensable — excusable delays, disruptions, interferences, hindrances, and/or accelerations." The sole remedy of CONTRACTOR and/or OWNER for such delays, disruptions, interferences, hindrances, and/or accelerations shall be an adjustment to the Milestones and/or Contract Time. Separate from the foregoing, CONTRACTOR and OWNER agree that an adjustment in the Milestones and/or Contract Time shall also be the sole remedy of each party for any mutually occurring and/or concurrent delays, disruptions, interferences, hindrances, and/or accelerations in the Work, even if such arise from causes, events, conditions, and/or circumstances within their respective control, provided that such delays, disruptions, interferences, hindrances, and/or accelerations are what is commonly referred to in the industry and at law as concurrent delays" or provided that such delays, disruptions, interferences, hindrances, and/or accelerations in fact occur concurrently during the Work, even if they arise from different causes, events, conditions, and/or circumstances, in whole or in part.

**12.3 OWNER Caused Compensable Delays/Disruptions/Interferences/Hindrances/A accelerations**

CONTRACTOR shall be entitled to additional compensation for any delays, disruptions, interferences, hindrances, and/or accelerations in the Work due to any issues, events, conditions, circumstances, and/or causes within the respective control of OWNER or created by third persons for whom the OWNER is responsible for, which were unforeseeable at the time of contracting and are unreasonable under the circumstances of the Project, provided that, CONTRACTOR complies with the notice provisions of this Contract. The parties acknowledge that damages arising from unreasonable and unforeseeable delays, disruptions, interferences, hindrances, and/or accelerations on a complex construction Project involve an enormous amount of factual information, are very expensive in terms of time and money to address and/or litigate, and irreparably deprive and detract from the time and attention required of the Project participants to successfully construct the Work. The parties acknowledge this is such a Project. Therefore, the parties establish the procedures set forth in Articles 12.4 through 12.6, and in Article 16, as the exclusive procedures for fully and finally resolving any and all damages to the CONTRACTOR, its Subcontractors and/or any persons who may claim under and/or through them, of every nature, type and kind, arising in whole or in part from such unreasonable and unforeseeable delays, disruptions, interferences, hindrances, and/or accelerations.

**12.4 Initial Notice of Start of Issue, Event, Condition, Circumstance, and/or Cause of Perceived or Actual Delay/Disruption/Interference/Hindrance/Acceleration**

If CONTRACTOR and/or its Subcontractor, encounter any issue, event, condition, circumstance and/or cause of a perceived and/or actual delay, disruption, interference, hindrance, and/or acceleration to the Work, or any portion thereof, CONTRACTOR shall provide a written notice to OR, utilizing a notice form provided by OWNER. The notice shall be transmitted to OR upon the date of discovery or no later than three (3) days after first encountering the issue, event, condition, circumstance, and/or cause. The notice shall supply all the information required by the provided form. CONTRACTOR shall also raise the issue, event, condition, circumstance and/or cause of a perceived and for actual delay, disruption, interference, hindrance, and/or acceleration at the first Project meeting with OR following the date of discovery of the issue, event, condition, circumstance, and/or cause. The matter shall be carried in the meeting minutes until resolved.

**12.5 Final Notice of End of Issue, Event, Condition, Circumstance, and/or Cause of Perceived or Actual Delay/Disruption/Interference/Hindrance/Acceleration**

Within three (3) days of the ending of the issue, event, condition, circumstance, and/or cause referred to in Article 12.4, CONTRACTOR shall provide written notice to OR , on an OWNER

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provided form, notifying OR of the date on which the issue, event, condition, circumstance, and/or cause ended. If CONTRACTOR fails to provide notice to OR then OR shall provide said notice to CONTRACTOR and CONTRACTOR shall provide all other information required by the form. If CONTRACTOR contends the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, then CONTRACTOR shall proceed as required by Article 12.6.

***Change Order Proposal Seeking Adjustment of Contract Amount, Milestones and/or Contract Time Based Upon Compensable Delay/Disruption/Interference/Hindrance/Acceleration***

**12.6** Within thirty five (35) days of a notice being issued by OR or CONTRACTOR pursuant to Article 12.5, if CONTRACTOR contends that the issue, event, condition, circumstance, and/or cause entitles CONTRACTOR to an adjustment of the Contract Amount, Milestones and/or Contract Time, then CONTRACTOR shall prepare and submit to ARCHITECT and OR, a Change Order Proposal pursuant to the requirements of Articles 10.7 through 10.12, inclusive, and Articles 11.3 through 11.7, inclusive, as applicable. The Change Order Proposal shall also identify all secondary and/or residual scopes of work/trades, if any, that will be or are likely to be impacted by the issue, event, condition, circumstance, and/or cause for which costs and/or time impacts could not be provided or estimated. Should CONTRACTOR identify such secondary and/or residual scopes of work/trades, CONTRACTOR shall state with specificity why and how, such scopes/trades, will, or are likely to be impacted and why CONTRACTOR cannot provide actual and or estimated cost and/or time impacts at the time the Change Order Proposal is submitted. Should CONTRACTOR fail or refuse to submit a Change Order Proposal as required by this Article 12.6 and/or fail or refuse to comply with the notice and other requirements of this Article 12, CONTRACTOR admits that it would be depriving OWNER of an opportunity to timely mitigate the issue, event, circumstance, condition and/or cause. As such, CONTRACTOR failure and/or refusal to follow the requirements of this Article 12 are an admission CONTRACTOR is not entitled to any adjustment in the Contract Amount, Milestones and/or Contract Time and CONTRACTOR has agreed to waive, relinquish and release any and all Claims in connection therewith.

**12.7** Nothing in this Article 12 alters, impairs, precludes, changes or modifies, in any way, other OWNER rights to additional compensation expressly set forth elsewhere in the Contract Documents. Nothing in this Article 12 alters, impairs, precludes, changes or modifies, in any way, CONTRACTOR obligation to include all costs, both direct and indirect, into a Change Order Proposal and/or Change Order, pursuant to the Contract.

**12.8 *Contractor Caused Compensable Delay***

It is agreed by OWNER and CONTRACTOR that, because it would be impracticable and extremely difficult to fix the actual damages to the OWNER should the Work not be completed in accordance with the specified Milestones and/or Contract Time, plus any authorized adjustments to the Milestones and/or Contract Time, there shall be assessed as liquidated damages, not as a penalty, but rather an approximation of all such damages, the parties establish the sums shown in Section 01010 – Phasing of the Work, Appendix A as the amount of liquidated damages for each day thereafter the Work remains incomplete beyond the Milestones and/or Contract Time, plus any authorized adjustments. The OWNER shall have the right to assess liquidated damages against Contract funds, the CONTRACTOR, and/or the performance bond.

**ARTICLE 13 - TESTING AND INSPECTION; DEFECTIVE WORK**

**13.1 *Notice of defective Work***

Although, OR, ARCHITECT, ARCHITECT Consultant or Inspectors have no obligation to discover



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or search for defective Work, if OR, ARCHITECT, ARCHITECT Consultant or Inspectors having jurisdiction acquire actual knowledge of any defective Work, the OR shall promptly notify the CONTRACTOR. Any or all defective Work may be rejected, corrected and/or accepted in accordance with the terms set forth in Articles 13 and 15.

### **13.2 Access to the Work**

CONTRACTOR shall provide access at any time to the Work, products, equipment, materials and/or fabrications of the Work, wherever same are stored, fabricated, erected or installed, when directed to do so by OR, ARCHITECT, ARCHITECT Consultant, other OWNER personnel, representatives of testing and inspection agencies and other governmental entities having jurisdiction over the Work. CONTRACTOR shall provide sufficient, safe, proper access to, labor and facilities to prepare for and take samples for testing and/or inspection of products, equipment, and materials or fabrications of the Work.

### **13.3 Inspector of Record**

Inspectors from government entities having jurisdiction over the Work and the OR shall have free access to any and all parts of the Work at any time. CONTRACTOR shall furnish Inspectors and OR such information and facilities as may be necessary to keep Inspectors and OR fully informed regarding progress, manner of Work and character of materials. Such observations shall not, in any way, relieve CONTRACTOR from responsibility for full compliance with all terms and conditions of the Contract Documents or be construed to lessen to any degree CONTRACTOR responsibility for providing efficient and capable superintendence of the Work. Inspectors are not authorized to make changes in the Contract Documents, including, without limitation, the Drawings or Specifications nor shall Inspectors inspection of the Work and methods relieve the CONTRACTOR of responsibility for the correction of subsequently discovered defects, or from its obligation to exactly comply with the Contract Documents. To the extent CONTRACTOR believes the Inspectors are requesting or requiring any such change, CONTRACTOR shall immediately provide notice to OR and ARCHITECT. OR review of percentage of the Work completed for the purpose of progress payments are stated for facilitating cash flow only and shall not constitute acceptance of the Work, in whole or in part, shall not be binding upon the OWNER in any way, and shall not be used as evidence of the actual percentage of the Work completed as per the requirements of the Contract Documents.

### **Testing, Inspection and Observation of the Work**

- 13.4** Tests, inspections, observations and approvals of any portion of the Work required by the Contract Documents will comply with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction.
- 13.5** Tests, inspections, observations and approvals conducted pursuant to the Contract Documents shall not serve as a basis for any CONTRACTOR Claim based on, but not limited to, delay, disruption, hindrance and/or acceleration of the Work.
- 13.6** CONTRACTOR shall provide a minimum of 2-day advance notice to Inspectors having jurisdiction of Work ready to be inspected, tested, observed and/or approved in order for Inspectors to perform or arrange performance thereof. CONTRACTOR shall fully cooperate with all testing and inspection personnel in the performance of their duties and responsibilities. CONTRACTOR shall provide a minimum of 2-day advance notice to OR of the supply, manufacture and/or fabrication of material to be supplied which must, by terms of the Contract Documents be tested, observed and/or inspected at the source of supply, fabrication or manufacture.

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- 13.7 If the Contract Documents require observation, inspection, testing or approval of Work to be performed outside normal hours of Work, the costs thereof shall be borne by OWNER. If CONTRACTOR elects to perform Work outside normal hours of Work the costs of any required observation, inspection, testing or approvals performed outside normal hours of Work shall be borne by CONTRACTOR with such costs of observation, inspection, testing and approval being assessed against Contract funds, the CONTRACTOR, and/or the performance bond. CONTRACTOR shall provide a minimum of 2-day advance notice to OR if CONTRACTOR elects to perform Work outside normal hours of Work.
- 13.8 If OR, ARCHITECT, or any other public authority having jurisdiction over the Work, require or consider it necessary to perform additional observation, testing, inspection and/or approval, OR or ARCHITECT shall arrange for such additional observation, testing, inspection, or approval with the costs thereof being borne by OWNER, except for costs as set forth in Articles 13.11, 13.12.6 and 13.14.1 through 13.14.6 or as otherwise noted in the Contract Documents.
- 13.9 If initial observations, tests, inspections or approvals do not pass or receive approvals, CONTRACTOR shall be responsible for all costs including the costs of additional observations, tests, inspections or approval, including, but not limited to, additional professional services and consultants provided by OWNER with the costs of such observation, tests, inspections and approval being assessed against Contract funds, the CONTRACTOR, and/or the performance bond.
- 13.10 CONTRACTOR shall not incorporate any material, product, assembly or fabrication requiring observation, testing, inspection and/or approval into the Work until such test results, observation or inspection reports denoting compliance with applicable provisions of the Contract Documents are provided to CONTRACTOR.
- 13.11 If observations, tests, inspections or approvals do not pass or receive approval, CONTRACTOR shall be responsible for all delays in the Milestones and/or Contract Time as set forth in Article 12.8.

**OWNER Consultants**

- 13.12 If required by the terms and conditions of the Contract Documents, OWNER will furnish at OWNER expense, professional consultants such as, but not limited to, geotechnical engineers or other consultants who shall provide observations, tests, inspections and approvals identified in the Contract Documents as being responsibility of OWNER except:
- 13.12.1 when such services and expenses thereof are stipulated by the Contract Documents to be provided by CONTRACTOR;
- 13.12.2 when a observed, tested, inspected or approved material, product, fabrication or assembly fails to meet the requirements of the Contract Documents;
- 13.12.3 when the source or supplier of material is changed after original observation, test or inspection has been approved or passed;
- 13.12.4 when, upon examination of the ARCHITECT, any material, product, fabrication or assembly appears to be inferior to and/or different from the originally observed, tested, inspected or approved material, product, fabrication or assembly;
- 13.12.5 when specified observations, testing, inspection and approval costs associated with CONTRACTOR provided materials, products, fabrications or assemblies are outside a sixty (60) mile radius of the Project site;

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- 13.12.6 then such costs of observation, testing, inspection and approvals shall be assessed against Contract funds, the CONTRACTOR, and/or the performance bond.
- 13.13 OWNER Consultant shall report results of all observations and tests noting if tested and/or observed materials passed or failed such tests and shall furnish copies to OR, ARCHITECT, CONTRACTOR and others as required. In the case of geotechnical engineers the report shall state such observations and tests were conducted under the responsible charge of a licensed State of Georgia civil engineer and the material was tested in accordance with applicable provisions of the Contract Documents.

### ***Testing Laboratories and Test Reports***

- 13.14 If required by the terms and conditions of the Contract Documents, OWNER will furnish at OWNER expense professional services of an independent approved testing laboratory to conduct required tests and inspections identified in the Contract Documents as being responsibility of OWNER except:
- 13.14.1 when such services and expenses thereof are stipulated by the Contract Documents to be provided by CONTRACTOR;
- 13.14.2 when a tested and/or inspected material, product, fabrication or assembly fails to meet the requirements of the Contract Documents;
- 13.14.3 when the source or supplier of material is changed after original observation, test or inspection has been approved or passed;
- 13.14.4 when, upon examination of the ARCHITECT, any material, product, fabrication or assembly appears to be inferior to and/or different from the originally observed, tested, inspected or approved material, product, fabrication or assembly;
- 13.14.5 when the specified observations, testing, inspection and approval costs associated with CONTRACTOR provided materials, products, fabrications or assemblies are outside a sixty (60) mile radius of the Project site;
- 13.14.6 then such costs of observation, testing, inspection and approvals shall be assessed against Contract funds, the CONTRACTOR, and/or the performance bond.
- 13.15 Independent testing laboratory shall report results of all tests noting if inspection and/or tested material passed or failed such tests and shall furnish copies to OR, ARCHITECT, CONTRACTOR and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of Georgia civil engineer and the material was tested in accordance with applicable provisions of the Contract Documents.

### ***Uncovering the Work***

- 13.16 If any portion of the Work is covered prior to any required observation, inspection, testing or approval it shall, upon notice to CONTRACTOR by OR, be uncovered for observation, inspection, testing or approval with the costs of uncovering and replacement thereof being borne by CONTRACTOR.
- 13.17 If ARCHITECT or OR deems it necessary to uncover any portion of the Work for additional observation, inspection, testing or approval, CONTRACTOR shall, upon receipt of OR directive, proceed with furnishing such labor, material and equipment to uncover such portion of the Work and

shall proceed as follows:

- 13.17.1 if uncovered Work is deemed to be defective, CONTRACTOR shall proceed in accordance with, but not limited to, Articles 13.18 through 13.21;
- 13.17.2 if uncovered Work is deemed to be in complete accordance with the Contract Documents, CONTRACTOR may be allowed an adjustment in the Contract Amount for those specific costs directly related to the costs of uncovering, repair and replacement of Work, and OR may adjust the Milestones and/or Contract Time;
- 13.17.3 however, if CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

#### **Remedying Defective Work**

- 13.18 Any Work, materials, equipment or other items, which do not conform to the requirements, standards or approvals as set forth in the Contract Documents may be deemed defective by OR, in which case, they shall be removed and replaced by CONTRACTOR upon notice from OR.
- 13.19 CONTRACTOR shall, upon receipt of OR notice, promptly correct any portion of the Work deemed defective, whether observed before or after completion and whether or not fabricated, installed, or completed. CONTRACTOR shall be responsible for all delays to the Milestones and/or Contract Time, costs of correcting defective Work, including the Work of others, including, but not limited to, additional professional services and consultants provided by OWNER with the costs of such observations, tests, inspections, and approvals being assessed against Contract funds, the CONTRACTOR, and/or the performance bond.
- 13.20 CONTRACTOR shall remove from the Project site all portions of defective Work not corrected by CONTRACTOR or accepted by OR.
- 13.21 If CONTRACTOR fails to remedy any defective Work, OR may proceed as set forth in Article 15.5.

#### **Correction Period for the Work**

- 13.22 If, within one (1) year after the date of Substantial Completion or such longer periods of time prescribed by any special guarantees or warranties established under the Contract Documents and/or by any specific provisions of the Contract Documents, any Work is found to be defective, CONTRACTOR shall, in accordance with OWNER written notice and directives; correct defective Work; or replace defective Work with Work which is not defective; and correct and/or replace damage to other Work resulting from correction and/or replacement of defective Work.
- 13.23 In the event OR accepts a particular item of equipment and places it into continuous service prior to Substantial Completion of the Work, the correction period for such item may commence from such date of OR acceptance if such acceptance is provided for in Article 14.18.
- 13.24 Where such defective Work has been corrected and/or replaced pursuant to Article 13.22 the correction period for such corrected and/or replaced Work shall be extended an additional term equal to the original correction period for the Work.
- 13.25 Nothing contained in Articles 13.22, 13.23, and 13.24 shall be construed to establish a period of limitation with respect to other CONTRACTOR obligations under the Contract Documents.

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Establishment of the one (1) year time period only relates to the specific obligation of CONTRACTOR to correct defective Work and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, or to the time within which proceedings may be commenced to establish CONTRACTOR liability with respect to CONTRACTOR obligations other than to correct any defective portion of the Work.

**13.26 OWNER Acceptance of defective Work**

Prior to ARCHITECT recommendation for final payment, OR may, in lieu of requiring correction and/or replacement of defective Work and where code, statute, ordinance or law does not require such correction, prefer to accept defective Work and may do so. CONTRACTOR shall pay all claims, costs, professional services, tests, inspections, losses, and damages incurred by OWNER in the evaluation of and determination of the acceptability of defective Work. If CONTRACTOR proposes acceptance of defective Work prior to ARCHITECT recommendation of final payment, a Construction Directive shall be issued. CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

**ARTICLE 14 - CONTRACTOR PAYMENTS AND COMPLETION**

**14.1 Schedule of Values**

The certified Schedule of Values, as established in Article 2.5.1, shall serve as the basis for progress payments and shall be incorporated into a certified Application for Payment form available from the OWNER.

***Application for Payment***

**14.2** On or before the fifth (5th) day of each calendar month following the month for which payment is being requested, but not more than once a month, CONTRACTOR shall submit to OR an itemized Application for Payment for Work completed during the preceding month in accordance with the Contract Documents. Such application shall be certified by CONTRACTOR under penalty of perjury and shall be supported by the following or such portion thereof as OR requires:

**14.2.1** the amount paid to the date of the application to CONTRACTOR, to all its Subcontractors, and all others furnishing labor, material, or equipment;

**14.2.2** the amount being requested with the Application for Payment by CONTRACTOR on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment up to and including the last day of the preceding month;

**14.2.3** the balance due to each of such entities after said payment is made;

**14.2.4** a certification the project record documents are current;

**14.2.5** the approved Change Orders to the Contract Amount, Milestones and/or Contract Time;

**14.2.7** in accordance with Articles 14.9 and 14.10 a summary of the retention withheld;

**14.2.8** material invoices, evidence of equipment purchases, rentals, and other supporting documentation and details of cost as OR may require from time to time;

- 14.2.9 the percentage of completion of the Work by line item referenced to the certified Schedule of Values;
- 14.2.10 a statement showing all payments made by CONTRACTOR for labor and materials on account of the Work covered in the preceding certified Application for Payment;
- 14.2.11 prior to CONTRACTOR receipt of any payment for monies due, as a result of a percentage of the Work completed, it shall furnish OR with a summary which must show payments to be made to Subcontractors covered by the payment application;
- 14.3 If CONTRACTOR fails to comply with any one of the certified Application for Payment requirements as set forth in Article 14.2, OWNER has no obligation whatsoever to make any payment, each of the Article 14.2 requirements, as well as performing the Work as per the Contract, being conditions precedent to the maturing of OWNER obligation to make payment under the Contract. A certified Application for Payment is not "properly submitted", within the meaning of this Contract unless and until CONTRACTOR has met each and every one of the requirements set forth in Article 14.2.
- 14.4 At CONTRACTOR sole cost and expense, OWNER will also permit the substitution of securities in lieu of retention withheld by OWNER to ensure performance under the Contract. At the request and expense of CONTRACTOR, securities equivalent to the amount otherwise to be withheld under the Contract shall be deposited with OWNER, or with a state or federally chartered bank as the escrow agent. If the securities are so deposited, then retention on progress payments will not be withheld. In accordance with the provisions of Article 14.21 the securities shall be returned to the CONTRACTOR. Securities eligible for investment, bank or savings and loan certificates of deposit, interest-bearing, demand-deposit accounts, standby letters of credit, or any other security mutually agreed to by CONTRACTOR and OWNER. CONTRACTOR shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon. The escrow agreement used for the purposes of this Article 14.4 shall be approved by the OWNER. The escrow agreement shall provide "in the event OWNER declares a material breach of the Contract and gives notice thereof in writing to CONTRACTOR and the escrow agent, the escrow agent shall immediately release to OWNER funds and/or securities in an amount necessary to permit OWNER to correct defective Work and/or complete the Work."
- 14.5 Since CONTRACTOR is required to order, obtain, and store materials and equipment sufficiently in advance of the Work at no additional cost or advance payment from OWNER, and to assure there will be no delays to the progress of the Work, payment by OWNER for stored material shall be made where OR specifically approves the payment in writing. If payments are to be made on account of materials and equipment not incorporated in the Work, but delivered and suitably stored at the Project site or at some other location agreed upon in writing by OR, the certified Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting OWNER has received the materials and equipment free and clear of all liens and encumbrances and the materials and equipment are covered by appropriate insurance and/or other arrangements to protect OWNER interests therein, including, without limitation, transportation to the Project site. All stored items shall be stored in a bonded warehouse, inventoried, and if applicable, specified by identification numbers, otherwise all risk of loss remains with CONTRACTOR.
- 14.6 **CONTRACTOR Warranty of Title**
- CONTRACTOR warrants and guarantees title to all Work, materials and equipment covered by any certified Application for Payment, whether incorporated into the Work or not, will pass to OWNER no later than the time of payment free and clear of stop notices and any and all encumbrances. CONTRACTOR further warrants upon submittal of a certified Application for Payment all Work for which a certified Application for Payment has been previously issued and payments received from

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OWNER shall, to the best of CONTRACTOR knowledge, information, and belief, be free and clear of stop notices and any and all encumbrances in favor of CONTRACTOR, Subcontractors, material and equipment suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work. Nothing set forth in this paragraph shall be construed to commence any warranty period for materials, equipment, systems, etc. incorporated into the Work. OWNER expressly reserves the right to reject any or all of the Work not in compliance with the Contract Documents at any time before Final Completion.

### **Review of Payment Applications**

- 14.7 Based on ARCHITECT observations and CONTRACTOR certified Application for Payment, ARCHITECT will review and make recommendations to OR regarding the amounts payable to CONTRACTOR on the certified Application for Payment.
- 14.8 ARCHITECT shall, within five (5) days after receipt of the certified Application for Payment, either recommend approval of said payment in writing to OR or notify OR in writing of the reasons for recommending withholding approval in whole or in part. OR receipt of ARCHITECT recommendation shall constitute OWNER receipt of CONTRACTOR certified Application for Payment for payment purposes.
- 14.9 If the certified Application for Payment is undisputed and properly submitted as per Articles 14.2 and 14.3, payment, less ten percent (10%) retainage and any OWNER assessments, will be made within thirty (30) days from receipt as defined in Article 14.8. If however, the certified Application for Payment is not properly submitted, and/or is otherwise disputed, the OR will return it within seven (7) days from receipt of ARCHITECT recommendation with a written statement setting forth the reason why the payment request is not proper. If the payment request is properly submitted as required under Articles 14.2, 14.3 and 14.8, and only a portion thereof is disputed, OWNER may pay the undisputed portion thereof and refuse to pay the disputed portion thereof until the dispute is resolved. All payments are made "in trust" and OR shall have the right to subsequently correct any error made in any certified Application for Payment. If CONTRACTOR disputes any OWNER assessment, then CONTRACTOR shall file a Claim as set forth in Article 16.
- 14.10 At any time after fifty percent (50%) of the value of the Contract Amount has been completed, CONTRACTOR can request, and OWNER may, by action of the OWNER governing Board, determine satisfactory progress of the Work and OWNER may make any of the remaining payments in full for actual Work completed or may withhold retainage in any amount up to ten percent (10%) as OWNER determines appropriate based on progress of the Work. CONTRACTOR can file a written request for a reduction in retainage accompanied by a notarized consent of surety to reduction in or partial release of retainage form.
- 14.11 ARCHITECT recommendation of any payment in a certified Application for Payment merely constitutes a representation by ARCHITECT to OR based on ARCHITECT observations at the Project site of executed Work and the data comprising the Application for Payment and to the best of ARCHITECT knowledge, information, and belief that:
- 14.11.1 Work has progressed to the points indicated in the certified Application for Payment;
- 14.11.2 quality of the Work is in general compliance with the Contract Documents.
- 14.12 However, the review and recommendation of payment will not be a representation ARCHITECT has made exhaustive or continuous on site Project inspections to check the quality or quantity of the Work or the Work is in fact as per the Contract Documents; reviewed construction means, methods, techniques, sequences, or procedures of CONTRACTOR; reviewed CONTRACTOR requisitions

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received from Subcontractors, material and equipment suppliers, and other data requested by OR to substantiate CONTRACTOR right to payment; or made an examination to ascertain how or for what purpose CONTRACTOR has used monies previously paid on account of the Contract Amount.

- 14.13** OR may refuse to make ARCHITECT recommended payments in whole or part because of:
- 14.13.1** defective Work not remedied or completed Work has been damaged requiring correction;
  - 14.13.2** the Contract Amount has been reduced by Change Order;
  - 14.13.3** OWNER has been required to correct defective Work and/or to complete Work in accordance with Articles 13.22 and/or 15.5;
  - 14.13.4** stop notices filed;
  - 14.13.5** liquidated damages assessed against CONTRACTOR;
  - 14.13.6** reasonable OR doubt the Work can be completed for the unpaid balance of any Contract Amount and/or within the Milestones and/or Contract Time;
  - 14.13.7** damage to OWNER and/or Separate Work Contract;
  - 14.13.8** failure to store and/or properly secure materials;
  - 14.13.9** failure of CONTRACTOR to submit on a timely basis, proper and sufficient documentation required by the Contract Documents, including, without limitation, Construction Schedules, Shop Drawings, submittal schedules, Schedule of Values, Product Data and Samples, proposed material lists, and/or verified reports;
  - 14.13.10** failure of CONTRACTOR to maintain current and accurate project record documents;
  - 14.13.11** erroneous estimates by CONTRACTOR of the value of the Work performed and/or other erroneous data in a certified Application for Payment;
  - 14.1 3.12** unauthorized deviations from the Contract Documents including, without limitation, CONTRACTOR failure to correct notices of defective Work and/or safety orders;
  - 14.13.13** failure of CONTRACTOR and/or its eligible Subcontractors to comply and remain in compliance with insurance requirements;
  - 14.13.14** other items entitling OWNER to a partial and/or full withholding of the recommended amounts;
  - 14.13.15** OWNER exercising any of its rights as set forth in Articles 15.2 through 15.5 inclusive;
  - 14.13.16** OWNER has assessed other costs, expenses and/or damages as permitted by the Contract;
  - 14.13.17** OWNER has assessed penalties as permitted by law. No interest or penalties shall be paid on any retention or amounts withheld due to the failure of CONTRACTOR to perform in full accordance with the terms and conditions of the Contract Documents.



**14.14 Payment Not Constituting Approval or Acceptance**

An approved certified Application for Payment, a progress payment, or partial or entire use or occupancy of the Work by the OWNER shall not constitute acceptance of Work that is not performed in accordance with the Contract Documents.

**14.15 Interest**

If payment is not made within thirty (30) days of receipt of an undisputed and properly submitted certified Application for Payment as set forth in Articles 14.2, 14.3 and 14.8, then interest shall begin to accrue as of the thirty-first (31st) day until paid at the rate of eight percent (8%). However, under no circumstances shall interest apply on a certified Application for Payment or sums claimed due under the terms of the Contract where the payment(s) is/are reasonably disputed by OWNER or CONTRACTOR.

**Substantial Completion**

**14.16** When CONTRACTOR considers the Work is complete and ready for the use intended, CONTRACTOR shall request OR to issue a certificate of Substantial Completion. Within a reasonable time, OR, ARCHITECT and CONTRACTOR shall inspect the Work. If OR does not consider the Work substantially complete, OR will notify CONTRACTOR stating the reasons thereof. If OR considers the Work to be substantially complete, ARCHITECT shall prepare and submit to OR and CONTRACTOR a comprehensive punch list of items to be completed. Upon receipt, OR shall prepare and deliver to OWNER a certificate of Substantial Completion thereby establishing the date of Substantial Completion, division of responsibilities pending final payment between OWNER and CONTRACTOR in respect to security, maintenance, safety, operation, heat, utilities, damage to the Work and insurance, warranties and guarantees and establish the date by which CONTRACTOR shall finish all items on the attached punch list. Warranties and guarantees shall commence on the date of Substantial Completion, unless otherwise provided in the certificate of Substantial Completion. CONTRACTOR shall promptly proceed in completing and correcting all items on the punch list in accordance with the Detailed Construction Schedule and prior to Final Completion. Failure to include an item on the punch list does not alter the responsibility of CONTRACTOR to complete all Work in accordance with the Contract Documents.

**14.17** OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the punch list.

**14.18 Partial Use or Occupancy**

OWNER may occupy or use any completed or partially completed portion of the Work with such Partial Use or Occupancy not constituting acceptance of the Work or a portion thereof. Upon OWNER election to partially use and/or occupy the Work, OR shall provide notice to CONTRACTOR, ARCHITECT and OR who shall jointly inspect the area to be partially used and/or occupied in order to determine and record the status of completion. ARCHITECT shall prepare and distribute a tentative punch list to CONTRACTOR and OR. OR and CONTRACTOR may also agree in writing to the division of responsibilities pending issuance of a Certificate of Substantial Completion in regards to security, maintenance, operation, heat, utilities, damage to the Work, insurance, warranties and guarantees.

**14.19 Final Inspection**

Upon notice from CONTRACTOR the Work is complete, OR, ARCHITECT and CONTRACTOR will

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perform a final inspection and will notify CONTRACTOR of all outstanding items in which said inspection reveals the Work to be incomplete and/or defective. CONTRACTOR shall immediately take all measures to correct and/or remedy said deficiencies.

**14.20 Final Payment Application**

After CONTRACTOR has completed all corrections to the satisfaction of OR, CONTRACTOR may make a final Application for Payment which shall be accompanied by the same details as set forth in Article 14.2 in addition to the following items as conditions precedent to final payment:

- 14.20.1 a full and final waiver and release of lien or other similar notices in connection with the Work shall be submitted by CONTRACTOR, including a release of stop notice in a recordable form, together with, to the extent permitted by law, any stop notice release bonds from a surety acceptable to OWNER as defined by the Contract Documents, in connection with the Work obtained by CONTRACTOR from each stop notice claimant. The waivers of stop notice shall be in a form as approved by OWNER;
- 14.20.2 CONTRACTOR shall have made, or caused to have been made, all corrections to the Work which are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and/or ordinances including but not limited to the filing of any final verified reports, or to fulfill any of the orders or directives of OR required under the Contract;
- 14.20.3 each Subcontractor and CONTRACTOR shall have delivered to OR all written guarantees, warranties, applications, and bonds required by the Contract Documents for its portion of the Work;
- 14.20.4 CONTRACTOR shall have delivered to OR reproducible final project record documents denoting "as built" Work with CONTRACTOR certification of the accuracy of the project record documents, all guarantees and warranties, bonds, operation and maintenance instructions for equipment, products, apparatus;
- 14.20.5 CONTRACTOR shall have delivered to OR all manuals and extra materials required by the Contract Documents;
- 14.20.6 CONTRACTOR shall have removed, or caused to be removed, all waste materials and rubbish from and about the Project site, as well as all tools, construction equipment, machinery, surplus material, scaffolding equipment, temporary facilities, and any other similar materials or equipment of CONTRACTOR or any Subcontractor;
- 14.20.7 CONTRACTOR shall have provided all training and OWNER orientations as specified in the Contract Documents;
- 14.20.8 consent of CONTRACTOR surety company to final payment has been received by OR;
- 14.20.9 all waivers and releases required by Georgia law and the Contract are provided to OR to be held in trust from all Subcontractors and CONTRACTOR;
- 14.20.10 all releases from Subcontractors are provided by CONTRACTOR to OR, then, and only then;
- 14.20.11 shall the Work be deemed to have attained Final Completion.

**Final Payment and Notice of Completion**

- 14.21 Upon receipt and approval of all of the items specified in conjunction with the final Application for Payment, as set forth in Article 14.20, ARCHITECT shall issue a final Certificate of Payment, stating to the best of its knowledge, information, and belief, and on the basis of its observations and all other data accumulated or received by ARCHITECT in connection with the Work, the Work has been completed in accordance with the Contract Documents. ARCHITECT shall present the final Application for Payment to OR. OWNER shall have no obligation to make, and shall not make, final payment of any outstanding disputed Claims not resolved by the dispute resolution procedures of Article 16.
- 14.22 Sixty (60) days after OR records the Notice of Completion, the retention shall be paid, except for one hundred fifty percent (150%) of any amount in dispute and/or which OWNER otherwise has a right to withhold.
- 14.23 CONTRACTOR hereby expressly agrees, pursuant to O.C.G.A. § 13-11-7(b), that the payment provisions within this Article 14 shall supersede the rates of interest, payment periods and contract and subcontract terms provided for by the Georgia Prompt Payment Act, O.C.G.A. § 13-11-1 *et seq.*, and that the rates of interest, payment periods and contract and subcontract terms provided for under the Prompt Payment Act shall have no application to this contract.

**ARTICLE 15 - WORK SUSPENSION AND TERMINATION**

**15.1 OWNER Right to Suspend Work**

The Work may be suspended for such period of time as may be necessary or convenient for OWNER upon OR notice to CONTRACTOR. Upon receipt of a directive to suspend Work, CONTRACTOR shall immediately comply with its terms and take all reasonable steps to minimize all costs allocable to the Work covered by the directive during the suspension. Where performance of the Work is suspended for an unreasonable time under the circumstances and which was not contemplated by the parties, and is a result of action or failure to act by OWNER, an adjustment may be made in the Contract Amount, Milestones and/or Contract Time, exclusive of fee, necessarily caused by such suspension. No adjustment shall be made for a suspension resulting from any cause other than action or inaction by OWNER. If CONTRACTOR believes a Construction Directive establishes a basis for an adjustment in the Contract Amount, Milestones and/or Contract Time, CONTRACTOR shall, pursuant to Articles 10.7 through 10.12, submit a Change Order Proposal within ten (10) days of the date of issuance of the Construction Directive.

**OWNER Termination for Convenience**

- 15.2 OWNER may, whenever its interests require, terminate this Contract for the convenience of OWNER upon OR notice to CONTRACTOR indicating the date upon which such termination is effective. Upon receipt of such notice, CONTRACTOR shall cease Work as directed and incur no further obligations with regard to the terminated Work.
- 15.3 Upon termination of the Contract for convenience of OWNER, CONTRACTOR shall transfer title and deliver to OWNER in the manner required by OR all parts fabricated or not, portions of the Work in process, completed portions of the Work, supplies and other materials produced or acquired for the terminated Work, completed or partially completed plans, drawings, information and other property which would be required to be furnished to OR upon Final Completion. CONTRACTOR shall protect and preserve property in its possession in which OWNER has an interest. If OR does not request transfer and delivery of such property, CONTRACTOR shall use its

best efforts to sell such supplies and material for exclusive benefit of OWNER.

- 15.4 Upon termination of the Contract for the convenience of the OWNER, CONTRACTOR shall be paid:
- 15.4.1 for completed and acceptable Work performed in accordance with the Contract Documents prior to the effective date of termination, including overhead and profit on such Work;
  - 15.4.2 storage, transportation and other costs reasonably necessary for the preservation or disposition of the Work and/or inventory described in Article 15.3;
  - 15.4.3 compensation under Articles 15.4.1 and 15.4.2 shall be the exclusive and only compensation CONTRACTOR is entitled to if OWNER exercises its rights under Article 15.2. Further, there shall be no payment for Work not completed pursuant to the Contract or for CONTRACTOR and/or Subcontractor expected overhead and profit had the Work and/or Project not been terminated;
  - 15.4.4 any outstanding Claims as of the date of termination shall be resolved pursuant to Section 16;
  - 15.4.5 amounts required to be withheld for stop notices shall not be paid until the stop notice issues are resolved.

15.5 ***Insufficient Performance by CONTRACTOR - OWNER Options-***

If, in the opinion of OR, CONTRACTOR at any time during the progress of the Work:

- 15.5.1 fails to immediately correct or remedy any defective Work;
- 15.5.2 refuses, fails or neglects to supply a sufficiency of material, labor, equipment, or the like;
- 15.5.3 fails to promptly pay Subcontractors;
- 15.5.4 fails to keep in full force and effect the payment and performance bonds required by the Contract for as long as those bonds are required to remain in effect by law and/or the Contract;
- 15.5.5 fails to keep the Contract funds free and clear of all stop notices;
- 15.5.6 fails to comply with a Construction Directive or notice of correction;
- 15.5.7 fails to keep to the Detailed Construction Schedule;
- 15.5.8 fails to maintain insurance;
- 15.5.9 fails to correct and complete punch list Work;
- 15.5.10 fails to adhere to any provision of this Contract, including safety requirements;

then OR shall give notice as required by Article 15.5.11 or Article 15.5.12, as applicable.

***Safety Violations-***

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- 15.5.11 in cases of safety violation(s), OWNER may correct the violation(s) in accordance with Articles 15.5.15 and/or 15.5.16 without giving prior written notice, so long as oral notice is given to CONTRACTOR and its performance bond surety, and the CONTRACTOR fails to act immediately to correct the safety violations. The oral notice will be followed, as soon as possible, by a written notice from OR to CONTRACTOR and performance bond surety.

**Non-Safety Violations-**

- 15.5.12 In cases other than violation(s) of safety requirements, before OWNER can proceed under Articles 15.5.15 and/or 15.5.16, OR shall first send a written notice to CONTRACTOR and its performance bond surety, at the addresses listed in the Contract, by facsimile, regular mail and/or electronic mail, giving CONTRACTOR and/or the performance bond surety three (3) days to correct the deficiencies to OR satisfaction. In the event CONTRACTOR and/or its performance bond surety fail to commence correction within the seven (7) days, OWNER can proceed forthwith, without any further notice, pursuant to Articles 15.5.15 and/or 15.5.16.

**OWNER Options-**

OWNER may, at its sole option and without prejudice to any other rights and/or remedies OWNER may have at law, under the Contract, and/or in equity, do any and/or all of the following:

- 15.5.13 after providing further notice as required by law, initiate procedures to revoke any pre-qualification status CONTRACTOR may have with OWNER;
- 15.5.14 after providing further notice as required by law, initiate procedures to have CONTRACTOR declared a non-responsive bidder and banned from all current and/or future OWNER Projects for a period of two (2) to five (5) years;
- 15.5.15 make good such deficiencies (i.e., Articles 15.5.1 through 15.5.10, inclusive) by whatever method OWNER deems most expedient with all costs and expenses thereof being deducted and/or drawn down from the Contract Amount;
- 15.5.16 terminate CONTRACTOR right to proceed with the Work of the Contract, in whole or in part, without terminating CONTRACTOR obligations under the Contract, with OWNER then completing the Work of the Contract, in whole or in part, by whatever method OWNER deems most expedient with all costs and expenses thereof being deducted and/or drawn down from the Contract Amount.

**OWNER Use of CONTRACTOR Equipment, Facilities, Orders, Etc-**

- 15.5.17 If OWNER elects to correct, remedy and/or complete Work, in whole or in part, as a result of electing the options provided for in Articles 15.5.15 and/or 15.5.16, then OWNER may: take possession of all or a portion of the Work; take possession of CONTRACTOR facilities, supplies, tools, equipment, appliances, apparatus, and machinery at the Work and/or Project site, whether owned, leased or rented by CONTRACTOR; incorporate into the Work all materials and equipment stored at the Project site, on order and/or stored elsewhere; proceed in accordance with, but not limited to, Articles 6.22 and 6.60.
- 15.5.18 With respect to the options in Articles 15.5.15 and/or 15.5.16, if the funds otherwise due and payable to the CONTRACTOR under the Contract are not sufficient to reimburse OWNER for all incurred costs and expenses, then CONTRACTOR and its performance

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bond surety shall be responsible therefore. OWNER shall pursue recovery of all such costs, expenses and/or damages in litigation. Such costs, expenses and/or damages are not subject to the provisions of Article 16. If the cost to correct or complete under Articles 15.5.15 and/or 15.5.16 does not exceed the Contract Amount, then any amount remaining in the Contract Amount shall be paid over to the CONTRACTOR, provided that such remaining amount is otherwise due and payable to CONTRACTOR.

- 15.5.19** CONTRACTOR shall not be allowed an adjustment in the Milestones and/or Contract Time because of any delays or disruptions in the performance of the Work which are attributable to the exercise of OWNER rights and remedies as set forth in this Article 15.5. To the extent CONTRACTOR contends OWNER has improperly invoked its options under Articles 15.5.15 and/or 15.5.16, CONTRACTOR shall file a Claim under Article 16. OWNER exercise of its rights under Articles 15.5.13 and/or 15.5.14 are not subject to the provisions of Article 16.

## ARTICLE 16 - CLAIMS AND MANDATORY DISPUTE RESOLUTION

### *Disputes and Claims General-*

- 16.1** The mandatory dispute resolution procedures set forth in this Article 16 shall not usurp OWNER authority to determine what Work is constructed, will be constructed, or whether the Work complies with the Contract Documents (notwithstanding the above, a determination by OWNER with regards to whether the Work complies with the Contract Documents shall give rise to a Dispute or Claim by CONTRACTOR). A "Dispute" or "Claim" is a demand or assertion by one of the parties seeking adjustments to the Contract Amount, Milestones and/or Contract Time. Every Dispute or Claim shall be in writing and signed under penalty of perjury and stated with specificity. The Dispute or Claim shall identify all of the issues, events, conditions, circumstances and/or causes giving rise to the Dispute/Claim, the dates thereof, and the asserted effects on the Contract Amount, Milestones and/or the Contract Time. The Dispute/Claim shall include and be accompanied by all supporting data to substantiate the claim. A Dispute/Claim asserting an effect on the Milestones and/or Contract Time shall include all pertinent scheduling data demonstrating the impacts on the critical paths, Milestones and/or Contract Time. A detailed cost breakdown of items allowed under the Contract shall accompany any Dispute/Claim asserting an effect on the Contract Amount. In accordance with Article 10.7 through 10.12, OR shall serve as the initial dispute resolution decision maker on all Disputes regarding the Work, Project, the Contract Documents and all matters pertaining thereto and/or caused thereby, excepting only those issues regarding stop notices, penalties, and other matters excluded in Article 16.2.
- 16.2** The term Dispute/Claim, for purposes of the Contract's mandatory dispute resolution procedures, shall not apply to:
- 16.2.1** the rights and obligations OWNER has as a public entity, such as, but without limitation, the revocation of pre-qualification status, barring a bidder from OWNER Contracts, governmental immunity and, without limitation, the imposition of penalties or forfeitures prescribed by statute or regulation and imposed by a governmental body upon a CONTRACTOR;
  - 16.2.2** personal injury, wrongful death or property damage claims;
  - 16.2.3** latent defect or breach of warranty or guarantee to repair;
  - 16.2.4** stop notices;

- 16.2.5 OWNER rights as set forth in Articles 15.5.13 and 15.5.14;
- 16.2.6 OWNER rights to recover all costs, expenses and/or damages as set forth in Articles 15.5.15 and 15.5.16.

***Mandatory Dispute Resolution Process-***

- 16.3 In accordance with Article 10.7 through 10.12 should a dispute arise, the CONTRACTOR shall request the OR to have the disputed amount reviewed by senior management. The request for senior management review must be made within seven (7) days of the rejection of the proposed adjustments by the OR. Within five (5) days of the CONTRACTOR'S request, the OR will coordinate a review meeting between the CONTRACTOR and senior management. If the senior management review resolves the dispute, a change order will be issued by the OR accordingly. If the dispute is not resolved at the senior management review, the CONTRACTOR must notify the OR that it protests the decision and shall proceed with the following mandatory dispute resolution process:
- 16.4 Within ten (10) days of the date stated on a written objection under Article 16.3, any party can send and/or personally deliver to the authorized representative of the other party a written Meet and Confer demand. The CONTRACTOR shall file the Meet and Confer demand with the Fulton County Schools Capital Program Contracts Department (FCCPCD). The FCCPCD will coordinate and facilitate the meet and confer meeting with the CONTRACTOR. CONTRACTOR shall be represented at the Meet and Confer meeting by a senior project manager and a person of higher management level who has full authority to instantly resolve the dispute. The parties shall meet and negotiate a good-faith resolution of the dispute. All dispute resolutions are subject to the approval of the governing Board, whether by change order or settlement agreement. If the Meet and Confer meeting does not take place and/or resolve the dispute within ten (10) days from the delivery of the Meet and Confer demand, the party asserting the dispute shall then have the option to go to a Neutral Master procedure set forth in Article 16.5 (in which case the other party must participate in such Neutral Master procedures) or to immediately proceed to follow Article 16.6. The parties agree that resolving all disputes as soon as possible or no later than thirty (30) days after the filing of the dispute is in both of their best interests and provide one another with a critical opportunity to mitigate damages, if any. The parties agree that such resolutions are so critical that if a party fails to follow any part of the mandatory dispute resolution process established by articles 16.3 through 16.5, that the party's dispute is waived, released, and forever forfeited.
- 16.5 Disputes not resolved through the Meet and Confer process will be submitted to a Neutral Master for further review, in an attempt to resolve the dispute. Both parties agree to select a mutually agreeable Neutral Master to hear the dispute. The Neutral Master shall, upon receipt of notice of dispute resolution request, schedule a hearing with all parties present. Both parties agree to attend the hearing with the intent being to resolve the dispute. The fees of the Neutral Master and the administrative costs of the hearing shall be shared equally between the parties. Both parties will submit all pertinent information regarding the dispute to the Neutral Master. The Neutral Master shall have 7 days to review the information submitted and shall schedule resolution meeting with all parties to the dispute. The meeting shall be held within 14 days after the Neutral Master has been selected. Every effort shall be made by both parties to resolve the issue at the Neutral Master meeting. The Neutral Master meeting shall be scheduled for one eight (8) hour day. If the dispute remains after the Neutral Master meeting then both parties will proceed in accordance with Article 16.6.

***Claim Process/Litigation***

- 16.6 If the dispute resolution proceedings, set forth in Articles 16.3 through 16.5, have been completed

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and a dispute is still unresolved, then (and only then) shall the Contractor or OWNER file a lawsuit with the Superior Court of Fulton County. However, in no event can the lawsuit be filed before Final Completion.

16.7 All claims, disputes and complaints filed pursuant to Articles 16 shall be addressed to:

Fulton County Board of Education  
Cindy Loe, Superintendent of Schools  
c/o Fulton County Schools  
786 Cleveland Avenue, SW  
Atlanta, Georgia 30315

Required copies to:

D. Glenn Brock, Esq.  
Brock, Clay Calhoun & Rogers, P.C.  
49 Atlanta Street  
Marietta, GA 30060

Capital Program Contracts Department  
The Meadows Operations Center  
5270 Northfield Boulevard  
College Park, Georgia 30349

## ARTICLE 17 – ADDITIONAL PROVISIONS

### 17.1 *Governing Law-*

The laws of the State of Georgia shall govern the Contract and any action on the Contract shall be filed in the Superior Court of Fulton County.

### 17.2 *Successors and Assigns-*

OWNER and CONTRACTOR respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

### 17.3 *Written Notice-*

In the absence of any other specific notice requirements set forth elsewhere in the Contract Documents, regarding a specific subject matter, notice shall be in writing, dated and personally signed by party giving notice or their duly authorized representative. Mechanical and/or electronically generated signatures are not acceptable under the terms and conditions of this Contract. Notice shall be deemed to be duly served if delivered in person to the individual, member of the firm or entity, or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice. Copies of notice or correspondence shall be distributed amongst the various parties of the Work by the party generating such notice or correspondence. Notwithstanding the above, the OWNER, OR and CONTRACTOR shall be required to provide written notice by using Expedition Software (provided



by the OWNER) where specifically set forth in the Contract or as directed in writing by the OR.

**17.4 *Rights, Remedies, Duties and Obligations Cumulative-***

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder, shall be in addition to any duties, obligations, rights, and remedies otherwise imposed or available by law.

**17.5 *No Waiver-***

No action or failure to act by OWNER, OWNER Consultant, ARCHITECT, ARCHITECT Consultant or the CONTRACTOR shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed to in writing.

**17.6 *Contract Language Controls-***

Custom and practice, industry standards, past (pre-Project) course of dealings, shall not be used to explain, interpret, supply or contradict the express text of this Contract unless a different intent is expressed in this Contract.

**17.7 *Communications Facilitating Contract Administration-***

Except as otherwise provided in the Contract Documents or when direct communications are warranted by special circumstances, CONTRACTOR shall communicate to OWNER and OWNER Consultants, through the OR and then only in writing with copies to all affected and/or mentioned parties. Official communications and notice shall be in writing only. Verbal communications are not official or binding under the Contract. Verbal communication, including directions, cannot be, and shall not be, the basis for: any change in the Contract Amount; Milestones; Contract Time; or any Claim, action, cause of action or other remedy regarding the Work and/or Contract and/or a breach thereof.

**17.8 *Claims Involving Injury or Damage to Person or Property***

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, any of the other party's employees or agents, or others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party with sufficient detail to enable the other party to investigate the matter.

**17.9 *Computation of Time***

**17.9.1** When any period of time is referred to in the Contract Documents by days and/or calendar days, it will be computed to exclude the first and include the last day of such period;

**17.9.2** a day of twenty-four hours measured from midnight to the next midnight will constitute a day and/or calendar day.

**17.10 *Oral Agreements or Modifications***

No oral conversation, representation or agreement with any representative of OWNER, OWNER Consultant, ARCHITECT, ARCHITECT Consultant, OR or any other employee or agent of OWNER shall affect, modify any of the terms and conditions in any documents comprising this Contract.

**17.11 Unfair Business Practice Claims; Assignment to OWNER**

In entering into a public works Contract or a subcontract to supply goods, services, or materials pursuant to a public works Contract, the CONTRACTOR and/or Subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to CONTRACTOR without further acknowledgement by the parties.

END OF ARTICLE

SECTION 00800

SUPPLEMENTARY CONDITIONS



## **SUPPLEMENTARY CONDITIONS**

The following supplements modify the General Conditions. Where a portion of the General Conditions is modified and or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

### **Article 2 – Prior to Construction**

Add sub-article 2.8 and 2.9 as follows:

#### **2.8 Detailed Construction Schedule**

Unless otherwise noted in the Contract Documents, and within Thirty (30) days after the Notice to Proceed, CONTRACTOR shall submit a Detailed Construction Schedule, using Primavera engineering and Construction Software provided by OWNER, based on the corrected Preliminary Construction Schedule described in Article 2.6.2 and in full compliance with related Sections of the Division 01 General Requirements.

- 2.9 OWNER shall provide an integrated project control system utilizing Primavera Engineering and Construction Software for construction scheduling and document management and control software system, type and versions designated by the OWNER, which shall be accessible by CONTRACTOR, ARCHITECT/ENGINEER and OWNER through a Web Based Program. The CONTRACTOR shall use designated software to prepare and maintain the Preliminary and Detailed Construction Schedules for the Project, and the CONTRACTOR, ARCHITECT/ENGINEER and OWNER shall use the designated document management and control software system to track and control all construction project documentation on generated forms that shall include, but not limited to, Contact Directory, Request for Information, Request for Proposal, Change Order Proposal, Construction Directive, Change Orders, Minutes of Meetings, Pay Requests, Schedules and all OWNER and CONTRACTOR communications such as Correspondence, Transmittals, Insurance Certificates, Telephone Records, Submittals, Action Items, Daily Reports and Punch Lists required under any Contract Documents and this Contract. However, any notice required under Article 16 of the Contract shall conform to the requirements stated therein.

### **Article 6 – CONTRACTOR DUTIES AND RESPONSIBILITIES**

Add sub-article 6.32 as follows:

#### **6.32 Permits and Fees**

CONTRACTOR shall obtain all permits and be financially responsible for all governmental fees, licenses, and inspections necessary for proper execution and completion of the Work that are customarily secured after the Effective Date of the Contract and are required by any authority having legal jurisdiction over the Work and/or Project. In cases where a local government does not issue permit for the School Systems' project and requires independent permitting and inspections, OWNER shall be responsible for all independent project reviews,

inspections, especially Certificate of Occupancy Inspections and on site Project testing and inspection within the distance limitations set forth in Article 13.15.5, unless a different distance limitation is specified in the Contract Documents.

## **Article 8 - OWNER DUTIES, RIGHTS AND RESPONSIBILITIES**

Add sub-article 8.1.1 and 8.1.2 as follows:

- 8.1.1 OWNER shall be represented by the PROGRAM MANAGER. The PROGRAM MANAGER is the OWNER's Representative in providing the services required to manage the Contract between the OWNER and CONTRACTOR, and the Agreement between the ARCHITECT/ENGINEER and the OWNER. The CONTRACTOR shall ensure: a.) that all changes in CONTRACTOR services or Work to be performed shall only be allowed pursuant to written agreement or direction; b.) that all contractually binding communications with the OWNER shall be through the PROGRAM MANAGER; and c.) that in the event the CONTRACTOR receives any communication from an Employee or other representative of the OWNER, the CONTRACTOR will immediately advise the PROGRAM MANAGER of the content of said communication after receipt of said communication by the CONTRACTOR.
- 8.1.2 In providing the services required to manage the Contract between the OWNER and CONTRACTOR, and the Agreement between the ARCHITECT/ENGINEER and the OWNER, the PROGRAM MANAGER shall endeavor to maintain a working relationship with the ARCHITECT/ENGINEER and CONTRACTOR on behalf of the OWNER. However, nothing should be construed to mean or imply that the PROGRAM MANAGER or OWNER assumes any of the responsibilities or duties of the ARCHITECT/ENGINEER or CONTRACTOR or that the OWNER waives any rights to strictly enforce the obligations of ARCHITECT/ENGINEER or CONTRACTOR under the applicable contracts. The ARCHITECT/ENGINEER shall be solely and exclusively responsible for the design aspects of the Project. The ARCHITECT/ENGINEER shall design and inspect the Project in accordance with the Agreement between ARCHITECT/ENGINEER and OWNER. The CONTRACTOR shall be solely and exclusively responsible for the construction aspects of the Project, including all means, methods, techniques, sequences and procedures used in construction of the Project in accordance with the Contract between the CONTRACTOR and OWNER.

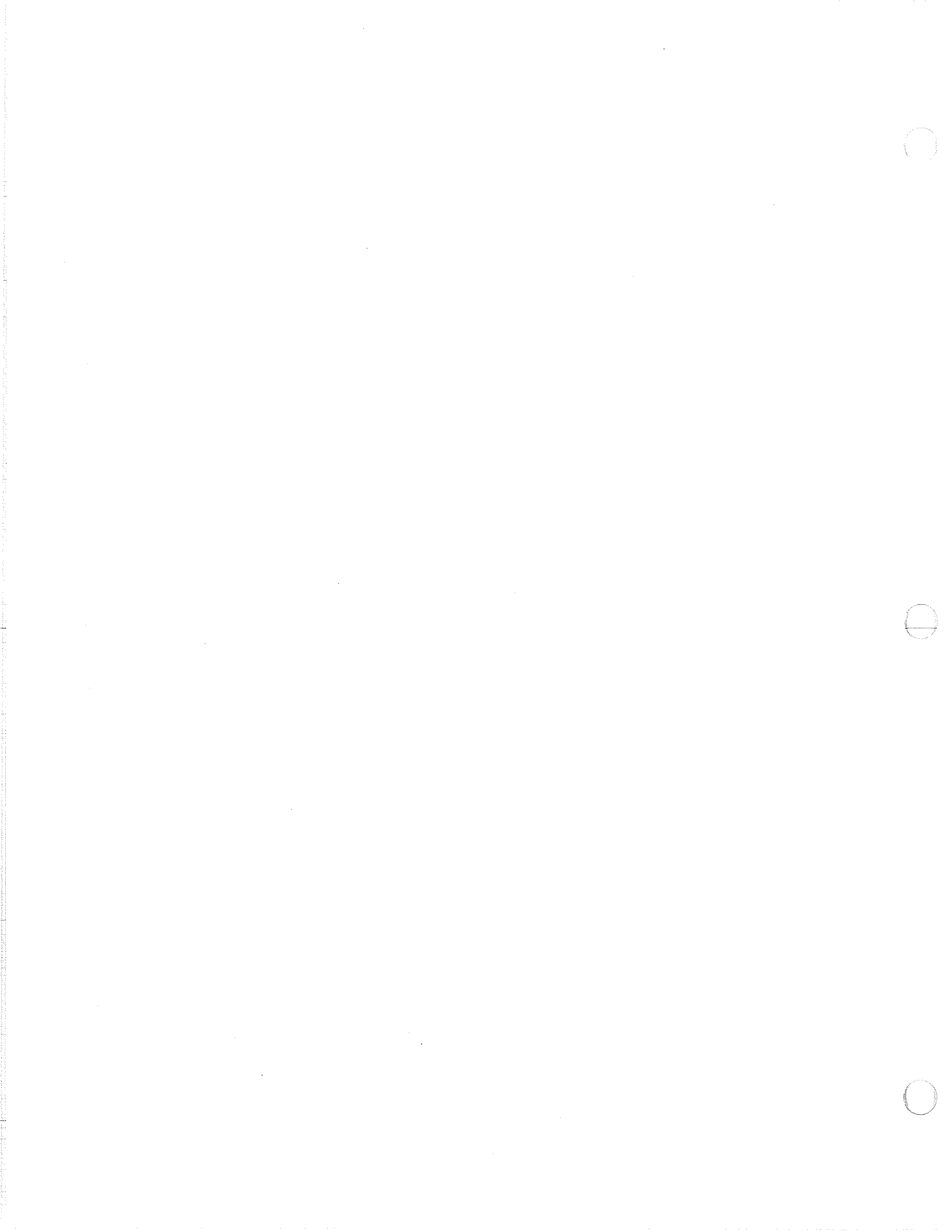
## **Article 12 - CHANGE OF CONTRACT TIME**

Add sub-article 12.8 as follows:

- 12.8 It is agreed by OWNER and CONTRACTOR that, because it would be impractical and extremely difficult to fix the actual damages to the OWNER should the Work not be completed in accordance with the specified Milestones and/ or Contract Time, plus any authorized adjustments to the Milestones and / or Contract Time, there shall be assessed as liquidated damages, not as a penalty, but rather an approximation of all such damages, and within the parameters of, without limitation, the parties establish the sums shown in Section 01010 Phasing of the Work, Appendix A, for each day thereafter the Work

remains incomplete beyond the Milestones and/ or Contract Time, plus any authorized adjustments. The OWNER shall have the right to assess liquidated damages against funds otherwise due and payable to the CONTRACTOR, CONTRACTOR and/ or the performance bond.

END OF SUPPLEMENTARY CONDITIONS





**SECTION 00900  
ADDENDUM**

**GENERAL**

**1.01 The following sets forth the format for issued Addenda.**

**ADDENDUM NO. \_\_\_\_\_, dated {Month, Day, Year}.**

RE: Chattahoochee HS - Band Suite Addition RFP 413-11  
5230 Taylor Road, Johns Creek, GA 30022

FROM: OWNER: FULTON COUNTY BOARD OF EDUCATION  
CONTRACTING DEPARTMENT  
THE MEADOWS OPERATION CENTER  
5270 Northfield Boulevard  
College Park, GA 30349

\_\_\_\_\_  
**Architect/Engineer Stamp & Signature**

TO: ALL PROSPECTIVE BIDDERS:

This Addendum forms a part of the Contract Documents and modifies the Proposal Documents dated {month, year}, as noted below. Acknowledge receipt of the Addendum in the space provided on Document 00400 - Proposal Acceptance Form. Failure to do so may result in the proposal being deemed non-responsive.

The Addendum consists of \_\_\_ pages, and the attached drawing, Sheet No. \_\_\_ with the revised date of \_\_\_\_\_.

- A. CHANGES TO PROPOSAL REQUIREMENTS TABLE OF CONTENTS {Make appropriate changes to the number of pages for each section affected by Addendum}.
- B. CHANGES TO PRIOR ADDENDUM:
  - 1. Addendum No. \_\_\_, Item No. \_\_\_, Page No. \_\_\_ {Provide description of the changes}
- C. CHANGES TO PROPOSAL DOCUMENTS {Describe changes to the PROPOSAL Documents starting with each document in the numerical order in which they are located on Document 00010 - Table of Contents}
- D. CHANGES TO CONDITIONS OF THE CONTRACT: {All modifications to Section 00700 - General Conditions shall be addressed in Section 00800 - Supplementary Conditions}
- E. CHANGES TO SPECIFICATIONS: {Make required changes to the relevant Specifications sections in sequence and accordance with the CSI numerical order of occurrence of the section and the 16 Division classifications}
- F. CHANGES TO DRAWINGS: {Describe changes made to Drawings indicating detail number, sheet number, etc., all in sequence}
- G. OTHER CHANGES AS SET FORTH: {Describe other changes, if any, made to the PROPOSAL Documents not covered by Items A through F.}

Clarification or any other notice of a change in the Proposal Documents will be issued only by the OWNER Contracting Department and only in the form of a written Addendum, transmitted by fax or e-mail to all who are known by the issuing office to have received a complete set of PROPOSAL Documents. Any other purported Addenda are void and unenforceable.

END OF ADDENDUM NO. \_\_\_\_\_

Ridgeview Charter Middle School  
Addition and Renovation 00900-2

CDH Partners  
School Code: 0286

Addendums

**SECTION 00950  
REQUIRED PROPOSAL FORMS**

GENERAL

1.01 SECTION INCLUDES

- A. As stated in Section 00200 – Instructions to Offerors, this Section contains the original proposal forms and supplemental proposal forms that shall be utilized by the offeror in preparing and submitting the proposal.

1.02 ORIGINAL PROPOSAL FORMS FOR USE BY OFFEERORS

- A. Fill out and submit the following original proposal forms in your proposal:
  - 1. Document 00100 – Request for Proposal ( Response must be provided to all requested information)
  - 2. Document 00400 -Offer and Acceptance Form
  - 3. Document 00410 – Offer (Bid)Security Form (1 page)
  - 4. Document 00480 - Non-Collusion Affidavit (1 page)
- B. The best value offeror shall fill out and submit the following forms within three (3) days after receipt of the letter of intent to award a contract:
  - 1. Document 00600 - Payment Bond (1 page)
  - 2. Document 00605 - Performance Bond (1 page)
  - 3. Certificate of Insurance

END OF SECTION



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 1

GENERAL REQUIREMENTS



**SECTION 01000**  
**ABBREVIATIONS, SYMBOLS AND ACRONYMS**

## PART 1 - GENERAL

## 1.01 SECTION INCLUDES

- A. List of abbreviations, symbols, and acronyms of societies, institutes, and associations generally appearing in the Contract Documents.

## 1.02 RELATED SECTIONS

- A. Division 01: General Requirements

## PART 2 - PRODUCTS (Not applicable)

## PART 3 - EXECUTION

## 3.01 ABBREVIATIONS

ac	Alternating current
amp	ampere
BTU	British thermal unit
cfh	Cubic feet per hour
cfm	Cubic feet per minute
cm	Centimeter
Co.	Company
COP	Coefficient of performance
Corp.	Corporation
d	Penny
db.	Decibel
DB	Dry bulb
dc	Direct current
EER	Energy efficiency ratio
F	Degrees Fahrenheit
fpm	Feet per minute
ft	Foot or feet
gph	Gallons per hour
gpm	Gallons per minute
HP	Horsepower
HVAC	Heating, ventilating and air conditioning
Hz	Hertz
Inc.	Incorporated
KHz	Kilohertz
Kip	thousand pounds
Ksf	Thousand pounds per square foot
Ksi	Thousand pounds per square inch
Kv	Kilovolt
KVA	Kilovolt amperes
KW	Kilowatt
KWH	Kilowatt hour
LF	Linear foot

lb	Pound
LED	Light emitting diode
MBH	1000 BTUs per hour
MHz	Mega hertz
mil	Thousandth of an inch
mm	Millimeter
mph	Miles per hour
oz.	Ounce
PCF	Pounds per cubic foot
pH	Acidity-alkalinity balance
psf	Pounds per square foot
psi	Pounds per square inch
psig	Pounds per square inch, gage
RF	Radio frequency
rpm	Revolutions per minute
SF	Square foot
SY	Square yard
V	Volt
WB	Wet bulb

## 3.02 SYMBOLS

#	Number or pound
'	Foot or feet
"	Inch(es)
%	Percent

## 3.03 ACRONYMS

AA	The Aluminum Association, Inc
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AGA	American Gas Association
AGCIH	American Conference of Governmental Industrial Hygienists
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association, Inc.
ANSI	American National Standards Institute
APA	APA – The Engineered Wood Association
ARI	Air-Conditioning and Refrigeration Institute



ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATBCB	Architectural & Transportation Barriers Compliance Board
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America
CFR	Code of Federal Regulations
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards, U.S. Department of Commerce
CSI	Construction Specifications Institute
CTIOA	Ceramic Tile Institute of America
CTI	Cooling Tower Institute
DHI	Door and Hardware Institute
EPA	Environmental Protection Agency
ETL	ETL Testing Laboratories
FCC	Federal Communication Commission
FM	Factory Mutual
FS	Federal Specifications
GA	Gypsum Association
GANA	Glass Association of North America
GPC	Georgia State Plumbing Code
HMMA	Hollow Metal Manufacturer's Association
HPVA	Hardwood Plywood & Veneer Association
IACS	International Annealed Copper Standards
IAMPO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical & Electronic Engineers, Inc.
IES	Illuminating Engineering Society
IMI	International Masonry Institute
IRI	Industrial Risk Insurers
ISO	International Organization for Standardization
MLSFA	Metal Lath/Steel Framing Association
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry.

NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEBB	National Environmental Balancing Bureau
NEMA	National Electrical Manufacturers Association
NEC	National Electrical Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NOFMA	National Oak Flooring Manufacturers Association
NPCA	National Paint and Coatings Association
NPDES	National Pollutant Discharge Elimination System
NRCA	National Roofing Contractors Association
NSF	National Sanitation Foundation
NTMA	National Terrazzo & Mosaic Association
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standard, U.S. Department of Commerce
RFCI	Resilient Floor Covering Institute
SBC	Standard Building Code
SDEI	Steel Deck Institute
SDI	Steel Door Institute
SFM	State Fire Marshal
SFPA	Southern Forest Products Association
SGC	Standard Gas Code
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TCA	Tile Council of America
UBPPA	Uni-Bell PVC Pipe Association
UCI	Uniform Construction Index
UFAS	Uniform Federal Accessibility Standards
UL	Underwriters' Laboratories, Inc.
WDMA	Window and Door Manufacturers Association

END OF SECTION

**SECTION 01005  
SUMMARY OF WORK**

**PART 1 – GENERAL**

**1.01 SCOPE**

- A. Work includes construction of:
  - 1. Chattahoochee HS - Band Suite Addition
  - 2. All work as shown on drawings and described in the Project Manual.
- B. Except as otherwise noted, the intent of this Contract is that the Contractor shall provide all materials, labor, equipment, services and temporary construction that may be required in order to construct the complete work shown on the drawings.
- C. General Description of Work  
New Band Suite Addition – Includes new rehearsal room, practice rooms, offices, storage rooms, restrooms and support facilities.

**1.02 OWNER**

Wherever the terms "Owner" or "Owner's Representative" are used in the Contract Documents, it shall mean the Fulton County Board of Education, Program Management Department. Owner is sometimes referred to in these specifications as FCBE or FCS.

**1.03 ARCHITECT**

Wherever the term "Architect" appears in the contract documents it shall mean "BRPH Architects - Engineers, Inc."

**1.04 OWNER'S REPRESENTATIVE**

- A. All documentation required by the Specifications to be submitted to the Owner shall be submitted to the Architect for review and transmittal to the Owner.
- B. All instructions and requests for changes from the Owner to the Contractor will be issued through the Architect; PROVIDED, that the Architect shall not have the authority to authorize any changes in the Work which would result in change to the Contract Sum or to the Contract Time, PROVIDED FURTHER, that the Architect will receive and review Contractor's proposal for such changes and will submit recommendations to the Owner for issuance of Change Orders.
- C. Changes in the Contract Sum shall be authorized in writing solely by the Owner.
- D. Except as otherwise noted, the Contractor shall disregard any instructions from persons other than the Architect.
- E. Should a situation arise in conflict with these requirements, the Contractor shall notify the Architect immediately.

- F. The Contractor shall bear all costs incurred by his failure to follow instructions contained in the preceding paragraphs.

#### 1.05 OBLIGATIONS OF CONTRACTOR

- A. Except as otherwise specifically noted, provide and pay for:

1. Labor, materials and equipment;
2. Tools, construction equipment and machinery;
3. Temporary heat and utilities required for construction;
4. Other temporary facilities and services necessary for proper execution and completion of work;
5. Temporary facilities such as partitions, lights, barricades, walkways, steps, ladders, railings, etc. necessary to assure the safety of the workers, students and staff of the school as well as the general public;
6. "As-Built" drawings.

- B. Pay legally required sales, consumer and use taxes.

- C. Make all applications, secure and pay for as may be required for proper execution and completion of the work, and as required by authorities having jurisdiction:

1. Any Permits, Business Licenses, deposits and/or fees of any kind that are a prerequisite for doing any of the work of this Contract.
2. Interim and final inspections of the Work and/or any portions of the Work.
3. Post all bonds (and/or security deposits) that are a prerequisite for doing any of the work of this Contract.

- D. Give required notices.

- E. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities having jurisdiction over this work.

- F. Promptly submit written notice to Architect of any observed variance of Contract Documents from legal requirements.

- G. The Contractor shall have a supervisor on the project anytime any work is taking place or when delivery of equipment is expected.

#### 1.06 CONTRACT

Contract work under a Lump Sum. type Contract, including all general construction work, temporary facilities, domestic water system, plumbing, heating, ventilating, air conditioning, fire protection systems, electrical work, specified finishes and specified equipment.

#### 1.07 WORK/COSTS BY OWNER

- A. Loose furnishings, not otherwise called for.

- B. Items marked N.I.C. on the drawings.

#### 1.08 CONTRACTOR USE OF PREMISES

- A. Confine operations at site as permitted by:
  - 1. Ordinances
  - 2. Permits
  - 3. Contract Documents
  - 4. Owner
- B. Do not unreasonably encumber site with materials or equipment. Do not load structure with weight that will endanger structure.
- C. Assume full responsibility for protection and safekeeping of products stored on premises.
- D. Move any stored products that interfere with drainage of storm water, operations of Owner or other Contractors.
- E. As the School will remain in operation on a normal schedule, Contractor will have to carefully coordinate with Owner areas to be worked in, as well as necessary safeguards for students and staff. Furnish barricades and dust partitions as required to protect the existing building and its staff, students and visitors.
- F. The Contractor shall schedule their work hours to accommodate the normal working schedule of the school. No overtime will be required for school personnel.

#### 1.09 EXECUTIVE ORDERS

- A. The Contractor, by signing the Contract, acknowledges that he is aware of and will comply with the contents and requirements of the following Acts and Executive Orders.
- B. The non-discrimination clause contained in Section 202, Executive Order 11246, as amended by Executive Order 11375, relative to Equal Employment Opportunity for all persons without regard to race, color, religion, sex, or national origin. The implementing rules and regulations described by the Secretary of Labor are incorporated.

#### 1.10 PROTECTION OF PUBLIC FROM INJURY

- A. Due to the proximity of the work to the public and to the large number of school personnel in the vicinity of the construction area, the Contractor is cautioned to exercise special care in protecting the public from injury during all phases of the work. The Contractor is directed to provide adequate protective barriers to restrain public access to all hazardous areas. Before commencing the Work, a SAFETY PLAN shall be developed by the Contractor. The Contractor shall make provisions for enforcing protection of property and public including locations of barricades, construction signs, and exit signs.
- B. As the development and implementation of The Safety Plan is the sole responsibility of the Contractor, it shall not be reviewed by the Architect.

#### 1.11 SPECIAL REQUIREMENTS

- A. There will be no smoking allowed in the school or on school property.
- B. Attire: Proper attire shall be worn at all times.
  - 1. Shirts shall be worn while on school property at all times. No tank tops or undershirts

- will be permitted.
  - 2. Clothing displaying nudity, obscene language, obscene symbols or pro-drug slogans is prohibited.
  - 3. Shorts will not be permitted.
- C. Fraternalization: Workers shall not fraternize with school staff or students.
- D. Any failure to follow these requirements will result in removal from the school grounds, without recourse.

END OF SECTION

**SECTION 01010  
PHASING OF THE WORK**

**PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Requirements for phasing of the Work include logistics, phasing, and completion of designated phases prior to commencement of subsequent phases.

**1.02 RELATED SECTIONS**

- |    |                |  |
|----|----------------|--|
| A. | Section 01005: | Summary of the Work                            |
| B. | Section 01010: | Exhibit A - Milestone Schedule                 |
| C. | Section 01100: | Coordination                                   |
| D. | Section 01300: | Submittals                                     |
| E. | Section 01360: | Construction Schedule                          |
| F. | Section 01500: | Construction Facilities and Temporary Controls |
| G. | Section 01700: | Contract Closeout                              |

**PART 2 - PRODUCTS (Not applicable)****PART 3 - EXECUTION****3.01 SUBMITTALS**

- A. CONTRACTOR shall submit a Project site logistics plans in accordance with and as required by this Section.

**3.02 LOGISTICS**

- A. Prior to commencement of the Work, CONTRACTOR shall prepare and submit to OR, a detailed Project site logistic plan, in the same size and scale of the Drawings, setting forth CONTRACTOR plan of the Work relative to the following, but not limited to items:
1. In accordance with local ordinances a truck access route to and from the Project site.
  2. The identification of any overhead wire restrictions for power, street lighting, signal, and/or cable.
  3. Local sidewalk access and street closure requirements.
  4. Protection of sidewalk pedestrians and vehicular traffic.
  5. Project site fencing and access gate locations.
  6. Construction parking.
  7. Material staging and/or delivery areas.
  8. Material storage areas.
  9. Temporary trailer locations if required.
  10. Temporary service location and proposed routing of all temporary utilities.
  11. Location of temporary and/or accessible fire protection
  12. Trash removal and location of dumpsters.
  13. Crane locations.
  14. Location of portable sanitary facilities.

15. Traffic control signage.
16. Perimeter and site lighting.
17. Storm Water Pollution Prevention Plan – SWPPP
18. Stockpile and/or lay down areas.

- B. A revised Project site logistic plan may be required by the OR for separately identified phases of the Work as set forth in this Section.
- C. Unless specifically required elsewhere in the Contract Documents, CONTRACTOR is responsible for securing and/or obtaining all approvals of authorities having jurisdiction relative to logistic plan activities.

### 3.03 PHASING OF THE WORK

- A. Project will be constructed in separate Milestone increments, as identified or as described in this Section and/or the Contract Documents. Phasing will also delineate Work to be completed in each designated phase. Each phase may be required to be completed according to the approved Construction Schedule prior to the commencement of the next subsequent phase. CONTRACTOR shall incorporate and coordinate the Work of Separate Work Contracts relative to this Project.

### 3.04 PHASING OF THE WORK – GENERAL

- A. CONTRACTOR shall prepare the Construction Schedule in order to complete the Work and related activities in accordance with the phasing plan. CONTRACTOR shall include all costs to complete all Work within the Milestones and/or Contract Time.
- B. OWNER will be seriously damaged by not having all Work completed within the Milestones and/or Contract Time. It is mandatory the Work be complete within the Milestones and/or Contract Time.

### 3.05 PHASING OF THE WORK – SPECIFIC

- A. CONTRACTOR shall prepare the Construction Schedule, and shall complete the following, but not limited to Milestones, within the designated phases in accordance with the following:

**COMPLETE FOLLOWING AFTER COMPLETING SECTION 01010, EXHIBIT "A"**

- B. The Contract Time shall be a total of **123** calendar days from the date of commencement of the Contract Time.

END OF SECTION



CONTRACTOR shall commence performance of the Contract upon the date specified in the Notice to Proceed and shall furnish sufficient forces, facilities and materials, work such hours, including extra shifts and overtime operations, so as to fully perform the Work in accordance with the following Milestones.

Milestone	Description	Schedule	Liquidated Damages Amount Per Calendar Day
No. 1	<u>Notice of Intent to Award</u> : Day after School Board Approval	Anticipated: 1/21/2010	
No. 2	<u>Notice to Proceed</u> : Is established in accordance with Articles 1.27 and 2.2 of the General Conditions.	Anticipated: 2/14/2011	
No. 3	<u>Completion of Mobilization activities</u> : Is defined as Contractor mobilization completed, logistics plan submittal and approval (access, gates, parking, trailer locations, signage, site fencing complete, temporary offices complete (trailers storage bins, dumpsters), temporary utilities complete (water, electric, phone, sanitation, fire protection), Project signage complete, obtain all required permits, implementation of Storm Water Pollution Prevention measures, submission of CONTRACTOR Safety Plan, submission of CONTRACTOR Hazard Communication.	Anticipated: 2/28/2011	
No. 4	<u>Initial 60-Day Look Ahead Schedule and Major Milestones Schedule of Project</u>	TBD	
No. 5	<u>Detailed Schedule Complete</u> : is defined as an OR approved Detailed Construction Schedule that meets all the requirements outlined in Division 01 Sections 0136 and 01010	TBD	
No. 6	<u>Phase I Building Substantial Completion Date/(TCO)</u> :	Anticipated: 6/30/2011	

Milestone	Description	Schedule	Liquidated Damages Amount Per Calendar Day
No. 7	Complete Site Work, Landscaping, and Asphalt Overlay	TBD	
No. 8	Punch-List Completion: is defined by OR verified satisfactory completion of all outstanding punch-list items.	Anticipated: 7/30/2011	
No. 9	Close-out and Final Payment Application: Is established in accordance with Article 14.20 of the General Conditions	Anticipated: 8/10/2011	
No. 10	Total Contract Time:		

**SECTION 01020  
PROJECT FORMS****PART 1 – GENERAL****1.01 SCOPE**

- A. The following, but not limited to, administrative forms and documents listed in this Section to be utilized in the administration of the Work. Upon CONTRACTOR request Owner's Representative may approve the use of alternate forms.
- B. General Conditions, Supplementary Conditions and General Requirements shall govern the work of this Section.

**PART 2 – PRODUCTS (Not Applicable)****PART 3 - EXECUTION****3.01 FORMS**

- A. The following examples of forms will be made available through the Owner's Representative upon request as needed during completion of the Work:
  - 1. Allowance Disbursement Authorization
  - 2. Application for Payment (2 pages)
  - 3. Certificate of Substantial Completion
  - 4. Change Order
  - 5. Change Order Proposal
  - 6. Conditional Waiver and Release – Final Payment
  - 7. Conditional Waiver and Release – Progress Payment
  - 8. Consent of Surety Company to Final Payment
  - 9. Consent of Surety to Reduction in or Partial Release of Retainage
  - 10. Construction Directive
  - 11. Correction Notice
  - 12. Daily Construction Report
  - 13. Daily Time and Material Record
  - 14. Final Notice of End of Issue. Event, Condition, Circumstance, and/or Cause of Perceived or Actual Delay/Disruption/Interference/Hindrance/Acceleration
  - 15. Initial Notice of Start of Issue, Event, Condition, Circumstance, and/or Cause of Perceived Delay/Disruption/Interference/Hindrance/Acceleration
  - 16. Notice of Final Completion
  - 17. Notice of OWNER Assessment
  - 18. Notice to Proceed
  - 19. "Or Equal" Substitution Request
  - 20. Property Inventory
  - 21. Request for Information
  - 22. Request for Proposal
  - 23. Schedule of Values
  - 24. Submittal Log

25. Substitution Request
26. Three Day Notice
27. Transmittal
28. Unconditional Waiver and Release – Final Payment
29. Unconditional Waiver and Release – Progress Payment

### 3.02 PROCEDURES

- A. Allowance Disbursement Authorization: This form is used for the request and approval of Contract allowances.
- B. Application for Payment: This form is used in requesting a progress payment.
- C. Application for Payment (Multiple Projects): Alternate progress payment request form for contracts comprising more than one project.
- D. Certificate of Substantial Completion: This form is used according to Article 14.16 of the General Conditions.
- E. Change Order Proposal: This form is used to communicate proposed adjustments to the Contract Amount, Milestones and/or Contract Time.
- F. Change Order: This form is used to adjust the Contract Amount, Milestones and/or the Contract Time.
- G. Conditional Waiver and Release: This form is used according to Article 14.2.12.2 of the General Conditions.
- H. Consent of Surety Company to Final Payment: This form is used to provide consent of surety company as set forth in General Condition Article 14.20.8.
- I. Consent of Surety to Reduction in or Partial Release of Retainage: This form is used to provide consent of surety as set forth in General Condition Article 14.10.
- J. Construction Directive: This form is used to issue a Construction Directive.
- K. Correction Notice: This form is used to provide notice of defective Work.
- L. Daily Construction Report: This form is used to report daily Work activities of CONTRACTOR and/or Subcontractor.
- M. Daily Time and Material Record: This form is used to provide daily records as set forth in Article 11.8.1 of the General Conditions.
- N. Final Notice of End of Issue, Event, Condition, Circumstance, and/or Cause of Perceived or Actual Delay/Disruption/Interference/Hindrance/Acceleration: This form is used to provide notice as set forth in Article 12.5 of the General Conditions.

- O. Initial Notice of Start of Issue, Event, Condition, Circumstance, and/or Cause of Perceived Delay/Disruption/Interference/Hindrance/Acceleration: This form is used to provide notice as set forth in Article 12.4 of the General Conditions.
- P. Notice of Final Completion: This form is used according to Article 14.22 of the General Conditions.
- Q. Notice of OWNER Assessment: This form is used for all assessments and/or withholds by the OWNER, permitted under the Contract and/or required by law, including without limitation, stop notices, prevailing wage violations, liquidated damages, additional consultant services, OCIP premiums, etc.
- R. Notice To Proceed: This form is used to establish the date of Contract Time commencement and the date CONTRACTOR is authorized to commence performance of CONTRACTOR obligations.
- S. "Or Equal" Substitution Request: This form is used to submit a list of proposed "or equal" substitutions.
- T. Property Inventory: This form is used to establish OWNER property in a space.
- U. Request for Clarification: This form is to be used for clarification of the intent of the Contract Documents.
- V. Request for Proposal: This form is used to request a proposed adjustment in the Contract Amount, Milestones and/or Contract Time in response to the Work contained within the Request for Proposal.
- W. Schedule of Values: This form is used to establish the basis of the certified Application for Payment.
- X. Submittal Log: This form is a format for the listing of the required submittals.
- Y. Substitution Request: This form is used to submit proposed substitutions of materials and/or equipment no longer manufactured and/or which cannot be acquired from existing inventories.
- Z. Three Day Notice: This notice is used according to Article 15.5.12 of the General Conditions.
- AA. Transmittal: This form is used for transmission of items related to the Contract.
- BB. Property Inventory: This form is used to record OWNER property in a space.
- CC. Unconditional Waiver and Release: This form is used according to Article 14.2.12.1 of the General Conditions.
- DD. Unconditional Waiver and Release: This form is used according to Article 14.20.9 of the General Conditions.

END OF SECTION



**SECTION 01025  
ALLOWANCES****PART 1 – GENERAL****1.01 SECTION INCLUDES**

- A. This Section specifies administrative and procedural requirements governing Contract allowances.
  - 1. Allowances as set forth in the Specifications are to be used as compensation for items as set forth in this Section. The amounts listed in the schedule and/or Specifications are to be included in the base bid and shall be listed separately in the Schedule of Values and Application for Payment.
- B. Type of allowances include the following:

**1.02 RELATED SECTIONS**

- A. Section 01020: Project Forms
- B. Section 01050: Schedule of Values
- C. Section 01080: Application for Payment
- D. Divisions 2-16: Specifications

**1.03 ALLOWANCES**

- A. Use the allowances only as authorized for OWNER purposes and only by an approved allowance disbursement form that indicate the amounts to be charged to the respective allowance amount.
- B. At Substantial Completion of the Work or at any time designated by the OR, credit unused amounts remaining in the allowances to the OWNER by Change Order.

**1.04 ALLOWANCE DISBURSEMENT**

- A. CONTRACTOR shall submit a request for allowance disbursement on an allowance disbursement form. Include all substantiating and/or required data along with the request. Utilize the allowance disbursement authorization form as set forth in the Project Forms Section 01020.
- B. The request shall have the requested amount listed as an allowance disbursement without CONTRACTOR overhead and markup.
- C. Once the OR has accepted the disbursement, ARCHITECT and OR will sign the allowance disbursement form.

**PART 2 - PRODUCTS (Not Applicable)**

PART 3 - EXECUTION

3.01 SCHEDULE OF ALLOWANCES

A. Include in the base bid the following allowances in the following amounts:

<u>Section</u>	<u>Description</u>	<u>Allowance Amount</u>
----------------	--------------------	-------------------------

END OF SECTION



**SECTION 01030  
PROPOSAL ITEMS (ALTERNATES)**

**PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. This Section specifies administrative and procedural requirements governing bid items.

**1.02 RELATED SECTIONS:**

- A. Section 00200: Instructions to Offerors  
B. Section 00400: Offer and Acceptance Form  
C. Section 01005: Summary of the Work

**PART 2 - PRODUCTS (Not applicable)****PART 3 - EXECUTION****3.01 SPECIFIC:**

- A. A proposal item is an amount proposed by offerors and stated on the Offer and Acceptance Form for certain Work defined in the Proposal Documents that may be added to or deducted from the base offer amount if OWNER decides to accept a corresponding change in either the amount of Work to be completed, the Contract Documents, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
1. The amount added or deducted from the base offer is the net addition to or deducted from the base offer to incorporate offer item Work into the Work. Unless noted otherwise, no other adjustments are made to the Contract Amount, Milestones and/or the Contract Time.

**3.02 PROCEDURES:**

- A. CONTRACTOR shall modify or adjust affected adjacent Work as necessary to completely and fully integrate OWNER accepted bid item Work.
1. Include as part of each proposal offer item, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the bid item.
- B. Accepted proposal items are subject to the same terms and conditions as other Work of the Contract Documents.
- C. OWNER reserves the right to accept bid items for a period of ninety (90) days after proposal submission date.

- D. Schedule: A schedule of proposal items is included at the end of this Section. The Contract Documents referenced in the schedule identify necessary requirements to complete the Work described as specified for each bid item.

3.03 SCHEDULE OF PROPOSAL ITEMS: (See the Proposal Documents for Additional Information)

END OF SECTION

**SECTION 01050  
SCHEDULE OF VALUES**

**PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Procedure for submission of a certified Schedule of Values for review and approval by the OR.

**1.02 RELATED SECTIONS**

- A. Section 01020: Project Forms  
B. Section 01080: Application for Payment  
C. Section 01300: Submittals  
D. Section 01360: Construction Schedule

**PART 2 - PRODUCTS (Not applicable)****PART 3 - EXECUTION****3.01 PREPARATION**

- A. Upon receipt of the Notice of Intent to Award, CONTRACTOR shall commence preparation of a certified Schedule of Values in accordance with the form included in Section 01020, or as directed by OR.
- B. CONTRACTOR shall coordinate the preparation of a certified Schedule of Values with preparation of the cost loaded Detailed Construction Schedules.
- C. CONTRACTOR shall breakdown the total value of Work by Milestones shown in Section 01010, Phasing of Work, Appendix A to establish the format for a certified Schedule of Values. The total value of each Milestone shall be further broken down by the individual values of each schedule activity having duration of 1 to 14 calendar days. The total value of all schedule activities between Milestones shall be equal to the Milestone value and the total value of all Milestones shall be equal to the total cost of the Work. CONTRACTOR shall provide separate line items for labor and material when required by the OR.
- D. Include the following Project identification on a certified Schedule of Values:
1. Project name and location
  2. Project Number
  3. ARCHITECT name
  4. CONTRACTOR name
  5. Date of Submittal
- E. Round amounts to the nearest whole dollar; the total shall equal the Contract Amount.

- F. An approved certified Schedule of Values shall serve as the basis for the monthly certified Application for Payment.

3.02 SUBMITTAL

- A. Within ten (10) days after the date established in the Notice to Proceed, CONTRACTOR shall submit five (5) certified copies of a final Schedule of Values for review and approval by the OR.
- B. OR will review and if necessary, return the submitted Schedule of Values with summary comments noting items not in compliance with the requirements of the Contract Documents. CONTRACTOR shall revise the submitted Schedule of Values and return five (5) copies within three (3) days of receipt of summary comments.
- C. Signature by OR shall constitute acceptance of the submitted Schedule of Values.
- D. After the OR agrees to the Contractor's draft Schedule of Values, the CONTRACTOR shall submit five (5) certified and signed copies to OR for OR signature.
- E. A copy of the approved Schedule of Values will be transmitted to CONTRACTOR, and ARCHITECT.
- F. CONTRACTOR shall obtain OR approval of the Schedule of Values prior to submittal of the certified Application for Payment.

END OF SECTION

**SECTION 01080  
APPLICATION FOR PAYMENT****PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. This Section specifies administrative and procedural requirements relative to a certified Application for Payment.
  - 1. Coordinate the certified Schedule of Values and certified Application for Payment with, but not limited to, the Detailed Construction Schedule, submittal log and list of Subcontractors.

**1.02 RELATED SECTIONS:**

- 1. Section 01020: Project Forms
- 2. Section 01050: Schedule of Values
- 3. Section 01360: Construction Schedule
- 4. Section 01700: Contract Closeout

**PART 2 - PRODUCTS (Not applicable)****PART 3 - EXECUTION****3.01 APPLICATION FOR PAYMENT**

- A. Each certified Application for Payment shall be consistent with previous applications and payments as reviewed by ARCHITECT and/or OR, paid for by OWNER, and:
  - 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment Application Times: The period of Work covered by each Application for Payment is the payment date for each progress payment as specified in the General Conditions. The period covered by each Application for Payment is the previous month.
- C. Payment Application Forms: Use OWNER provided Expedition generated forms for the Application for Payment.
- D. Calculation of Payment: The Expedition generated Application for Payment is tied to the CONTRACTOR's "cost loaded" Detailed Construction Schedule. The OR, ARCHITECT and CONTRACTOR shall agree on the percent complete for each scheduled activity completed during the payment period. Each activity percent complete is multiplied times the activity "cost loaded" value to calculate payment to the CONTRACTOR. The sum of all activity values completed during the payment period shall be shown on the Application for Payment and paid to the CONTRACTOR.
- E. Pre-Approval Review: CONTRACTOR prepares a "draft" Application for Payment. The OR, ARCHITECT and CONTRACTOR meet during one of their regularly

scheduled progress meetings and agree on percents of completion for activities that progressed during the performance period. If required, the OR, ARCHITECT and CONTRACTOR shall field verify percentages in order to reach agreement. The OR directs CONTRACTOR to make necessary revisions prior to submittal.

- F. Application Submittal: The CONTRACTOR submits an Expedition generated Application for Payment and three (3) signed and certified printed originals to the OR. Within 7 days of receipt of Application for Payment, the OR must either validate or return the Application with a written statement of rejection. A validated Application for Payment shall be signed by the ARCHITECT and OR and processed for payment.
- G. Transmit each Application for Payment printed original with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to OR and ARCHITECT.
- H. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal for the first certified Application for Payment include, but are not limited to, the following:
1. Certified Schedule of Values (defined by OWNER Milestones).
  2. Performance and payment bonds. List of principal suppliers and fabricators.
  3. Worker Compensation certificates, if applicable.
  4. Auto Insurance, if applicable.
  5. Hazardous Material Insurance Certificates, if applicable.
  6. Detailed Construction Schedule
  7. Submittal Schedule
  8. Emergency Contact List
  9. Copies of authorizations and licenses from governing authorities for performance of the Work
- I. Application for Payment at Substantial Completion: Following OR issuance of the certificate of Substantial Completion, submit an Application for Payment:
1. Administrative actions, submittals and/or Work that shall precede or coincide with this application include:
    - a. Occupancy permits and similar approvals by authorities having legal jurisdiction over the Work.
    - b. Removal of temporary facilities and services.
    - c. Testing, adjusting and balance records.
    - d. Removal of surplus materials, rubbish, and similar elements.
    - e. Meter readings.
    - f. Start-up performance reports.
    - g. OWNER training and orientations.
    - h. Change over information related to OWNER occupancy, use, operation, and maintenance.
    - i. Final cleaning.
    - j. Ensure that incomplete Work is not accepted and will be completed without undue delay.
    - k. Advice on shifting insurance coverage.
    - l. List of defective Work, recognized as exceptions to certificate of Substantial Completion.

- m. Change of door locks to OWNER system.
- J. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include, but are not limited to, the following:
1. Completion of Contract Closeout requirements.
  2. Project record documents.
  3. Completion of final punch list items.
  4. Delivery of extra materials, products and or stock.
  5. Identification of unsettled claims.
  6. Proof that taxes, fees, and similar obligations are paid.
  7. Operating and maintenance instruction manuals.
  8. Consent of surety to final payment.
  9. Waivers and releases.
  10. Warranties, guarantees and maintenance agreements.

END OF SECTION





**SECTION 01100  
COORDINATION****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. This Section specifies administrative and procedural requirements necessary for coordinating Work operations including, but not limited to, the following:
1. General coordination procedures.
  2. Coordination drawings.

**1.2 RELATED SECTIONS**

- |    |                |                        |
|----|----------------|------------------------|
| A. | Section 01010: | Phasing of the Work    |
| B. | Section 01300: | Submittals             |
| C. | Section 01360: | Construction Schedule  |
| D. | Section 01420: | Testing and Inspection |
| E. | Section 01700: | Contract Closeout      |

**PART 2 - PRODUCTS (Not applicable)****PART 3 - EXECUTION****3.01 COORDINATION**

- A. CONTRACTOR shall coordinate operations included in various sections of the Contract Documents to assure efficient and orderly installation of each part of the Work. Coordinate Work operations included under related sections of the Contract Documents that depend on each other for proper installation, connection, and operation of the Work, including but not limited to:
1. Schedule construction operations in the sequence required where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
  3. Provide provisions to accommodate items scheduled for later installation.
  4. Prepare and administer provisions for coordination of drawings.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required in notices, reports, attendance at meetings, and:
1. Prepare similar memoranda for OR and Separate Work Contract where coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of schedules.
  - 2. Installation, relocation, and removal of temporary facilities.
  - 3. Delivery and processing of submittals.
  - 4. Progress meetings.
  - 5. Project closeout activities.
  
- D. Conservation: Coordinate Work operations to assure operations are carried out with consideration given to conservation of energy, water, materials, and:
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into the Work.

### 3.02 SUBMITTALS

- A. Coordination Drawings: CONTRACTOR shall prepare coordination drawings for coordination of installation of products and materials fabricated by separate entities. Prepare coordination drawings for those areas where limited space availability necessitates maximum utilization of space for efficient installation of different components.
  
- B. Prepare coordination drawings in the following manner:
  - 1. Mechanical, electrical, and plumbing Subcontractors are to first submit their respective Shop Drawings for review in order to make any necessary changes prior to going through the coordination process.
  - 2. The routing process will begin with the HVAC Subcontractor who will provide a black line mylar denoting all of the approved ductwork. HVAC Subcontractor is to locate on mylar all ductwork and/or piping in orange pencil lines. Forward drawings to plumbing Subcontractor.
  - 3. Plumbing Subcontractor is to locate the plumbing lines on mylar in blue pencil lines. Fire sprinkler Subcontractor is to locate all piping on mylar in red pencil lines and forward drawing to electrical Subcontractor.
  - 4. Electrical Subcontractor to indicate service and feeder conduit runs in green pencil lines and forward to CONTRACTOR.
  - 5. CONTRACTOR will perform the last coordination review. As each coordination drawing is completed, CONTRACTOR will meet with ARCHITECT and OR to review and resolve all conflicts on the coordination drawings.
  - 6. All coordination meetings will be held in the Project field office of CONTRACTOR. CONTRACTOR is required to distribute Shop Drawings, cut sheets and submittals to Subcontractors where appropriate. Reviewed

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Coordination

coordination drawings will be maintained in the Project field office of  
CONTRACTOR.

END OF SECTION



**SECTION 01110  
APPLICABLE STANDARDS****PART ONE - GENERAL****1.01 SCOPE**

Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.

**1.02 PURPOSE OF STANDARDS**

- A. The sole purpose of these standards is to govern the work of the Contractor on this Project.
- B. The fact that any particular standard is listed in these specifications shall not be construed as a representation that the Architect and/or Engineers have followed the standard in the design of this work.

**1.03 QUALITY ASSURANCE**

- A. Familiarity with pertinent codes and standards: In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.
- B. Rejection of non-complying items: The Architect reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirement. The Architect further reserves the right, and without prejudice to other recourse the Architect may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Architect and the Owner.
- C. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship which meet or exceed the specifically named code or standard.
- D. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect, to deliver to the Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Architect, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Architect.

**1.04 STANDARDS**

Insofar as is applicable, the following standards shall govern the work of this Contract.

- 1. AISC - American Institute of Steel Construction, Inc.  
One East Wacker Drive, Suite 3100  
Chicago, IL 60601-2001
- 2. ANSI - American National Standards, Institute

(successor to USASI and ASA)  
25 West 43<sup>rd</sup> Street, 4<sup>th</sup> Floor  
New York, New York 10036

3. ASTM - American Society for Testing and Materials  
100 Barr Harbor Drive  
West Conshohocken, Pennsylvania 19428-2959
4. AWS - American Welding Society, Inc.  
550 NW LeJeune Road  
Miami, Florida 33126
5. CRSI - Concrete Reinforcing Steel Institute  
933 North Plum Grove Road  
Schaumburg, Illinois 60173-4758
6. CS - Commercial Standards of NBS, U.S. Dept. of  
Commerce, Government Printing Office  
Washington, D.C. 20402
7. FM - Factory Mutual Global  
1301 Atwood Avenue/P.O. Box 7500  
Johnston, RI 02919
8. NAAMM - The National Association of Architectural Metal Manufactures  
8 South Michigan Avenue, Suite 1000  
Chicago, Illinois 60603
9. NEC - National Electrical Code
10. NEMA - National Electrical Manufacturers Association  
1300 North 17<sup>th</sup> Street, Suite 1847 Rosslyn, VA 22209
11. NFPA - National Fire Protection Association  
1 Batterymarch Park  
Quincy, Massachusetts 02169-7471
12. PDCA - Painting and Decorating Contractors of America  
9380 Wehrle Drive  
Clarence, NY 14031
13. SMACNA- Sheet Metal and Air Conditioning Contractors  
National Association, Inc.  
4201 Lafayette Center Drive  
Chantilly, VA 20151-1209
14. TCA - Tile Council of America, Inc.  
100 Clemson Research Blvd.  
Anderson, SC 29625
15. UL - Underwriters' Laboratories, Inc.  
333 Pfingsten Road  
Northbrook, Illinois 60062-2096

## 1.05 DEFINITIONS

- A. Wherever the terms "necessary", "suitable", "as directed", "when directed", "good and sufficient", "approved", or other general qualifying terms are used on the drawings, they are deemed to be followed by the words "in the opinion of the Architect", or "by the Architect", as the case may be.
- B. The terms "approval", "approved", "approved equal", "or equal", or "other approved", means approved by the Architect.
- C. "Furnish" means to supply and deliver materials to project site, ready for installation. "Install" means to place, in final position for service or use, completely anchored and connected. This would include doing all work necessary to make item being installed fully operational to serve its intended purpose. "Provide" means to furnish and install complete and ready for intended use. When neither furnish, install nor provide is stated, "provide" is implied.

## 1.06 ARRANGEMENT OF SPECIFICATIONS AND DRAWINGS

The specifications and drawings are separated into numbered and titled sections for convenience of reference. Neither the Owner nor the Architect assumes any responsibility for defining the limits on any subcontracts on account of the arrangement of the specifications and/or drawings. Notwithstanding the appearance of such language in the various sections of the specifications as "The Masonry Contractor", the Contractor is responsible to the Owner for the entire contract and the execution of all the work referred to in the Contract Documents. Regardless of so called "trade customs", any work called for in any section of the Specifications or on any sheet of the drawings must be performed (or furnished) by the Contractor.

END OF SECTION





**SECTION 01120  
CUTTING AND PATCHING**

**PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. This Section specifies administrative and procedural requirements for cutting and patching.

**1.02 RELATED SECTIONS**

- |    |                |                        |
|----|----------------|------------------------|
| A. | Section 01050: | Schedule of Values     |
| B. | Section 01100: | Coordination           |
| C. | Section 01130: | Field Engineering      |
| D. | Section 01200: | Project Meetings       |
| E. | Section 01300: | Submittals             |
| F. | Section 01360: | Construction Schedule  |
| G. | Section 01450: | Testing and Inspection |
| H. | Section 01740: | Warranties             |

**PART 2 - PRODUCTS (Not applicable)****PART 3 - EXECUTION****3.01 SUBMITTALS**

- A. The word "cutting" as used in the Contract Documents includes, but is not limited to, cutting, drilling, chopping, and other similar operations and the word "patching" includes, but is not limited to, patching, rebuilding, reinforcing, repairing, refurbishing, restoring, replacing, or other similar operations.
- B. Cutting and Patching Proposal: CONTRACTOR shall submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Contract Documents requires approval of these procedures before proceeding. Include the following information, as applicable, in the proposal:
1. Describe the extent of cutting and patching required. Denote how it will be performed and indicate why it cannot be avoided.
  2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance or other significant visual elements.
  3. List products to be used and firms or entities that will perform this Work.
  4. Indicate dates when cutting and patching will be performed.
  5. Utilities: List utilities that cutting and patching operations will disturb or affect. List utilities to be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
7. Review by ARCHITECT and OR prior to proceeding with cutting and patching does not waive ARCHITECT right to later require complete removal and replacement of defective Work.

### 3.02 QUALITY ASSURANCE

- A. Requirements for structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
  1. Obtain approval from ARCHITECT and OR of the cutting and patching proposal before cutting and patching the following structural elements:
    - a. Foundation construction
    - b. Bearing and retaining walls
    - c. Structural concrete
    - d. Structural steel
    - e. Lintels
    - f. Timber and primary wood framing
    - g. Structural decking
    - h. Stair systems
    - i. Miscellaneous structural metals
    - j. Exterior curtain-wall construction
    - k. Equipment supports
    - l. Piping, ductwork, vessels, and equipment
    - m. Structural systems of special construction in Division 13 Sections.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
  1. Obtain review of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
    - a. Primary operational systems and equipment
    - b. Air or smoke barriers
    - c. Water, moisture, or vapor barriers
    - d. Membranes and flashings
    - e. Fire protection systems
    - f. Noise and vibration control elements and systems
    - g. Control systems
    - h. Communication and/or data systems
    - i. Conveying systems
    - j. Electrical wiring systems
    - k. Operating systems of special construction in Division 13 Sections

- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the opinion of ARCHITECT, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.
1. If possible, retain the original installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.
    - a. Firestopping
    - b. Acoustical ceilings
    - c. Acoustical panels
    - d. Finished wood flooring
    - e. Synthetic sports flooring
    - f. Carpeting
    - g. HVAC enclosures, cabinets, or covers
    - h. Ceramic and quarry tile
    - i. Gypsum board
    - j. Masonry (exterior and interior where exposed)
    - k. Tack boards
    - l. Casework
    - m. Finish carpentry

### 3.03 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

### 3.04 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
1. Before proceeding, meet at the Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

### 3.05 PREPARATION

- A. Temporary support: Provide adequate temporary support of existing improvements or Work to be cut.
- B. Protection: Protect existing improvements and Work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of existing improvements or Work that might be exposed during cutting and patching operations.

- C. Avoid interference with operation of adjoining areas or interruption of free passage to adjoining areas.
- D. Where the Work requires sandblasting of existing surfaces in order to receive new materials secured by cementitious, adhesive or chemical bond, completely remove existing finishes, stains, oil, grease, bitumen, mastic and adhesives or other substances deleterious to the new bonding and/or fastening of new Work. Utilize wet sand blasting for interior surfaces and for exterior surfaces where necessary to prevent objectionable production of dust.

### 3.06 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Carefully remove existing Work to be salvaged and/or reinstalled. Protect and store for reuse into the Work. Verify compatibility and suitability of existing substrates before starting the Work.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining Work. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.
  - 1. In general, where cutting, provide hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Cut through concrete and masonry using a cutting machine, such as a carborundum saw or a diamond-core drill. Saw cut reinforcing bars and paint ends with bituminous paint except where bonded into new concrete or masonry.
  - 4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating, backfill, or re-compaction.
  - 5. Woodwork: Cut and or remove to a panel or joint line.
  - 6. Sheet Metal: Remove back to joint, lap, or connection. Secure loose or unfastened ends or edges and seal watertight.
  - 7. Glass: Remove cracked, broken, or damaged glass and clean rebates and stops of setting materials.
  - 8. Plaster: Cut back to sound plaster on straight lines, and back bevel edges of remaining plaster. Trim existing lath and prepare for new lath.
  - 9. Gypsum Wallboard: Cut back on straight lines to undamaged surfaces with at least two opposite cut edges centered on supports.

10. Acoustical ceilings: Remove hanger wires and related appurtenances where ceilings are not scheduled to be installed.
  11. Tile: Cut back to sound tile and backing on joint lines.
  12. Flooring: Completely remove flooring and clean backing of prior adhesive. Carefully remove wood flooring for patching and repairing of existing wood flooring scheduled to remain.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with required tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation. Verify conditions of existing substrates prior to executing Work.
  2. Restore exposed finishes of patched areas and extend finish restoration into retaining adjoining construction in a manner that will eliminate all evidence of patching and refinishing.
  3. Concrete: Maintain cut edges in a moist condition for twenty four (24) hours prior to the placement of new concrete. In lieu of this an epoxy adhesive may be provided. Finish placed concrete to match existing unless noted otherwise. Concrete shall provide a compressive strength 3,000 psi where installed to repair and/or match existing improvements, unless noted otherwise.
  4. Metal Fabrications: Items to remain exposed shall have their edges cut and ground smooth and rounded.
  5. Sheet Metal: Replace removed and/or damaged sheet metal items as required for new Work.
  6. Glass: Install matching glass and re-seal exterior window assemblies.
  7. Lath and Plaster: Install new lath materials to match existing and fasten to supports at 6" centers. Provide a 6" lap where new lath to adjoins existing lath. Fasten new lath as required for new Work. Restore paper backings as required. Apply a bonding agent on cut edges of existing plaster. Apply three coat plaster of the type, thickness, finish, texture, and color to match existing.
  8. Gypsum Wallboard: Fasten cut edges of wallboard. Install patches with at least two opposite edges centered on supports and secure at 6" centers. Tape and finish joints and fastener heads. Patching shall be non-apparent when painted and/or finished.
  9. Acoustical Ceilings: Comply with the requirements for new Work specified in related sections of the Contract Documents.
  10. Resilient Flooring: Completely remove flooring and prepare substrate for new material.

11. Painting: Prepare areas to be patched, patch and paint as specified under related sections of the Contract Documents.

3.07 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged coverings to their original condition.

END OF SECTION

**SECTION 01130  
FIELD ENGINEERING**

**PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Surveying requirements for the Work.

**1.02 RELATED SECTIONS**

- A. Section 01005: Summary of the Work
- B. Section 01360: Construction Schedule
- C. Section 01700: Contract Closeout

**PART 2 - PRODUCTS (Not applicable)****PART 3 - EXECUTION****3.01 SUBMITTALS**

- A. CONTRACTOR shall submit the name and address of the State of Georgia licensed surveyor to ARCHITECT and OR including any changes as they may occur.
- B. At request of ARCHITECT and OR, CONTRACTOR shall submit copies of cut sheets, coordinate plots, data collector printouts, and other documentation as available to verify completeness and/or accuracy of field surveying Work

**3.02 LAYOUT OF THE WORK**

- A. CONTRACTOR shall employ a State of Georgia licensed surveyor to lay out the entire Work, set grades, lines, levels, control points, vertical and horizontal control, elevations, grids and positions. Before the commencement of Work, surveyor shall, in conjunction with OWNER provided engineering survey of the Project site, locate all reference points and benchmarks, then lay out all lines, elevations, and measurements for the entire Work including but not limited to, buildings, grading, paving and utilities.

**3.03 SURVEY REQUIREMENTS where necessary to establish grades where structures are removed.**

- A. Establish a minimum of two permanent horizontal and vertical control points on the Project site, remote from the building area, referenced to data established by the survey control points.
- B. Indicate the reference points on the project record drawings with the basis of elevation being the established benchmarks.
- C. Establish lines, grades, locations and dimensions by instrumentation. From time to time, verify the layout of all Work by the same methods.
- D. Provide grade stakes and elevations to construct over excavation and re-compaction, rough and final grades, paved areas, curbs, gutters, sidewalks, building pads, landscaped areas, and other areas as required.

- E. Calculate and layout proposed finished elevations and intermediate control as required providing smooth transitions between the spot elevations indicated in the Contract Documents.
- F. Provide stakes and elevations for grading, fill, and topsoil placement.
- G. Provide adequate horizontal and vertical control to locate utility lines, including but not limited to, storm, sewers, water mains, gas, electric and signal and provide vertical control in proportion to the slope of the line as required for accurate construction. Dry utilities will be based upon adequate horizontal and vertical control layout. Prior to trench closure, survey and record invert and flow line elevations. Survey and record top of curb and flow line elevations on finished concrete or AC surfaces at key locations such as BC's, EC's, grade breaks, corners or angle points in sufficient number to demonstrate the Work complies with the intent of the Contract Documents.
- H. Provide horizontal and vertical control for batter boards for drainage, utility, and other on-site structures as required.
- I. Submit a certification signed by the surveyor confirming the elevations and locations of improvements are in conformance with the Contract Documents. The statement shall include survey notes for the finish floor and building pad, showing the actual measured elevations on the completed sub-grade, recorded to the nearest 0.01'. Building pad tolerance will be  $\pm 0.10'$ .
- J. Contractor is not to assume that there will be adequate fill material on site, and may be required to provide fill dirt as needed to bring the site to a level grade.

#### 3.04 RECORD DRAWINGS

- A. Upon Substantial Completion, CONTRACTOR shall obtain and pay for reproducible transparencies of the as built survey drawings. Deliver to OR, final "record" drawings of the original drawings and completed Work within specified tolerances.
- B. Record drawings shall indicate locations by coordinate of all utilities onsite with top of pipe elevations at major grade and alignment changes, rim grate or top-of-curb and flow line elevations of all drainage structures and manholes.
- C. Completed record drawing transparencies shall be signed and certified as correct and within specified tolerances by the licensed surveyor.
- D. Attention is called to other sections of the Contract Documents requiring verification or measurements of installed Work by survey. Surveyor shall perform and certify all such surveys or verification is completed in accordance with the Contract Documents.

END OF SECTION



**SECTION 01160  
REQUEST FOR INFORMATION**

**PART ONE - GENERAL**

1.01 SCOPE

- A. Procedure for requesting clarification of the intent of the Contract Documents.
- B. General Conditions, Supplementary Conditions and General Requirements shall govern the work of this Section.

1.02 RELATED SECTIONS

- A. Section 01005: Summary of the Work
- B. Section 01020: Project Forms
- C. Section 01700: Contract Closeout

**PART TWO - PRODUCTS (Not applicable)**

**PART THREE- EXECUTION**

3.01 PROCEDURE

- A. CONTRACTOR shall prepare a Request for Information on the form provided in Section 01020. CONTRACTOR shall transmit the Request for Information to the OWNER'S REPRESENTATIVE.
- B. ARCHITECT's response is a clarification of the intent of the Contract Documents and does not authorize changes in the Contract Amount, Milestones and/or Contract Time. ARCHITECT responses shall be routed through the OWNER'S REPRESENTATIVE for approval before being released to the CONTRACTOR.
- C. A Request for Information may be returned with the notation "Not Reviewed" if:
  - 1. The requested information is not ambiguous or unclear;
  - 2. The requested information is equally available to the requesting party by researching and/or examining the Contract Documents;
  - 3. CONTRACTOR has not reviewed the Request for Information prior to submittal.
- D. Allow a minimum of nine (9) days for review and response time, after receipt by ARCHITECT and OWNER'S REPRESENTATIVE. CONTRACTOR shall verify and is responsible in verifying ARCHITECT and OWNERS REPRESENTATIVE receipt of a Request for Information.
- E. Changes or alterations to the approved drawings or specifications shall be made by means of addenda or change order.

END OF SECTION



**SECTION 01200  
PROJECT MEETINGS**

**PART ONE - GENERAL**

1.01 SCOPE

- A. This Section specifies administrative and procedural requirements for Project meetings, including but not limited to, the following:
1. Job start meeting
  2. Progress meetings
  3. Meetings as required by the OWNER'S REPRESENTATIVE.
- B. General Conditions, Supplementary Conditions and General Requirements shall govern the work of this Section.

1.02 RELATED SECTIONS

- A. Section 01020 Project Forms  
B. Section 01300 Submittals  
C. Section 01360 Construction Schedule

**PART TWO - PRODUCTS (Not applicable)**

**PART THREE - EXECUTION**

3.01 JOB START MEETING

- A. The OWNER'S REPRESENTATIVE will schedule a job start meeting before starting the Work, at a time and date determined by OWNER'S REPRESENTATIVE. Meeting shall be held at the Project site or another location as determined by OWNER'S REPRESENTATIVE. Meeting will be held in order to review responsibilities, procedures, and other administrative requirements contained within the Contract Documents.
- B. Authorized representatives of OWNER, ARCHITECT, CONTRACTOR and the SCHOOL (Kitchen Manager, Principal, Custodian). All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda items shall include significant items which could affect progress of the Work, including, but not limited to the following:
1. Preliminary Construction Schedule
  2. Critical work sequencing
  3. Designation of responsible personnel
  4. Identification of OWNER'S REPRESENTATIVE
  5. Procedures for processing field decisions
  6. Request for Proposal
  7. Construction Directive and Change Order

8. Procedures for processing Applications for Payment
9. Submittal of Shop Drawings, Product Data, material lists, and Samples
10. Preparation of project record documents
11. Use of the Project site and/or premises
12. Parking availability
13. Office, work, and storage areas
14. Equipment deliveries and priorities
15. Safety procedures
16. First Aid
17. Security
18. Housekeeping
19. Working hours
20. Contract Compliance Officer
21. Insurance Services
22. Environmental Health & Safety

- D. ARCHITECT shall prepare and issue meeting minutes to attendees and interested parties no later than five (5) calendar days after the meeting date.

### 3.02 PROGRESS MEETINGS

- A. OWNER'S REPRESENTATIVE conducted progress meetings will be held at the Project site, as deemed necessary by the OWNER'S REPRESENTATIVE.
- B. In addition to representatives of the CONTRACTOR, OWNER, and ARCHITECT, each Subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of the work shall, if requested by OR, be represented at these meetings. All participants shall be familiar with the project and authorized to conclude all matters relating to the work.
- C. Failure of the contractor to be represented at any progress meeting which is held at a mutually agreed time or for which a written notice is given, shall not relieve the CONTRACTOR from abiding by any and all OR and/or ARCHITECT determinations or directives issued at such meeting.
- D. OR will review and correct or approve ARCHITECT'S minutes of the progress meeting and will review other significant items affecting progress.
- E. No later than three (3) calendar days after each progress meeting the ARCHITECT will prepare and distribute meeting minutes to all required parties after approval from OR. Include a brief summary, in narrative form, of progress, decisions, directives, actions taken and all other issues since the previous meeting and report.
1. Schedule Update: If required, CONTRACTOR shall revise the Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the next regularly scheduled progress meeting.
  2. Aerial Photography: CONTRACTOR shall provide monthly aerial photography of the site/building. CONTRACTOR shall have a professional photographer provide three (3) different angled view aerial photographs of the site/building taken during

the last week of each month. The aerial photographs shall be distributed to the OWNER via compact disk in .jpeg format along with one set of 8x10 inch color prints. In addition the CONTRACTOR shall submit one set of color prints to the ARCHITECT. Aerial photography shall begin within one week after the Notice to Proceed has been issued and will continue until the Certificate of Substantial Completion has been issued.

END OF SECTION



**SECTION 01300  
SUBMITTALS****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Administrative and procedural requirements for submittals required for the Work, including but not limited to; Shop Drawings, Product Data, Samples, material lists, and quality control items as required by the Contract Documents.
- B. Wherever possible, throughout the Contract Documents, the minimum acceptable quality of workmanship and products has been defined by the name and catalog number of a manufacturer and by reference of recognized industry standards.
- C. To ensure that specified products are furnished and installed in accordance with the design intent, procedures have been established for submittal of design data and for its review by ARCHITECT, OR and/or others.

**1.02 RELATED SECTIONS**

- A. Section 01010: Phasing of the Work
- B. Section 01020: Project Forms
- C. Section 01050: Schedule of Values
- D. Section 01080: Application for Payment
- E. Section 01100: Coordination
- F. Section 01120: Cutting and Patching
- G. Section 01130: Field Engineering
- H. Section 01330: Storm Water Pollution Prevention
- I. Section 01360: Construction Schedule
- J. Section 01420: Testing and Inspection
- K. Section 01450: Test and Balance
- L. Section 01500: Construction Facilities and Temporary Controls
- M. Section 01640: Substitutions
- N. Section 01700: Contract Closeout
- O. Section 01740: Warranties

**PART 2 – PRODUCTS (Not applicable)****PART 3 - EXECUTION****3.01 PROCEDURES**

- A. CONTRACTOR shall package each submittal appropriately for transmittal and handling. CONTRACTOR shall transmit each submittal to ARCHITECT with concurrent copy of the transmittal to the OR. ARCHITECT and/or OR will not accept submittals received from sources other than from CONTRACTOR.
- B. After ARCHITECT review, ARCHITECT will transmit submittals to OR and OR shall further distribute to CONTRACTOR, OR and/or others as required. Work shall not commence, unless otherwise approved by OR, until approved submittals are transmitted to CONTRACTOR.

- C. CONTRACTOR shall clearly identify any deviations from the Contract Documents on each submittal. Any deviation not so noted even though stamped reviewed is not acceptable.
- D. CONTRACTOR shall coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities requiring sequential activity.
- E. Timing of Submittals:
  - 1. In accordance with General Conditions, CONTRACTOR shall submit to ARCHITECT, with copy of transmittal to the OR, those Shop Drawings and Product Data, diagrams, materials lists, Samples and other submittals required by the Contract Documents.
  - 2. The schedule of submittals shall provide adequate time between submittals in order to allow for proper review without negative impact to the Construction Schedule.
  - 3. Schedule of submittals shall be related to Work progress, and shall be so organized as to allow sufficient time for transmitting, reviewing, corrections, resubmission, and re-reviewing.
  - 4. CONTRACTOR shall coordinate submittal of related items and ARCHITECT reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received by ARCHITECT.
  - 5. CONTRACTOR shall revise, update and submit submittal schedule to ARCHITECT and OR on the first of each month, or as required by OR.
  - 6. CONTRACTOR shall allow in the Detailed Construction Schedule, at least seven (7) days for ARCHITECT review following ARCHITECT receipt of submittal. For mechanical, plumbing, electrical, and other submittals requiring joint review with OR, CONTRACTOR shall allow a minimum of seven (7) days following ARCHITECT receipt of submittal.
  - 7. No adjustments to the Contract Time and/or Milestones will be authorized because of a failure to transmit submittals to ARCHITECT sufficiently in advance of the Work to permit review and processing.
  - 8. In case of product substitution, Shop Drawing preparation shall not commence until such time ARCHITECT and OR reviews said submittal relative to the General Conditions.
- F. If required, resubmit submittals in a timely manner. Resubmit as specified for initial submittal but identify as such. Review times for re-submitted items shall be as per the time frames for initial submittal review.
- G. Shop Drawing preparation shall not commence until such time as CONTRACTOR receives Product Data approval.



- H. ARCHITECT, or authorized agent, will stamp each submittal with a uniform, action stamp. ARCHITECT, or authorized agent, will mark the stamp appropriately to indicate the action taken, as follows:
1. Final Unrestricted Release: When ARCHITECT, or authorized agent, marks a submittal "Reviewed," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
  2. Final-But-Restricted Release: When ARCHITECT, or authorized agent, marks a submittal "Reviewed as Noted," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
  3. Returned for Re-submittal: When ARCHITECT, or authorized agent, marks a submittal "Rejected, Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat as necessary to obtain different action mark. In case of multiple submittals covering same items of Work, CONTRACTOR is responsible for any time delays, schedule disruptions, out of sequence Work, or additional costs due to multiple submissions of the same submittal item. Do not use, or allow others to use, submittals marked "Rejected, Revise and Resubmit" at the Project site or elsewhere where Work is in progress.
  4. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the ARCHITECT, or authorized agent, will return the submittal marked "Action Not Required".

### 3.02 SHOP DRAWINGS

- A. Shop Drawings are original drawings prepared by CONTRACTOR, Subcontractor, supplier, or distributor illustrating some portion of Work by showing fabrication, layout, setting, or erection details. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings.
- B. Produce Shop Drawings to an accurate scale that is large enough to indicate all pertinent features and methods. Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 x 11 inches but no larger than 24 x 36 inches.
- C. Shop Drawings shall include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
1. Dimensions
  2. Identification of products and materials included by sheet and detail number.
  3. Compliance with specified standards.
  4. Notation of coordination requirements.
  5. Notation of dimensions established by field measurement.

- D. Provide a space of approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record CONTRACTOR and ARCHITECT review, and the action taken. Include the following information on the label for processing and recording action taken:
1. Project name.
  2. Date.
  3. Name and address of ARCHITECT.
  4. Name and address of CONTRACTOR.
  5. Name and address of Subcontractor.
  6. Name and address of supplier.
  7. Name and address of manufacturer.
  8. Name and title of appropriate Specification section.
  9. Drawing number and detail references, as appropriate.
- E. Unless otherwise agreed to or indicated in individual Specification sections, submit a sufficient number to allow for adequate CONTRACTOR, Subcontractor, supplier, manufacturer and fabricators distribution plus two sets to be retained by ARCHITECT, one set to OR and one set to OR. .

### 3.03 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of Work or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, wiring diagrams, schedules, illustrations, or performance curves.
1. Mark each copy to show or delineate pertinent materials, products, models, applicable choices, or options. Where Product Data includes information on several products that are not required, clearly mark copies to indicate the applicable information. Include the following information:
    - a. Manufacturer's printed recommendations.
    - b. Compliance with trade association standards.
    - c. Compliance with recognized testing agency standards.
    - d. Application of testing agency labels and seals.
    - e. Notation of dimensions verified by field measurement.
    - f. Notation of coordination requirements.
    - g. Notation of dimensions and required clearances.
    - h. Indicate performance characteristics and capacities.
    - i. Indicate wiring diagrams and controls.
  2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
- C. Required Copies and Distribution: Same as denoted in sub - section 3.02, E.

### 3.04 SAMPLES

- A. Procedure:

1. Submit Samples of sufficient size, quantity, cured and finished and physically identical to the proposed product or material. Samples include partial or full sections or range of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches denoting color, texture, and/or pattern.
    - a. Mount or display Samples in the manner to facilitate review of qualities indicated. Include the following:
      1. Specification section number and reference.
      2. Generic description of the Sample.
      3. Sampling source.
      4. Product name or name of manufacturer.
      5. Compliance with recognized standards.
      6. Availability and delivery time.
  2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
    - a. Where variations in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show the approximate limits of the variations.
    - b. Refer to other Specification sections for requirements for Samples that illustrate workmanship, fabrication techniques, assembly details, connections, operation, and similar construction characteristics.
    - c. Refer to other sections for Samples to be returned to CONTRACTOR for incorporation into the Work. Such Samples must be undamaged at time of installation. On the transmittal indicate special requests regarding disposition of Sample submittals.
    - d. Samples not incorporated into the Work, or otherwise not designated as OWNER property, remain the property of CONTRACTOR and shall be removed from the Project site prior to Substantial Completion.
  3. Color and Pattern: Whenever a choice of color or pattern is available in a specified product, submit accurate color chips and pattern charts to OR for review and selection.
  4. Number Required: Submit 5 of each. Two will be returned to CONTRACTOR with one to ARCHITECT, OR, and OR.
- B. When specified, erect field Samples and mock-ups at the Project site to illustrate products, materials, or workmanship and to establish standards by which completed Work shall be judged.
- C. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of the Work. Sample sets may be used to obtain final acceptance of the Work associated with each set.

3.05 QUALITY CONTROL SUBMITTALS

- A. Submit quality control submittals, including design data, certifications, manufacturer's field reports, and other quality control submittals as required under other sections of the Contract Documents.
- B. When other sections of the Contract Documents require manufacturer's certification of a product, material, and/or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
- C. Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the represented company.
- D. Requirements for submittal of inspection and test reports are specified in other sections of the Contract Documents.

END OF SECTION

**SECTION 01330  
STORM WATER POLLUTION PREVENTION**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Preparation, implementation, and monitoring of Storm Water Pollution Prevention Plan (SWPPP) for the purpose of preventing the discharge of pollutants from the Project site into receiving waters. This includes the elimination of pollution discharges such as improper dumping, spills or leakage from storage tanks or transfer areas.
- B. Compliance with local, state, and federal regulations.

**1.02 RELATED SECTIONS**

- A. Section 01300: Submittals
- B. Section 01700: Contract Closeout
- C. Section 02540: Erosion, Sediment and Pollution Controls

**PART 2 – PRODUCTS**

**2.01 MATERIALS**

- A. Provide the quality, grade and type of materials as specified in BMP Handbook required by local authorities.

**PART 3 – EXECUTION**

**3.01 QUALITY ASSURANCE**

- A. Comply with the following as a minimum requirement:
  - 1. Georgia Storm Water Best Management Practice Handbook for Construction Activity (BMP Handbook) 1993 Edition.

**END OF SECTION**



**SECTION 01350  
PROJECT CONTROLS TOOLS**

**PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. This Section outlines the administrative and procedural requirements for training, implementing and utilizing project controls tools on the Project.

**1.02 RELATED SECTIONS**

- |    |                |  |
|----|----------------|--|
| A. | Section 01005: | Summary of the Work                            |
| B. | Section 01010: | Phasing of the Work                            |
| C. | Section 01050: | Schedule of Values                             |
| D. | Section 01080: | Application for Payment                        |
| E. | Section 01300: | Submittals                                     |
| F. | Section 01360: | Construction Schedule                          |
| G. | Section 01500: | Construction Facilities and Temporary Controls |
| H. | Section 01700: | Contract Closeout                              |

**PART 2 – PRODUCTS****2.01 SOFTWARE**

- A. OWNER shall use an integrated project control system utilizing Primavera P3 Engineering and Construction Software for construction scheduling and OWNER Project Management software for document management and control. The software designated by the OWNER shall be accessible by CONTRACTOR, ARCHITECT/ENGINEER and OWNER through the internet. The CONTRACTOR shall use the OWNER Primavera P3 Engineering and Construction Software to prepare and maintain the Preliminary and Detailed Construction Schedules for the Project, and the CONTRACTOR, ARCHITECT/ENGINEER and OWNER shall use the OWNER Project Management software for document management to track and control all construction project documentation on generated forms that shall include, but not limited to, Contact Directory, Request for Information, Request for Proposal, Change Order Proposal, Construction Directive, Change Orders, Minutes of Meetings, Pay Requests, Schedules and all OWNER and CONTRACTOR communications such as Correspondence, Transmittals, Insurance Certificates, Telephone Records, Submittals, Action Items, Daily Reports and Punch Lists required under any Contract Documents and this Contract.

**2.02 HARDWARE**

- A. CONTRACTOR shall provide field office hardware to support the Primavera P3 Engineering and Construction Software and the OWNER Project Management software specified in Section 01500, Construction Facilities and Temporary Controls.

**PART 3 – EXECUTION****3.01 TRAINING AND SYSTEM OPERATION**

- A. CONTRACTOR shall utilize the complete capabilities of the OWNER Project Control Tools (PCT) to meet the requirements of this Section. The CONTRACTOR shall provide a highly trained and experienced construction project controls staff member knowledgeable in construction work sequencing, productivity, scheduling and application of the PCT software. This staff member, along with the CONTRACTOR's management team, shall work closely with the OWNER and ARCHITECT/ENGINEER to deliver the documents outlined in this Section.

### 3.02 SCOPE OF PCT SYSTEM

- A. The OWNER shall designate the Project Control Tools (PCT) to be utilized by the OWNER, ARCHITECT/ENGINEER and CONTRACTOR. The primary function of the PCT system is to facilitate timely processing and approval of all Contract documentation in coordination with the Detailed Construction Schedule prepared by the CONTRACTOR and approved by the OWNER and ARCHITECT/ENGINEER. This system shall utilize Primavera P3 Engineering and Construction software for Project scheduling, as specified and discussed in Section 01360, and OWNER Project Management software for document management and control. The OWNER Project Management software for document tracking and control software shall:

1. Facilitate CONTRACTOR, ARCHITECT/ENGINEER and OWNER teamwork and communications;
2. Facilitate turn-around time with regard to responses and approvals;
3. Provide a central location for all Project information to facilitate all Project participants in the performance of their assigned tasks;
4. Provide a standard system of Project reporting and administration with accountability.

- B. The CONTRACTOR, ARCHITECT/ENGINEER and OWNER shall utilize the system to create the required Project documents and monthly Project status reports. All Project documents generated by the CONTRACTOR, ARCHITECT/ENGINEER and the OWNER shall be created and maintained within the PCT database. The system will be used to create and track the following documents:

1. Project Contact List: Addresses, phone numbers, personnel contacts, etc.
2. Drawing Log: "Issued for Construction" Drawings and Revisions thereto
3. Shop Drawing Submittal Log
4. Transmittals
5. Requests for Information (RFI)
6. Change Documents
  - a. Request for Proposal
  - b. Construction Directive
  - c. Change Order Proposal
  - d. Change Order
7. Daily Reports: Integrated with the Overall Project Schedule
8. Field Orders and Clarification Memos
9. Notices of Non-Compliance
10. Construction Issue Memos
11. Punch Lists
12. Meeting Minutes and Agendas



13. Correspondence
14. Progress Payments (Integrated with cost loaded Detailed Construction Schedule)
15. Work Plans
16. Start-up Plans
17. Equipment Operation and Maintenance Training
18. Spare Parts
19. Equipment Vendor other requirements

### 3.03 DRAWINGS

- A. General: The ARCHITECT/ENGINEER shall establish a log of initial "Issued for Construction" Drawings in the PCT. Information shall include drawing number, title and revision number(s) as applicable.
- B. Drawings: After ARCHITECT/ENGINEER's logging of initial Project Drawing List, the ARCHITECT/ENGINEER shall maintain the log on the PCT for all subsequent revisions to the "Issued for Construction" Drawings resulting from Clarification Memos, RFI's, Field Orders, Construction Directives and Change Orders. The CONTRACTOR is responsible to utilize the latest Drawings and sketches, as identified in the PCT system, in the performance of the Work.
- C. Sketches: The ARCHITECT/ENGINEER shall maintain a log on the PCT of all sketches issued and incorporated into the Project as a result of Clarification Memos, RFI's, Field Orders and Change Orders. The CONTRACTOR shall ensure the utilization of the most current sketches as identified in the PCT system, in the performance of the Work.

### 3.04 SUBMITTALS AND SHOP DRAWINGS

- A. Requirements: The CONTRACTOR, ARCHITECT/ENGINEER and OR shall monitor and manage submittal processing. The PCT shall be utilized to log and track submittals, generate transmittal letters and generate dunning letters through the review process
- B. Submittal Log: The CONTRACTOR shall create, in conjunction with the Preliminary Construction Schedule, the Submittal Log and enter it into the PCT utilizing the owner designated program. The log shall list all of the submittals required for review by the ARCHITECT/ENGINEER and OWNER. Within ten (10) days of the effective date of this Contract, the CONTRACTOR shall provide the OWNER and ARCHITECT/ENGINEER the initial Submittal Log with the Preliminary Construction Schedule. The ARCHITECT/ENGINEER and OWNER shall review the log and may propose amendments. Within ten (10) days after the commencement of the Contract Time, the CONTRACTOR shall provide the OWNER and ARCHITECT/ENGINEER the Final Submittal Log with the Detailed Construction Schedule. Any recommended expansions and/or alterations to packaging requirements after the Final Submittal Log shall be mutually agreed to by the OWNER and CONTRACTOR.
- C. Submittal identification and Packaging: Submittals shall be incorporated into packages with numbering as follows: XXXXX.YYYZ, where "X" denotes the applicable Specification Section; "Y" denotes the individual submittal number for that particular Specification Section, beginning with 001, and "Z" denotes the initial submittal

identified as "Latest Revision" starting with A. Subsequent re-submittals shall be identified as B, C, etc. Packages shall be identified as follows: XXXXX; where "X" denotes the applicable Specification Section. The CONTRACTOR shall log and track all submittals utilizing the PCT. Each review cycle shall be entered into the PCT. The CONTRACTOR shall identify as an activity in the Detailed Construction Schedule, all major equipment submittals as well as those involving complex reviews and long lead deliveries. Submittal schedule information shall be updated monthly with the CONTRACTOR's schedule update.

- D. **Samples:** A list of all required sample submittals shall be entered into the PCT by the CONTRACTOR. Sample submittals shall be identified as individual submittals within the submittal packages with numbering as specified above.
- E. **Guarantees/Warranties:** A list of all required Guarantee/Warranty submittals shall be entered into the PCT by the CONTRACTOR. These submittals shall be identified as individual submittals within the submittal packages with numbering as specified above.
- F. **Operation and Maintenance Manuals:** A list of all required Operation and Maintenance Manual (O&M) submittals shall be entered into the PCT. These submittals shall be identified either as individual submittals within the General Conditions or by corresponding equipment Section.
- G. **Test Reports:** These submittals shall be identified as individual submittals within the submittal packages identified with numbering as specified above.
- H. **Submittal Procedures:** The CONTRACTOR shall prepare all submittal packages utilizing the submittal numbering system, description and packaging conventions described above. Submittals prepared by the CONTRACTOR, which fail to follow the conventions described above, shall be returned "un-reviewed." After the submittal log has been assembled, reviewed and implemented, should the CONTRACTOR determine that a submittal is required, that is not listed in the log; consult with the ARCHITECT/ENGINEER and OR to determine the submittal number, description and packaging required. The submittal and package shall be added to the log by the CONTRACTOR, after mutual agreement with the OWNER.
- I. **Submittal Transmissions:** To the maximum extent possible, transmit submittals to the ARCHITECT/ENGINEER and OWNER electronically. Exceptions are Shop Drawings larger than 11" x 17", samples and color charts. Other exceptions to the electronic format requirement must be approved by the OWNER. Electronic and hard copies of the O&M manuals shall be provided in accordance with Section 01700. The electronic submittal data file shall be attached to the transmittal form in the OWNER Project Management software for document management and control. The CONTRACTOR shall transmit the submittal to the OWNER by placing the transmittal and attached electronic submittal in the OWNER's Project Management software inbox.

### 3.05 TRANSMITTAL LOG

- A. General: The OR shall monitor and manage the transmittal log. All Project transmittal shall be created electronically and are automatically sequentially numbered and logged into the PCT system as they are created. The CONTRACTOR shall generate transmittals for transmitting submittals, reports and other data to the OR and ARCHITECT/ENGINEER.
- B. Requests for Information: The CONTRACTOR shall be responsible for generating RFI's in the owner's designated PCT. The CONTRACTOR shall place the RFI in the OR and ARCHITECT/ENGINEER's in-boxes simultaneously. The OR shall monitor and manage the RFI log and the ARCHITECT/ENGINEER shall generate Answer documents in response to the CONTRACTOR's RFI. The ARCHITECT/ENGINEER's answers shall be reviewed and approved by the OR before being placed in the CONTRACTOR's PCT In-box. The PCT will track "Ball in Court" for all RFI's and answers and date of original generation and response date. In addition, the RFI shall reference the relative Specification Section and applicable Drawing(s). The OR and ARCHITECT/ENGINEER shall coordinate answers to Requests for Information based upon a review of the Contract Documents. The PCT shall identify the date of the request, the originator, responsible party for a response and the date of the response. The OR shall manage the system in strict accordance to review and response time limits established in the General Conditions of the Contract.

### 3.06 CHANGE DOCUMENTS

- A. These documents include Request for Proposals (RFP), Change Order Proposals (COP), and Change Orders (CO). All change documents shall be generated within the Change Management Module and shall be monitored and managed by the OR. The PCT shall track "Ball in Court" status of all change documents. Following OWNER acceptance and formal execution of a Change Order, the Change Order shall be generated within the PCT and integrated with the Monthly Payment Requisition form.

### 3.07 DAILY REPORTS

- A. The CONTRACTOR is responsible for creating Daily Reports utilizing the owner designated PCT program. The CONTRACTOR shall produce the daily reports in the OWNER Project Management software for document management and control, thereby entering the reports into the PCT. The CONTRACTOR shall complete each daily report by 10:00 AM Eastern Time of the subsequent day that CONTRACTOR or Subcontractor performed Work under the Contract. The CONTRACTOR shall also provide hard copies of all daily reports on a weekly basis at the regularly scheduled weekly progress meeting. The hard copies must bear the "wet signature" of the author of the report. Required information shall include the Contractor's name, date the Work was performed, description of the Work performed, equipment used, field force, visitors, key materials and equipment delivered and list the scheduled activities utilizing the P3 EC schedule activity codes. Daily reports, which fail to link Work activities to the Detailed Construction Schedule, shall not be acceptable.

### 3.08 CONSTRUCTION ISSUES MEMOS AND NOTICES

- A. The OR shall monitor and manage the Issues and Notices Log. Construction Issue Memos and Notices shall identify the responsible "ball in court" party, date of issue or notice, and track the item through the assignment of a sequential numbering system.

### 3.09 PUNCH LISTS

- A. The ARCHITECT/ENGINEER shall monitor and manage the Punch List Log and create the Punch List within the PCT. The CONTRACTOR shall electronically update the punch list items that have been assigned to the CONTRACTOR and forward updates to the ARCHITECT/ENGINEER and OWNER electronic Inbox in the PCT.

### 3.10 MEETING MINUTES AND AGENDA

- A. The OR shall monitor and manage the meeting minutes process. The ARCHITECT/ENGINEER is responsible to utilize meeting minutes and respond to meeting minutes items assigned to the CONTRACTOR. Meeting minutes will be available on the PCT.

### 3.11 CORRESPONDENCE LOG

- A. The OR shall monitor and manage the Correspondence Log. All Project correspondence shall be generated utilizing the OWNER Project Management software for document management and control program and logged into the PCT system.

### 3.12 PROGRESS PAYMENTS/REQUISITIONS FOR PAYMENT

- A. The CONTRACTOR is responsible for creating the initial payment requisition document electronically by inputting the activity identification numbers and approved scheduled values from the Detailed Construction Schedule into the OWNER Project Management software for document management and control program's payment requisition Schedule of Values, or a mutually agreed upon submittal form. Each payment requisition shall be produced from updated progress data from the current Primavera P3 EC Detailed Construction Schedule. On a monthly basis, the CONTRACTOR shall meet with the ARCHITECT/ENGINEER and OR to discuss and agree on the actual progress of the Work. The CONTRACTOR shall update the Detailed Construction Schedule to reflect the agreed upon progress. Once the schedule has been updated, the CONTRACTOR shall generate each payment requisition, subsequent to the initial requisition described above. Maintenance of all record documents by the CONTRACTOR shall be verified monthly by the ARCHITECT/ENGINEER and OR before the payment requisition is approved. Failure of the CONTRACTOR to maintain record documents, properly prepare daily reports and submit project schedule updates shall be just cause for withholding of the monthly or final payments.

END OF SECTION

**SECTION 01360  
CONSTRUCTION SCHEDULE**

**PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Required procedures, preparation, submittals, reviews, updates, and revisions to the construction schedule.

**1.02 RELATED SECTIONS**

- A. Section 01005: Summary of the Work
- B. Section 01010: Phasing of the Work
- C. Section 01030: Bid Items (Alternates)
- D. Section 01050: Schedule of Values
- E. Section 01080: Application for Payment
- F. Section 01300: Submittals
- G. Section 01420: Testing and Inspection
- H. Section 01450: Test and Balance
- I. Section 01500: Construction Facilities and Temporary Controls
- J. Section 01700: Contract Closeout

**PART 2 - PRODUCTS****2.01 SCHEDULING SOFTWARE**

- A. CONTRACTOR shall utilize OWNER provided *Primavera Project Planner™ for Windows®* (P3ec) software (latest version) by Primavera Systems, Inc. for updating the Detailed Construction Schedule. The CONTRACTOR shall provide and use compatible software to generate and maintain project schedules off-line for downloading to the OWNER's provided P3ec.
- B. In utilizing Primavera Project Planner the schedule calculation rules, auto cost rules and resource calculation rules shall be in a format acceptable to OWNER.

**PART 3 - EXECUTION****3.01 SUBMITTALS**

- A. CONTRACTOR shall submit six (6) 11"x17" colored copies and two (2) 3.5" computer disks of all Construction Schedules. CONTRACTOR shall submit three (3) copies of all bar charts, reports and/or other required data.
- B. CONTRACTOR shall submit a resume of the proposed scheduler for review and acceptance prior to the preparation of any Construction Schedule. CONTRACTOR shall retain at least one full time scheduler with a minimum of five (5) years direct experience using automated scheduling systems of the types set forth in this Section. Scheduler will cooperate with ARCHITECT and OWNER and shall be available on a full time basis for continuously monitoring, maintaining and updating the Detailed Construction Schedule.

OWNER has the right to refuse to accept the scheduler based upon lack of experience as required by this Section. If OWNER refuses to accept the proposed scheduler, CONTRACTOR shall propose another scheduler meeting the stated experience requirements.

- C. Preliminary Construction Schedule.
- D. Detailed Construction Schedule.
- E. Weekly, monthly, rolling and recovery schedules as required.

### 3.02 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Major Milestone Schedule of Project
- B. SIXTY (60) DAY LOOK AHEAD SCHEDULE

The sixty (60) day Look Ahead Schedule provided by the CONTRACTOR shall represent all work activities to be completed within the first sixty (10) days after the Notice to Proceed.

1. The sixty (60) day Look Ahead Schedule will show the following:
  - a. List of activities for procurement, delivery, installation of equipment, materials, mobilization, and site work.
  - b. List of activities including planned start and planned end dates.
  - c. Activity's dates shall be no more than fourteen (14) days duration.
  - d. Planned completion of Milestones within sixty (60) days.

### 3.03 CPM NETWORK

- A. CPM network shall incorporate activity descriptions, sequence, logic relationships, duration estimates, resource loading and other information as set forth in this Section including but not limited to:
  1. The CPM network shall include all Milestones as well as all engineering, fabrication and delivery dates required to support the Milestones.
  2. Activities to be integrated and shown in the CPM network shall include in addition to all construction activities: Milestones representing CONTRACTOR submittal dates of all critical submittals; activities representing ARCHITECT and/or OWNER review period of each submittal with each review period scheduled for no less than fourteen (14) days; procurement of materials and equipment; manufacture and/or fabrication; testing and delivery to the Project site of special material and major equipment; equipment installation and preliminary, final and performance testing of equipment or systems installed under the Contract Documents.
  3. Indicate start and completion dates for all temporary facilities; construction of mock-ups, prototypes and/or samples; punch list; OWNER interfaces and furnishing of items; interfaces with Separate Work Contracts and regulatory

- agency approvals; securing of approvals and permits required for performance of the Work.
4. Shall take into account all foreseeable factors or risks affecting or which may affect; performance of the Work including historical and predicted weather conditions; applicable laws, regulations or collective bargaining agreements pertaining to labor, transportation, traffic, air quality, noise and any other applicable regulatory requirements.
  5. Shall allocate a minimum of ninety (90) days for all Deferred Approval items.
  6. CONTRACTOR shall not use any float suppression techniques such as preferential sequencing or logic, special lead/lag constraints or unjustifiably over-estimating activity durations in preparing the construction schedule except that finish no later than constraints for Milestones will be permissible.
  7. CONTRACTOR will include with the CPM network a written narrative report sufficiently comprehensive to explain basis and determinations of CONTRACTOR approach to the Work including but not limited to: activity durations; manpower flow; average crew sizes; equipment requirements; production rates and long-lead items; restraints: critical path activities that contain time contingencies for impacts to be expected from normal rainfall; holidays and other non-work days; potential problem areas; permits; required coordination with authorities, utilities, Separate Work Contracts and other parties; and long lead delivery items requiring more than thirty (30) days from the date of order to delivery on the Project site.
- B. ARCHITECT and/or OWNER will notify CONTRACTOR of any recommended adjustments to the CPM network. CONTRACTOR shall perform any required adjustments to the CPM network and resubmit it for acceptance certifying in writing all information contained therein complies with the Contract Documents.
- C. Upon notification by OWNER of acceptance of the CPM network, CONTRACTOR shall prepare computer plots and printouts, and complete submission of the Detailed Construction Schedule, which shall include the following, as a minimum:
1. Bar charts, generated separately using the format template provided by OWNER for:
    - a. Milestones only;
    - b. Summary level sorted by craft/trade and area;
    - c. Detail sorted by date;
    - d. Detail sorted by responsibility.
  2. Reports, generated separately using the format template provided by OWNER for:
    - a. Float sorted low to high;
    - b. Resource histogram.
  3. Activities must be coded to OWNER Activity Code Structure, which will be defined and provided to CONTRACTOR.

- A. Milestones are designated dates as set forth in the Preliminary Construction Schedule in which Work or portions thereof are required to be started and/or completed in accordance with the Contract Documents including but not limited to:
1. Where the term completion or similar terms are used in the designation of a Milestone, it shall be construed to mean all portions of the Work in the indicated phase, area and/or zone are complete and acceptable to OWNER. Where the term start or similar terms are used in the designation of a Milestone, it shall be construed to mean a portion of the Work in the indicated phase, area and/or zone is required to be commenced.
  2. CONTRACTOR shall identify all OWNER defined Milestones in the Detailed Construction Schedule. OWNER defined Milestones shall serve as an essential instrument of measurement by ARCHITECT and OWNER of CONTRACTOR compliance with the Preliminary Construction Schedule.

### 3.05 SCHEDULES

- A. Preliminary Construction Schedule shall represent CONTRACTOR plan to complete the Work within the Milestones and/or Contract Time, however; a schedule extending beyond the Milestones and/or Contract Time will not be acceptable and a schedule indicating Work completed in less than the Milestones and/or Contract Time will not be acceptable. CONTRACTOR shall indicate any available float. A schedule found unacceptable by the OWNER and/or ARCHITECT shall be revised by CONTRACTOR and resubmitted within five (5) days. The Preliminary Construction Schedule shall show the following:
1. Start and completion of all Milestones identified by OWNER.
  2. Activities for procurement, delivery, installation of equipment, materials and other supplies, including:
    - a. Time for submittals, re-submittal, and reviews. Include decision dates for selection of finishes.
    - b. Time for fabrication and delivery of manufactured products for the Work.
    - c. Interdependence of procurement and construction activities.
    - d. Dates for mobilization, test and balance of equipment, Substantial Completion, and Final Completion.
    - e. All activities during the first thirty (30) days after the Notice to Proceed.
- B. Detailed Construction Schedule shall be in sufficient detail to assure adequate planning and execution of Work including but not limited to:
1. Each activity shall range in duration from 1 to 10 workdays (1 to 14 calendar days), with exception of fabrication and procurement activities, unless directed otherwise by OWNER. Activity durations shall be total of actual days required to



- perform and complete that activity and shall not include consideration of weather impact on the activity.
2. Shall be cost and resource-loaded according to each scheduled activity with the resulting total equal to the Contract Amount and shall include all associated interface activities contained within the Contract Documents including, but not limited to, OWNER maintenance and operations activities and/or interim housing schedules, which will be provided by OWNER.
  3. Shall be designed, in judgment of the ARCHITECT and/or OWNER to allow monitoring and evaluation of progress in performance of the Work and it shall be calendar time-scaled in precedence diagramming method (PDM).
  4. Activities shall include:
    - a. A description of what is to be accomplished and where.
    - b. Workday duration.
    - c. Responsibility code identifying the performing party for each individual activity.
    - d. Area of Work shall be coded on each Work activity.
    - e. Phase of Work shall be coded on each Work activity.
  5. Network shall show continuous flow from left to right.
  6. Identify days per week and shifts per day worked; also, non-work days and holidays.
  7. Identify activities that constitute controlling operations, i.e., Milestones or critical path.
  8. ARCHITECT and/or OWNER may require additional coding of activities.
- C. Notwithstanding acceptance of the Detailed Construction Schedule, failure to identify and/or include any element of the Contract into the Detailed Construction Schedule shall not release CONTRACTOR from obligation of completing all required Work in accordance with any OWNER Milestones.
- D. Submittal of the Detailed Construction Schedule shall constitute CONTRACTOR confirmation the schedule meets the requirements of the Contract Documents, and the Work will be executed in the sequence indicated in the schedule.
- E. Weather
1. Definition of rain days and drying days.
    - a. Rainfall sufficient to result in a workday being potentially lost due to rain (rain day) shall be defined as liquid precipitation greater than .10 inch.

- b. It shall be considered normal for the workday immediately following a rain day of precipitation greater than 1.00 inch to potentially be lost due to wet ground conditions (drying day). FCS may allow additional drying days if deemed reasonable, in its discretion.
2. Unusually severe weather.
- a. Rain: To qualify as unusually severe weather due to rain, the number of actual weekdays lost due to rain days and drying days must be greater than that calculated for the month in question using the following averages:
- |          |    |        |    |           |    |
|----------|----|--------|----|-----------|----|
| January  | 12 | May    | 9  | September | 8  |
| February | 10 | June   | 10 | October   | 7  |
| March    | 11 | July   | 12 | November  | 8  |
| April    | 9  | August | 9  | December  | 10 |
- (i) Actual weather impact shall be calculated by first determining the actual lost rain weekdays during each month in question. If any of the following conditions existed on a given weekday, the day will be deducted from the total actual rain days for the month to determine the net number of weekdays lost to rain:
- rainfall occurred on a non-work weekday such as a holiday;
  - rainfall occurred at a time when no weather-dependent work was in progress or occurred during planned or unplanned shutdowns due to other (non-weather) circumstances such as equipment failure, strikes, delays, etc.; or
  - Contractor was still working or able to work on all weather dependent activities to the extent that production was or could have been within actual normal levels established on the project (average plus or minus the standard deviation).
- b. Time adjustments for rain. If the net number of weekdays lost to rain is less than the normal number in question (average rain days and drying days plus one standard deviation), no time adjustment will be made. If the net number of weekdays lost to rain is more than the normal number for the month in question, an excusable and non-compensable time extension will be granted. No adjustments will be made for the time between the start date stated in the Notice to Proceed and the first day of the following month or for the last partial month.
3. Other weather conditions. Time extensions for delays due to unusual weather conditions other than rain (such as snow, extreme cold or heat, high winds, etc.) will be considered only to the extent Contractor can prove (a) conditions were unusually severe, and (b) they caused actual delay to the adjusted as-planned/as-built critical path.

3.06 REQUIREMENTS FOR WEEKLY/MONTHLY REVIEW AND UPDATING

- A. Prepare updated Detailed Construction Schedule by one of following two methods:
1. When updating current Detailed Construction Schedule with actual Work progress only (non logic changes), status current Detailed Construction Schedule with actual start and finish dates, remaining durations, and percent completion of cost and resource loaded activities and submit to OWNER and ARCHITECT for review as specified.
  2. When updating current Detailed Construction Schedule with logic changes, Construction Directives, Change Orders, delay / disruption activities, or recovery plans, prepare a fragnet as set forth in Section 3.07 and submit to OWNER and ARCHITECT for review. Incorporate changes into current Detailed Construction Schedule prior to data date.
- B. When Work is associated with a Change Order, incorporate adjustments to the schedule. The adjustments shall be resource-loaded with material unit quantities and the corresponding cost account, resources account codes, activity description, accepted costs and time adjustments. The activity ID number shall identify the number of the Change Order.
- C. Float is not for exclusive use or benefit of either OWNER or CONTRACTOR but is an expiring resource available to both parties on a non-discriminatory basis. If required to meet specified Milestones, either party may utilize float. Adjustments to the Milestones and/or Contract Time will only be authorized by Change Order and only to the extent the claimed adjustment exceed total float along the most critical path of the current Detailed Construction Schedule in effect at the time of the claimed adjustment. The claimed adjustments to the Milestones and/or Contract Time must also cause the Final Completion date to exceed that currently indicated in the Detailed Construction Schedule. CONTRACTOR claimed adjustments to an existing negative float path will not receive consideration until the activity with the highest negative float is driven even further negative. Claimed adjustments to the Milestones and/or Contract Time will be administered in conjunction with those set forth in the General Conditions.
- D. Pursuant to the float sharing requirements of this Section, the use of float suppression techniques such as preferential sequencing or logic, special lead / lag logic restraints, and extended activity times or durations are prohibited and the use of float time disclosed or implied by the use of alternate float suppression techniques shall be proportionally shared to benefit OWNER and CONTRACTOR. The use of any network technique solely for purpose of suppressing float will be cause for rejection of the submitted Milestone Schedule.
- E. CONTRACTOR shall attend weekly and monthly Detailed Construction Schedule review meetings in order to accomplish the following:
1. Reflect current Work progress in updates.
  2. Provide all specified reporting.
  3. Take remedial action to mitigate schedule variances.
- F. ARCHITECT, OWNER and CONTRACTOR shall conduct weekly reviews of the progress of the Work and compare such progress to the Detailed Construction

Schedule, the schedule of submittals and the four-week rolling schedule. The weekly schedule review shall include, at a minimum:

1. CONTRACTOR shall update and status the Detailed Construction Schedule databases weekly prior to review. Utilizing the "Project Groups/Project" feature of P3ec, CONTRACTOR shall include submittal schedule and material procurement schedule information linked to the Detailed Construction Schedule activity information in each update and or status.
2. When expanding activities to reduce maximum durations, CONTRACTOR shall identify expanded activities so the baseline activity they originate from is readily apparent. CONTRACTOR shall not allow the aggregate duration of the expanded activities to exceed the duration assigned to their parent activity in the Detailed Construction Schedule unless specifically permitted by OWNER in writing.
3. CONTRACTOR shall prepare a four-week rolling schedule immediately following the weekly update/status of and from the Detailed Construction Schedule database and shall ensure it accurately reflects progress of the Work. CONTRACTOR shall provide ARCHITECT and OWNER with printed copies as well as electronic files on disk.
4. CONTRACTOR shall review of all submissions, submittal reviews, fabrication/delivery status, Work started and/or completed in the preceding week, all Work in progress, and scheduled Work for the upcoming twenty-one (21) days.
5. CONTRACTOR shall review all revisions, added and/or deleted Work, and shall determine and incorporate these into CONTRACTOR plan of the Work.
6. CONTRACTOR shall review all interfacing and coordination with Separate Work Contracts.
7. CONTRACTOR shall review progress and allocation of Work forces. Each report shall indicate a planned curve and an actual curve plotted on the same graph, where the planned curve derived from the accepted resource-loaded Detailed Construction Schedule.
8. CONTRACTOR shall provide variance reports including all activities in excess of two (2) days behind schedule and proposed mitigation measures for each item on the variance report.
9. CONTRACTOR shall, at a minimum, attend review meetings prepared to discuss actual activity start and/or completion dates and any applicable variances, forecast activity start and/or completion dates and any applicable variances and progress of all activities underway at the time of the review.
10. During reviews, CONTRACTOR shall alert ARCHITECT and OWNER of all activities behind schedule and further identify all activities and/or Milestones impacted by such variances. CONTRACTOR shall prepare and transmit to ARCHITECT and OWNER proposed recovery plans to regain time lost due to variances.
11. Following review of the recovery plan and all other information relevant to the progress of the Work, CONTRACTOR shall adjust its Work plan as required to assure compliance with the Detailed Construction Schedule. If the latest calculated completion date for any critical activity (total float less than or equal to

- 2 work days) does not fall within the time allowed by the Detailed Construction Schedule, the sequence of Work and or performance of the Work shall be revised by CONTRACTOR. CONTRACTOR shall, by means of utilizing concurrent operations, additional Work force allocations, additional shifts, overtime, etc., provide all such means until a subsequent Detailed Construction Schedule indicates all Milestones will be met. The requirement for such additional Work force allocations, additional shifts, overtime, etc., does not entitle CONTRACTOR to an adjustment in the Contract Amount.
12. CONTRACTOR shall derive from the Detailed Construction Schedule database and provide a weekly four-week rolling schedule (1-week back, 3 weeks ahead) in printed form and with electronic files on disk. At the next Project meeting review, CONTRACTOR shall submit an updated four-week rolling schedule indicating any remedial measures necessary to maintain compliance with the Detailed Construction Schedule.
- G. Simultaneously with each submittal of an Application for Payment, CONTRACTOR shall deliver to ARCHITECT and OWNER an updated Detailed Construction Schedule reflecting progress of the Work up until the end of the previous reporting period. Each such Detailed Construction Schedule shall indicate actual Work progress to date together with a projected schedule for completion of the Work. No changes in logic will be permitted unless agreed upon with OWNER.
- H. ARCHITECT, OWNER and CONTRACTOR shall conduct monthly reviews to determine: planned versus actual progress to date; compliance with submittal requirements, Milestones and accepted Detailed Construction Schedule; determination of any changes to the Work plan or implementation which must be made by CONTRACTOR to comply with the Detailed Construction Schedule. The monthly schedule review shall include, at a minimum:
1. All requirements of weekly reviews listed above. Monthly update/status of electronic database shall include recording of all actual start dates and actual finish dates and status of activities in progress.
  2. Review of planned versus actual Work force allocations and progress for the preceding month.
  3. Review of revisions, added and/or deleted Work and how those are being integrated into CONTRACTOR Work plan.
  4. Review of CONTRACTOR interface and coordination with Separate Work Contracts.
  5. Review of all impacts to the Work during the preceding month and to date, CONTRACTOR evaluation of those impacts and any recovery plans or remedial actions required in order to meet the Detailed Construction Schedule.
  6. Submission of a stand-alone fragmented network if current progress reflects negative float of minus ten (10) days or more for any Milestone activity. Detail activities affected, date delay and/or disruption occurred or productivity rates which were impacted and unmitigated impacts to schedule caused by such events. Submit similar fragnet detailing CONTRACTOR plan to mitigate delay and/or disruption and subsequent impacts to schedule. Provide written narrative describing circumstances that caused delay and/or disruption and methodology

used to determine delay and/or disruption. Submission of such fragments does not constitute permission to proceed with the plan.

Following review of the above and all other information relevant to the progress of the Work, CONTRACTOR shall adjust the Work plan and submit a revised Detailed Construction Schedule for acceptance. CONTRACTOR shall, by means of utilizing concurrent operations, additional Work force allocations, additional shifts, overtime, etc., provide all such means until a subsequent Detailed Construction Schedule indicates all Milestones will be met. The requirement for additional Work force allocations, additional shifts, overtime, etc., does not entitle CONTRACTOR to an adjustment in the Contract Amount.

- I. The Detailed Construction Schedule shall be updated by CONTRACTOR on a weekly basis and submitted to ARCHITECT and OWNER on a monthly basis for concurrent review with each payment application submitted by CONTRACTOR. The update shall incorporate actual status to date and shall include the following:
  1. Computer plotted time-scaled CPM network
  2. Bar Charts, generated separately using the format template provided by OWNER for:
    - a. Milestones only (Baseline vs. forecast)
    - b. Summary Level (sorted by craft/trade and area);
    - c. Detail (sorted by Dates);
    - d. Detail (sorted by Responsibility);
    - e. Detail (sorted by phase).
  3. Reports, generated separately using the format template provided by OWNER for:
    - a. Variance (Baseline vs. forecast);
    - b. Progress Curves (baseline vs. earned/forecast);
    - c. Float (sorted low to high), and;
    - d. Resource Histogram.
  4. Provide all data files electronically.
- J. Written Narrative Report: CONTRACTOR shall include a stand-alone narrative of sufficient detail to explain the basis of the Detailed Construction Schedule with each monthly submittal as follows:
  1. CONTRACTOR shall explain determination of activity duration and describe approach for meeting required Milestones. Include as a minimum: basis and assumptions used in preparing submittal including crew sizes; equipment requirements; verified delivery dates; and restraints: critical path activities that contain time contingencies for impacts from normal rainfall; holidays and other non-work days; potential problem areas; permits; required coordination; utilities; Separate Work Contracts and other parties; and long lead items requiring more than thirty (30) days delivery time from the date of order to the date of delivery on the Project site.

2. CONTRACTOR shall state in a narrative format all Work actually started and/or completed and reflect progress along critical path in terms of days ahead of and/or behind allowable dates. Specific requirements of narrative are as follows:
  - a. If updated Detailed Construction Schedule indicates an actual or potential impact to the Contract Time and or Milestones, identify causes of impacts and provide proposed corrective action to meet Milestones and/or Contract Time. Document and log in matrix format all activities with non-mitigated float until the negative float is mitigated. Identify any deviation from previous month's critical path. The matrix will include applicable activity number, description, approved planned start and finish dates, current start and finish dates and float quantity.
  - b. Identify activities in progress and scheduled to be completed by activity number and description.
  - c. Identify by activity number and description, activities to be started during month following report period. Indicate CONTRACTOR forecast early and late start and finish dates.
  - d. Discuss Construction Directive and/or Change Order items.
3. Implementation of revised schedule logic and/or activity duration estimates for updating the Detailed Construction Schedule whether furnished by CONTRACTOR or OWNER does not constitute an adjustment to the Contract Amount, Milestones and/or Contract Time. Such revisions are for the purpose of maintaining the accuracy of the Detailed Construction Schedule. A detailed time-impact analysis with a narrative shall be submitted explaining the means and methods, basis and assumptions for same. The process used to develop the time impact and fragnets shall be detailed as set forth in Section 3.07.
4. In updating status of the Detailed Construction Schedule, CONTRACTOR shall make no modifications to Activity ID numbers in the accepted Detailed Construction Schedule, schedule calculation rules/criteria or the Activity Coding Structure provided by OWNER without the explicit written permission of OWNER.
5. As Built Schedule Submittals: CONTRACTOR shall describe basis for any logic or activity duration changes from the initial Detailed Construction Schedule.

### 3.07 FRAGNETS

- A. In order to consider the purported impact of events predicated by Sections 10 and 12 of the General Conditions, CONTRACTOR shall prepare and submit fragnet schedules in order to determine the impacts of the event. The submitted format shall compare the current approved Detailed Construction Schedule minus the event under consideration, to a revised Detailed Construction Schedule including the event under consideration. Include a detailed written narrative setting forth the basis and assumptions made in preparing the fragnet schedule.
- B. The fragnet shall properly connect to, and be constrained by, pre-event predecessor and successor activities and post-event event predecessor and successor activities. The submitted fragnet shall band impacted activities in separate networks indicating the specific impact of the event.

- C. CONTRACTOR shall submit two computer file copies of the fragnet, computer generated tabular reports and time scaled logic diagrams.

### 3.08 PAYMENT FOR SCHEDULING

- A. Deleted

### 3.09 FAILURE TO COMPLY WITH REQUIREMENTS

- A. If CONTRACTOR fails to comply with the specified requirements, OWNER reserves the right, but will not be required, to engage an independent scheduling consultant and/or provide its own expertise to fulfill these requirements. Upon notice to CONTRACTOR, OWNER shall retain additional professional services and shall be entitled to recover by assessment all incurred costs for the additional services.
- B. In such an event, OWNER will require, and CONTRACTOR shall participate and provide all requested and/or required information to ensure the resulting Detailed Construction Schedule accurately reflects CONTRACTOR plan to execute the Work in compliance with the Contract Documents. If it becomes necessary for ARCHITECT and/or OWNER to recommend logic and/or duration revisions as a result of CONTRACTOR failure to furnish acceptable data, and if CONTRACTOR has objections to the recommendations, CONTRACTOR shall provide notice to ARCHITECT and OWNER within three (3) days and CONTRACTOR shall provide an acceptable alternate plan. If CONTRACTOR fails to so note any objections and provide an acceptable alternate plan, or if CONTRACTOR implements the recommendations of ARCHITECT and/or OWNER without so noting any objections, CONTRACTOR will be deemed to have waived all objections and concurred with the recommended logic/duration revisions provided by ARCHITECT and/or OWNER.
- C. Submittal of any Detailed Construction Schedule is subject to review and acceptance by ARCHITECT and/or OWNER. OWNER retains the right, including, but not limited to Section 14.13.9 of the General Conditions, to withhold progress payments in whole or part until CONTRACTOR submits a Detailed Construction Schedule acceptable to OWNER.

### 3.10 CONTRACTOR RESPONSIBILITY

- A. Nothing in this Section shall be construed to be a usurpation of CONTRACTOR authority, responsibility and obligation to plan and schedule Work as CONTRACTOR deems, subject to all other requirements of the Contract Documents.

### 3.11 RECORD DOCUMENTS

- A. Prior to Final Completion of the Work, CONTRACTOR shall submit as-built report and time-scaled network diagram reflecting as-built Project critical paths.



END OF SECTION



**SECTION 01420  
TESTING AND INSPECTIONS****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Testing and inspection services to meet requirements of all codes, laws and regulations applicable to Fulton County school construction.
- B. Testing and supervision of the Remediation of Asbestos Containing Materials by the Owner's Consultant

**1.02 RELATED SECTIONS**

- A. Section 01020: Project Forms
- B. Section 01110: Applicable Standards
- C. Section 01300: Submittals
- D. Section 01360: Construction Schedule
- E. Section 01700: Contract Closeout
- F. Section 01740: Warranties

**1.03 CONTRACTOR'S GENERAL RESPONSIBILITIES**

- A. Cooperate with Testing Agency Personnel. Provide access to Work and to material supplier's plant and operations.
- B. Provide representative samples of materials proposed for use in the Work, in quantities sufficient for accurate testing and as specified.
- C. Submit copies of reinforcing steel mill test reports.
- D. Furnish casual labor and facilities:
  - 1. To provide access to work to be tested and inspected.
  - 2. To obtain and handle samples at the site under the direction of the Testing Agency.
  - 3. To facilitate inspections and test.
- E. Notify testing agency sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
- F. Furnish and pay for the following:
  - 1. Soil survey of location of borrow soil materials, samples of existing soil materials, delivered to the Testing Agency.
  - 2. Certification of reinforcing steel mill order.
  - 3. Certification of Portland cement.
  - 4. Weld procedure qualification tests.
  - 5. Tests and samples when source material is changed after original test or inspection has been made.

6. Samples and mock-ups of substitute material, when the substitution is requested by the Contractor and the tests are necessary in the opinion of the Architect to establish equality with specified items.
  7. Provide and maintain, for the sole use of the Testing Agency, adequate facilities for safe storage and proper curing of such test specimens which must remain on the project site prior to testing.
- G. Neither the observations, inspections, tests, or approvals made by the Architect, OR, or the Testing Agency shall relieve the Contractor from his obligation to perform the Work in accordance with the Contract Documents.
- H. Contractor shall notify the Architect and OR in writing and receive a written reply prior to proceeding with additional testing beyond that specified in the Contract Documents.
- I. Contractor shall designate one individual in his organization to be responsible for conducting Contractor's duties relative to testing. Individual will be instructed in his duties by Testing Agency. Individual shall not be changed without notice to Architect and OR.

#### 1.04 TESTING AGENCY PERSONNEL

- A. When requested by the Architect, the Testing Agency will render professional opinions regarding corrective measures for construction deficiencies.
- B. Testing Agency is not authorized to revoke or change requirements of the Contract Documents or to approve or accept any portion of the Work.

#### 1.05 SUMMARY OF TESTING SERVICES (See specific criteria within respective Specification Sections and Attachments G1, G2, G3, S1, S2, S3, S4, S5, E1, E2, Q1, and Q2 at the end of this Specification Section):

- A. Owner's Testing Laboratory Responsibilities (includes required written reports):
  1. 02200 – Earthwork
    - a. Evaluations of proposed fill material from borrow site.
    - b. Qualification of topsoil material.
    - c. Documentation of proofrolling at subgrade elevations.
    - d. Determination of unsuitable soils and their quantities.
    - e. Determination of mass rock materials and their quantities.
    - f. Determination of trench rock materials and their quantities.
    - g. Compaction testing of earth fill materials.
  2. 02205 – Foundations
    - a. Testing of soil bearing capacities at footing excavations.
    - b. Documenting actual sizes, depths, and bottom elevations of foundations.
    - c. Documenting reinforcing steel layouts, quantities, sizes and spacings per Contract Drawings for each footing and foundation.
  3. 02511 – Asphalt Paving
    - a. Analysis of proposed mix designs and sieve analyses of aggregates.
    - b. Testing for subgrade compaction.
    - c. Density testing of binder course and surface course materials.
    - d. Thickness testing of graded aggregate base, binder course, and surface course materials.
  4. 03011 – Concrete

- a. Sampling and documentation of on-site concrete for slump, water content, air entrainment percentage, and admixture materials.
  - b. Preparing test cylinders for concrete strength tests.
  - c. Performing laboratory tests of sampled concrete strength; one 7-day test and two 28-day tests.
  - d. Testing for achievement of required floor flatness criteria.
5. 05120, 05200, and 05300 – Structural Steel Assemblies
- a. Verification testing of welder qualifications.
  - b. Visual and dimension weld examinations.
  - c. Ultrasonic testing of all full-penetration welds.
  - d. Testing of bolted connections.
  - e. Inspection of all roof decking welding for size, quantity, and spacing per Contract Documents.
6. 07811 – Fireproofing
- a. Probe testing for thickness of applications.
  - b. Testing for material density and bond strength.
7. Attachments G1, G2, G3, S1, S2, S3, S4, S5, E1, and E2.
- a. G1 – Statement of Special Inspections
  - b. G2 – Schedule of Special Agents
  - c. G3 – Final Report of Special Inspections
  - d. S1 thru S5 – Schedule of Special Inspection Services
  - e. E1 – Schedule of Special Inspections for Seismic
  - f. E2 – Schedule of Special Testing for Seismic
- B. Contractor's Testing Responsibilities (includes required written reports):
1. 02701 – Video inspections of underground piping.
  2. 03200 – Mill tests for reinforcing steel.
  3. 04150 – Mill tests for reinforcing steel.
  4. 05120 – Mill tests for structural steel.
  5. 07412 – Verification testing for metal roofing structural performance.
  6. 08410 – Field testing of completed storefront assemblies for water leakage.
  7. 08560 – Field testing of completed aluminum window assemblies for water leakage.
  8. 09680 – Representative sample testing for delivered carpet materials.
  9. Attachments Q1 and Q2.
    - a. Q1 – Quality Assurance Plan for Seismic
    - b. Q2 – Quality Assurance Plan for Wind

## PART 2 – PRODUCTS (Not applicable)

## PART 3 – EXECUTION

### 3.01 TESTS

- A. OWNER will select an independent testing agency to conduct tests, sampling, and testing of materials. Selection of material to be tested shall be by the agency and not by CONTRACTOR.

- B. OWNER will select and directly reimburse testing agency the costs for all required tests and inspections, but may be reimbursed by CONTRACTOR for such costs as noted in related sections of the Contract Documents.
- C. The independent testing agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work. The agency shall not perform any duties of CONTRACTOR.

### 3.02 TEST REPORTS

- A. Test reports shall include all tests performed, regardless of whether such tests indicate the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. Reports shall indicate the material or materials were sampled and tested in accordance with code requirements as indicated on the Drawings. Test reports shall indicate specified design strength. They shall also definitely state whether or not material or materials tested comply with the specified requirements.

### 3.03 INSPECTION BY OWNER

- A. OWNER and its representatives shall at all times have access, for purpose of inspection, to all parts of the Work and to shops wherein the Work is in preparation, and CONTRACTOR shall at all times maintain proper facilities and provide safe access for such inspection.
- B. OWNER shall have the right to reject materials and/or workmanship deemed defective Work, and to require correction. Defective workmanship shall be corrected in a satisfactory manner and defective materials shall be removed from the premises and legally disposed of, all without charge to OWNER. If CONTRACTOR does not correct such defective Work within a reasonable time, fixed by written notice and in accordance with the terms and conditions of the Contract Documents, OWNER may correct such defective Work and proceed in accordance with related Articles of the Contract Documents.
- C. CONTRACTOR is responsible for compliance to all applicable local, state, and federal regulations regarding codes, regulations, ordinances, restrictions, and requirements.

END OF SECTION

## SECTION 01450 TEST AND BALANCE

### PART 1 - GENERAL

#### 1.01 SECTION INCLUDES

- A. This Section specifies the requirements for test and balance of HVAC and related systems.

#### 1.02 RELATED SECTIONS

- A. Section 01005: Summary of the Work  
B. Section 01100: Coordination  
C. Section 01300: Submittals  
D. Section 01360: Construction Schedule  
E. Section 01700: Contract Closeout  
F. Section 15010: Basic Mechanical Requirements.  
G. Section 15050: Basic Mechanical Materials and Methods.  
H. Section 15070: Mechanical Sound, Vibration and Seismic Control.  
I. Section 15180: Heating and Air Conditioning Piping Systems  
J. Section 15500: Heat Generation Equipment  
K. Section 15600: Refrigeration Equipment  
L. Section 15700: Heating, Ventilating and Air Conditioning Equipment  
M. Section 15800: Air Distribution  
N. Section 15875: Kitchen Ventilation Systems  
O. Section 15900: HVAC Instrumentation and Controls

### PART 2 - PRODUCTS (Not applicable)

### PART 3 - EXECUTION

#### 3.01 DEFINITIONS AND APPLICABLE PUBLICATIONS

- A. For the purposes of this Section definitions are as indicated in applicable publications of AABC, NEBB, ASHRAE, ANSI and SMACNA.
- B.
1. TAB: Testing, Adjusting and Balancing.
  2. AABC: Associated Air Balance Council
  3. NEBB: National Environmental Balancing Bureau.
  4. OR: Owner's Representative

### 3.02 QUALITY ASSURANCE

- A. The test and balance agency shall be directly subcontracted to the CONTRACTOR. The qualifications of the agency shall comply with Section 3.02, Quality Assurance. The agency shall be responsible for furnishing labor, instruments, and tools required to test, adjust and balance the heating, ventilating and air conditioning (HVAC) systems and related plumbing systems, as described and/or as indicated in the Contract Documents.
- B. CONTRACTOR shall obtain services of an independent, qualified testing agency acceptable to ARCHITECT to perform testing and balancing Work as specified and as follows:
  - 1. Agency shall be currently certified by either The Associated Air Balance Council (AABC) or The National Environmental Balancing Bureau (NEBB). NEBB certification shall be for Air and Hydronic Testing, Adjusting and Balancing and Sound and Vibration Measurement.
  - 2. Work shall be in accordance with the latest edition of the AABC or NEBB National Standards. Where the requirements of the two standards are different, the more stringent requirements shall prevail. Also, if the Contract Documents impose a more stringent standard than the Contract Documents shall prevail.
- C. Performance Criteria: Work of this Section shall be performed in accordance with approved Testing, Adjusting and Balancing agenda.
- D. Test Equipment Criteria: Basic instrumentation requirements and accuracy/calibration required by Section Two of the AABC or Section II of the NEBB Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.
- E. Verification: The Test and Balance Agency shall recheck a minimum 10 percent of the measurements listed in the report. The locations shall be selected by the OR. The recheck will be witnessed by the OR. If 20 percent of the measurements that are retested differ from the report and are also out of the specified range, an additional 10 percent will be tested. If 20 percent fall outside the specified range, the report will be considered invalid and all test and balance work shall be repeated.

### 3.03 SUBMITTALS

- A. Submit name of agency to perform the Work. Include in the submittal the certified qualifications of all persons responsible for supervising and performing actual Work of this Section. Agency shall submit a minimum of five (5) commercial or industrial HVAC system TAB projects of similar type, size, and degree of difficulty completed within the last two years. Agency shall provide name and telephone number of contact person for each listed project.
- B. Submit, for approval, 6 copies of the Agenda as indicated in Section 3.06 to test and balance all mechanical and relevant plumbing systems.
- C. Preliminary Report: Review the Contract Documents, examine Work installations and submit a written report to ARCHITECT and/or OR indicating deficiencies in Work precluding proper testing and balancing of the Work.



- D. Final TAB Report: Submit the final TAB report for review by ARCHITECT and/or OR outlining the conditions and Work completed on each HVAC system. All outlets, devices, HVAC equipment, etc. shall be identified, along with a numbering system corresponding to report unit identification.
- E. Submit an AABC "National Project Performance Guaranty" or "NEBB Quality Assurance Certification" assuring the Project systems were tested, adjusted and balanced in accordance with the Specifications and AABC or NEBB National Standards.
- F. CADD drawings: Submit single line, multi-color CADD drawings indicating outside return and supply air, volume control boxes, each outlet and inlet, room numbers, duct sizes at traverse locations, temperatures and pressures, systems balanced, components changed and CONTRACTOR installed access points. In addition, drawings shall identify controls, equipment settings, including manual damper quadrant positions, manual valve indicators, fan speed control levers, and similar controls and devices shall be marked on the drawings to show final settings. CADD files shall be submitted on CD-ROM upon final submittal of TAB report. Reports shall identify discrepancies between completed Work and the Contract Documents affecting the performance and /or longevity of the system.

#### 3.04 GENERAL SCOPE OF WORK

- A. The general scope of Work shall include but not be limited to the following:
  - 1. Measure airflow rates of HVAC systems and make adjustments to achieve design airflow rates, tabulate results and submit reports.
  - 2. Measure water-flow rates of HVAC systems and make adjustments to achieve design water flow rates, tabulate results and submit reports.
  - 3. Measure flow velocities, temperatures, static pressures or head, rotational speed, and electrical power demand of fans, pumps and other related HVAC system components, tabulate results and submit reports.
  - 4. Measure sound levels in each conditioned space, tabulate results and submit reports.
  - 5. Measure ambient sound levels of outdoor HVAC units and system components such as chillers and cooling towers, tabulate results and submit reports.
  - 6. Reports shall contain sufficient data for the system designer to evaluate system performance and solve installation problems such as system pressure profiles and pressure drops across system components

#### 3.05 SPECIFIC SCOPE OF WORK

- A. The specific scope of Work shall include the following HVAC system components as indicated on the Drawings:

1. Air Handling Units
2. Air Conditioning Units
3. Heating and Ventilating Units
4. Heating and Cooling Coils
5. Supply, Return, Relief and Exhaust Fans
6. Outside Air and Return Air Plenums
7. Outside Air Intakes
8. All Supply and Return Ductwork
9. All associated Air Terminal Devices, i.e. Supply Diffusers, Return Registers, etc.
10. Mixing Boxes and Variable Air Volume (VAV) boxes
11. Reheat Coils (Electric or Hot Water)
12. Exhaust Duct Systems
13. Fire and Fire/Smoke Dampers
14. Kitchen Hoods
15. Laboratory Hoods
16. Heat Exchangers
17. Chillers
18. Cooling Towers
19. Boilers
20. Chilled water, heating hot water and cooling tower water pumps

### 3.06 TESTING, ADJUSTING AND BALANCING AGENDA

- A. Provide proposed materials, methods, procedures, forms, diagrams and reports for test and balance Work.
- B. Agenda to be completed by the test and balance agency and submitted to ARCHITECT and OR for review and approval.
- C. Agenda shall include one complete set of AABC or NEBB publications listed in Section 3.02, B, 2, applicable publications, or, in case of other test and balance agencies and or organizations, comparable publications to establish an approved, systematic and uniform set of procedures.
- D. Agenda shall also include the following detailed narrative procedures, system diagrams and forms for test results:
  1. Specific standard procedures required and proposed for each system of the Work.
  2. Specified test forms for recording each procedure and for recording sound and vibration measurements.
  3. Systems diagrams for each air, water and steam system. Diagrams may be single line.
- E. In addition to information recorded for standard AABC or NEBB procedures, the following information is required:
  1. Fan Data
  2. System number, Location, Manufacturer, Model and Serial Number
  3. Fan wheel type and size

4. Motor horse power, type and rpm
  5. Drive size, type, number of grooves, and open turns on Variable Pitch Drives
  6. Number and size of belts, motor and fan shaft sizes, center-to-center of shafts in inches, and adjustment available motor data, including nameplate data, actual amps, rated and actual motor rpm, volts, phase, hp, kW, starter heater size, and capacity
  7. Fan design airflow and service (Supply, return, outdoor air or exhaust)
  8. Fan static pressure, suction/discharge, static profile and static control point.
- F. The following traverse data is required:
1. Traverse location, size of duct (inside dimensions), Area of duct in square feet
  2. Column for each hole traversed/lines for each reading
  3. Barometric pressure
  4. Temperature/Static Pressure in the duct
  5. Actual CFM corrected to SCFM
  6. Notes
- G. The following air distribution data is required:
1. Room identification
  2. Outlet or intake balance sequence number
  3. Size of outlet or inlet
  4. AK Factor
  5. Design and Actual FPM and CFM
  6. Notes
- H. The following hydronic coil data is required:
1. Air flow through the coil in CFM
  2. Dry bulb and wet bulb temperatures entering/leaving coil
  3. Enthalpy or total heat differences in BTU/lb.
  4. Capacity in BTU/hr at time of test
  5. Water temperature and pressure entering/leaving coil
  6. Flow (in GPM) through coil
  7. Air pressure drop across coil
  8. Water head drop across coil
  9. Notes
- I. The following DX coil data is required:
1. Air flow through the coil in CFM
  2. Dry and wet bulb temperatures entering/leaving coil
  3. Enthalpy or total heat difference across coil in BTU/ lb.
  4. Capacity in BTU/hr at time of test
  5. Air pressure drop across coil
  6. Notes
- J. The following data is required for steam to water heat exchangers for heat and/or domestic generation:

1. Exchanger identification number
  2. Nameplate data; manufacturer, model and serial number
  3. Temperature entering/leaving unit
  4. Flow through unit in GPM
  5. Pressure drop through unit
  6. Entering steam pressure
  7. Notes
- K. The following electric heating coil data is required:
1. Heating coil identification number
  2. Nameplate data; manufacturer, model and serial number
  3. Amperage/Voltage on each phase
  4. Phase, kW and Stages
  5. Safety device installed
  6. Air pressure drop across coil
  7. Notes
- L. The following water-cooled chiller data is required:
1. Identification number
  2. Nameplate data; manufacturer, model and serial number
  3. Chilled water flow through evaporator in GPM
  4. Water temperature entering/leaving evaporator
  5. Pressure drop through evaporator
  6. Condenser water flow through
  7. Pressure drop through condenser
  8. Water temperature entering/leaving condenser
  9. Motor data, amps, volts, rpm, starter type, overload protection type, phase, hertz, nameplate, and actual measured kW input
  10. Type of refrigerant
  11. Notes
- M. The following cooling tower data is required:
1. Identification number
  2. Nameplate data; manufacturer, model and serial number
  3. Performance test results for rated capacity
  4. Water flow through the tower in GPM
  5. Water temperature entering/leaving tower
  6. Outside Air dry and wet bulb temperatures
  7. Motor data, amps, volts, phase, hertz, and kW input
  8. Starter size and type and heater size and capacity
  9. Water droplets leaving tower - yes/no
  10. Water balanced across tower pans and basins
  11. Airflow across the tower within design rating according to fan curves
  12. Notes
- N. The following boiler and domestic water heater data is required:

1. Performance test results for rated capacity
  2. Boiler identification number
  3. Nameplate data; manufacturer, model and serial number
  4. Water temperature entering/leaving the boiler
  5. Outside conditions: temperature, humidity, general cloud cover
  6. Barometric pressure
- O. The following air-cooled split system condensing unit data is required:
1. Performance test results for rated capacity
  2. Unit identification number
  3. Nameplate data, manufacturer, model and serial number.
  4. Compressor nameplate and actual amps, volts, phase, and hertz
  5. RPM of motors, where applicable
  6. Refrigerant type
  7. Suction/Discharge pressure when gauge installed
  8. Number of stages
  9. Low-pressure/High-pressure control setting
  10. Condenser fan sequence stages
  11. Crankcase heater watts (nameplate)
  12. Hot gas bypass installed - yes/no
  13. SCFM Air Flow Measurement vs. Design CFM
- P. The following air-cooled split system heat pump data is required:
1. Performance test results for rated heating and cooling capacities
  2. Unit identification number
  3. Nameplate data, manufacturer, model and serial number.
  4. Compressor nameplate and actual amps, volts, phase, and hertz
  5. RPM of motors, where applicable
  6. Refrigerant type
  7. Suction/Discharge pressure for both heating and cooling modes when gauge installed
  8. Number of stages
  9. Low-pressure/High-pressure control setting
  10. Condenser fan sequence stages
  11. Crankcase heater watts (nameplate)
  12. Hot gas bypass installed - yes/no
  13. SCFM Air Flow Measurement vs. Design CFM
- Q. The following sound test data is required:
1. Area or location
  2. Sound level in dB(A) as specified in Section 3.20
  3. Sound level at the center band frequencies of eight non-weighted octaves with equipment on and off.
  4. Plot corrected sound-level reading on Noise Criteria (NC) curve.
- R. The following vibration test data is required:
1. Equipment identification number

2. Vibration levels at all accessible bearings, motors, fans, pumps, casings, and isolators
  3. Measurements in mils deflection and velocity in inches per second as specified per section XIV of this document
  4. Each measurement taken in horizontal, vertical, and axial planes as accessible.
- S. The following mixing damper leakage test data is required:
1. Equipment identification number (unit, box, zone, etc.)
  2. Dry bulb temperature in the cold/hot (or bypass) deck
  3. Dry bulb temperature in the mixed air stream
  4. Calculated percent leakage
  5. Data above taken in the full cool and full heat (or bypass) mode
  6. Notes
- T. The following airflow station data is required:
1. Station identification number
  2. Nameplate data including effective area
  3. Differential test pressure or velocity
  4. Calculated CFM
  5. Actual CFM (From Pitot tube traverse form)
  6. Read out CFM
  7. Notes
- U. The following unit heater data is required:
1. Equipment identification number
  2. Nameplate data; manufacturer, model and serial number
  3. Test CFM (use manufacturer rated CFM if not ducted)
  4. Heat test data per applicable procedure (hot water, electric, etc.)
  5. Notes
- V. The following fan coil and unit ventilator data is required:
1. Equipment identification number
  2. Nameplate data; manufacturer, model and serial number
  3. Tested supply CFM or manufacturer rated CFM if not ducted
  4. Tested outside air in CFM
  5. Motor data and actual amps and volts
  6. Cooling/Heating test data
  7. Static pressure
  8. Notes
- W. The following kitchen hood data is required:
1. Hood identification number
  2. Nameplate data; manufacturer, model and serial number
  3. Pitot-tube traverse total air flow
  4. Exhaust and supply (when part of hood) CFM

5. Exhaust and supply (when part of hood) test velocities shown on hood face diagram
  6. Face velocities
  7. Hood opening dimensions
  8. Notes (turbulence and flow patterns at the face and inside the hood)
- X. The following laboratory hood data is required:
1. Hood identification number
  2. Nameplate data; manufacturer, model and serial number
  3. Pitot-tube traverse total air flow
  4. Exhaust and supply (when part of hood) CFM
  5. Exhaust and supply (when part of hood) test velocities shown on hood face diagram
  6. Face velocities
  7. Hood opening dimensions
  8. Notes (turbulence and flow patterns at the face and inside the hood)
- Y. The following data for water-to-water heat exchangers for domestic and/or heating is required:
1. Exchanger identification number
  2. Nameplate data; manufacturer, model and serial number
  3. GPM and Pressure drop through each side
  4. Capacity of each side
  5. Notes
- Z. The following pump data, including but not limited to, chilled water, heating hot water, cooling tower water, boiler feed, domestic hot water booster, domestic hot water circulation, sewage ejectors, sump pumps and domestic hot water booster is required:
1. Pump number
  2. Nameplate data; manufacturer, model and serial number
  3. Motor data including nameplate data, actual amps, volts, RPM, horsepower, starter heater size and capacity
  4. Pump discharge and suction pressure along with total dynamic head in the following modes
  5. Shut-off head FT, Wide open Head FT and Final operating Head FT
  6. Final GPM Test plotted on a pump curve
  7. Notes
- AA. The following water flow station data is required:
1. Station identification number
  2. Nameplate data; manufacturer, model, and serial number
  3. Design and actual GPM
  4. Differential test pressure
  5. Setting (open turns, degree, etc.) if required GPM
  6. Notes
- BB. The following terminal box data is required:

1. Box identification number
2. Node, address or designation on system
3. Box size
4. Cooling CFM
5. Minimum CFM (if applicable)
6. Heating CFM (if applicable)
7. Box fan amps and volts (if applicable)
8. For DDC controlled boxes, record computer readout maximum, minimum, and heat, along with box correction factor for calibrating to true CFM
9. Notes

### 3.07 PROCEDURES

- A. Schedule the Work of this Section in order for test and balance activities to be completed prior to the date of Substantial Completion. CONTRACTOR shall place all heating, ventilating, and air conditioning equipment into operation during each day and until all HVAC adjusting, balancing, testing, demonstrations, and instructions on systems are completed. Agency shall prepare and submit reports within ten (10) days from completion of the Work of this Section to allow sufficient time for corrective measures to be completed before Final Completion of the Work. When an individual building or portion thereof is ready for occupancy, all equipment relative to such portion of Work shall be put into service, tested and balanced.
- B. Prior to the date of Substantial Completion, and upon completion of test and balance Work, place all exhaust fans in operation, force all air handling units and air conditioning units into a 100% outdoor air economizer mode with heating and cooling locked out and flush the building continuously for a period of fourteen (14) days.
- C. Coordinate test and balance procedures with any phased Project requirements so test and balance procedures on each phased portion of the Work will be completed prior to completion of said designated phase.

### 3.08 FIELD EXAMINATION

- A. Before the commencement of test and balance Work, CONTRACTOR shall ascertain that following conditions are fulfilled:
  1. Ensure that all water heating and water cooling systems have been flushed, cleaned, filled and high points vented
  2. Boilers, steam and hot water, are filled
  3. Refrigerant systems are fully charged with specified refrigerant
  4. Over-voltage and current protection have been provided for motors
  5. Equipment has been labeled as required
  6. Curves and descriptive data on each piece of equipment to be tested and adjusted are available as required
  7. Operations and maintenance manuals have been supplied
  8. Controls manufacturer and boiler-burner representatives shall be available for consultation and supervision of adjustments during tests
  9. Verify that heating and cooling coil fins are cleaned and combed and air filters clean and installed



10. Verify that duct systems are clean of debris and leakage is minimized, access doors are closed and duct end caps are in place, fire and volume dampers are in place and open
  11. Automatic control systems are completed and operating
  12. Start up and initial commissioning of all HVAC equipment except fans shall be by the manufacturer.
- B. In addition to the above, CONTRACTOR shall establish a specific, coordinated plan which details how each area of existing building will be balanced during the various phases of the Work. The evaluation shall address, at a minimum, the following concerns:
1. OWNER operations
  2. Building safety and security policies. Prior to any fire safety or security systems shutdown at any time during the Work, CONTRACTOR shall first advise and coordinate with OWNER to ensure all concerned parties are notified.
  3. Protecting furniture, computers, photocopiers, and other office equipment.
  4. Protecting classroom fixtures and equipment.
  5. Concerns specific and unique to building related issues.
  6. Downtime required for each AHU including projected time to return each portion of the building back to its normal occupancy temperature and humidity.
  7. Shutdown and reactivation of the fire alarm system to avoid accidental alarms during test and balance and related Work.

## 3.09

## TEST AND BALANCE

- A. For each heating, ventilating, or air conditioning system the following shall be performed, recorded and submitted in an approved format for review. Make, type, and model of unit, and location of each piece of equipment shall be included in the report. Readings shall include but not be limited to following:
1. AIR SYSTEMS:
    - a. General
      - 1) Verify all ductwork, dampers, grilles, registers, and diffusers have been installed per design and set in the full open position. Agency shall perform the following TAB procedures in accordance with AABC or NEBB National Standards. Where the requirements of the two standards are different, the more stringent requirements shall prevail. Also, if the Contract Documents impose a more stringent standard then the Contract Documents shall prevail.
    - b. Zone, Branch and Main Ducts:
      - 1) Adjust ducts to within design CFM requirements by means of Pitot-tube duct traverse.
    - c. Supply Fans:

- 1) Fan speeds: Test and adjust fan RPM to achieve maximum or design CFM. CONTRACTOR shall provide new belt pulleys when required.
  - 2) Current and Voltage: Test and record motor voltage and amperage, and compare data with the nameplate limits. Ensure fan motor is not in or above the service factor as published by the motor manufacturer.
  - 3) Pitot-Tube Traverse: Perform a Pitot-tube traverse of main supply and return ducts, record total CFM.
  - 4) Outside Air: Test and adjust the outside air using Pitot-tube traverse.
  - 5) Static Pressure: Test and record system static profile of each supply fan.
  - 6) Current and Voltage: Test and record motor voltage and amperage, and compare data with the nameplate limits. Ensure fan motor is not in or above the service factor as published by the motor manufacturer.
- d. Return, Relief and Exhaust Fans:
- 1) Fan speeds: Test and adjust fan RPM to achieve maximum or design CFM. CONTRACTOR shall provide new belt pulleys where required.
  - 2) Pitot-Tube Traverse: Perform a Pitot-tube traverse of the main return ducts to obtain total CFM.
  - 3) Static Pressure: Test and record system static profile of each fan.
- e. VAV Systems:
- 1) Set volume regulators on all terminal boxes to meet design maximum and minimum CFM requirements.
  - 2) Identification: Identify the type, location, and size of each terminal box. This information shall be recorded on terminal box data sheets.
- f. Diffusers, Registers and Grilles:
- 1) Tolerances: Test and balance each diffuser, grille, and register to within 5% of design requirements.
  - 2) Identification: Identify the type, location, and size of each grille, diffuser, and register. This information shall be recorded on air outlet data sheets.
- g. Coils:
- 1) Air Temperature: Once airflow is set to acceptable limits, agency shall take wet bulb and dry bulb air temperatures on the entering and leaving side of each cooling coil. Dry-bulb temperature shall be taken on the entering and leaving side of each heating coil.

## h. Duct Leakage Testing:

- 1) On existing ductwork, agency shall calculate duct leakage by traversing the unit and reading associated diffusers.
- 2) On new installations, agency shall base one test per isolated section unless otherwise noted. New ductwork shall be tested at one and one-half times (1-1/2) design static pressure. New supply ducts shall demonstrate 0.5% leakage maximum. New return ducts shall demonstrate 1.0 % leakage maximum.

## i. Air handling units:

- 1) Prepare pressure profile and show design and actual CFM (outside air, return air, and supply air).
- 2) Measure and record each mode (minimum OA and 100% OA) where economizer cycle is specified.
- 3) Record pressure drops of all components (coils, filters, sound attenuators, louvers, dampers, and fans) and compare with design values.
- 4) Pressure profile and component pressure drops are performance indicators and are not to be used for flow measurements.

## j. System Pressure Profiles:

- 1) Prepare pressure profiles from air handling unit to extremities of system.
- 2) As a minimum, show pressure at each floor, main branch, and airflow, measuring device.
- 3) Make pitot tube traverses of all trunk lines and major branch lines where required for analysis of distribution system. Airflow measuring devices installed in ductwork, if available, may be utilized.
- 4) Record residual pressures at inlets of volume controlled terminals at ends of system.
- 5) Show actual pressures at all static pressure control points utilized for constant or variable flow systems.

## 2. WATER SYSTEMS:

CONTRACTOR shall confirm all equipment, piping, and coils have been filled and purged, strainers are clean and all balancing valves (except bypass valves) are set full open. Agency shall perform the following TAB procedures in accordance with the AABC or NEBB National Standards:

## B. Pumps:

1. Test and adjust chilled water, hot water, and condenser water pumps to achieve maximum or design GPM.
2. Measure and record suction and discharge pressures.
3. Check pumps for proper operation. Pumps shall be free of vibration and cavitation.

4. Current and Voltage: agency shall test and record motor voltage and amperage, and compare data with the nameplate limits. Ensure pump motor is not in or above the service factor as published by the motor manufacturer.
5. Adjust pump flow by adjusting and setting balancing valves, to obtain amperage reading on a clamp-on ammeter, to correspond to amperage indicated on pump's curves for required flow.
6. Verify that the motor is not drawing more current than indicated on motor plate rating. When actual flows of primary pumps are found by test to vary more than 5% from specified amount, system shall be re-balanced to regulate flow within this tolerance. When a flow indicating device(s) is in circuit, it shall be used to verify pump flows.
7. When testing is completed, a pump capacity chart with pump number and location indicated thereon, shall be marked indicating operating point of pump on the curve. Chart shall then be included in the report.

C. Cooling Towers:

1. Test and balance water flows, balance tower cells and flows between towers.
2. Test and record temperature profiles for water and airside operation.
3. Outside Climatic Conditions: Outside air DB, WB, atmospheric conditions, during temperature profile runs.

D. Chillers: (Start-up and initial commissioning by manufacturer only.)

1. Test and balance chiller water flows to achieve maximum or design GPM.
2. Current and Voltage: Test and record motor voltage and amperage, and compare data with the nameplate limits. Ensure compressor motor is not in or above the service factor as published by the motor manufacturer.
3. Test and record temperature and pressure profiles of chillers;
  - a. Inlet and outlet water temperature.
  - b. Inlet and outlet water pressure.
  - c. Evaporator temperature.
  - d. Condensing temperature pressure.
  - e. Purge pressure.
  - f. Oil temperature and pressure.
4. Outside Climatic Conditions: Outside air DB, WB, atmospheric conditions, during temperature profile runs.

E. Boilers: (Start-up and initial commissioning by manufacturer only.)

Test and balance boilers only after test and balance of pumps have been completed. Boilers shall not be initially operated or tests performed with students or faculty on the Project site. The boiler(s) shall be tested for the following:

1. Heating Hot Water Boilers and Domestic Hot Water Boilers:
  - a. Current and Voltage: Test and record motor voltage and amperage, and compare data with the nameplate limits. Ensure motor is not in or above the service factor.

- b. Test and balance water flow through water boilers.
    - c. Test and record temperature and pressure profiles of water and/or steam boilers.
    - d. Upon completion of tests, controls and devices shall be returned to their normal operating condition and boiler shall remain in service.
  2. Steam Boilers:
    - a. Start-up and initial commissioning by manufacturer only.
- F. Heat Exchangers:
  1. Steam to Hot Water Heat Exchanger: Steam pressure, entering and leaving hot water temperatures, gpm flow, pressure drop, and control set point.
  2. Water to Water Heat Exchanger:
    - a. Primary Heating Water: Entering and leaving hot water temperatures, gpm flow, and pressure drop.
    - b. Secondary Heated Water: Entering and leaving hot water temperatures, gpm flow, pressure drop, and control set point.
- G. Coils:
  1. Tolerances: Test and balance all chilled-water and hot-water coils within 5% of design requirements.
  2. Verify the type, location, final pressure drop and GPM of each coil.
- H. System Mains and Branches including chilled water, heating hot water, cooling tower water, domestic hot water and domestic cold water:
  1. Balance water flow in pipes to achieve maximum or design GPM.
- I. Steam Heating Systems:
  1. Heating Coils: Steam pressure at coils, cfm, coil pressure drop, entering and leaving air DB temperatures.
  2. Boiler: Steam pressure, temperature and quantity of feed-water (see Testing and Adjusting procedures); boiler make, type, serial number and rated capacity; flue gas temperature at boiler outlet ahead of back-draft diverter; percent carbon dioxide in flue gas; condensate quantities and temperatures.
  3. Air Conditioning Units: (Start-up and initial commissioning by manufacturer only.)
    - a. Suction pressure and temperature.
    - b. Discharge pressure and temperature.

- c. Amps and volts.
  - d. Make, type, and model of unit, capacity rating.
  - e. Ambient temperature: WB, DB
  - f. Supply, return, relief and exhaust fans shall be balanced as indicated in Section 3.09, A, 1, Air Systems.
  - g. Proper operation of controls: Temperature controllers and safety devices shall be tested during operating tests, with all other controls and devices, except one under test, being by-passed.
  - h. Upon completion of tests, controls and devices shall be returned to their normal operating condition and boiler shall remain in service.
4. Condensing and Refrigerating Units: (Start-up and initial commissioning by manufacturer only.)
- a. Suction pressure and temperature.
  - b. Discharge pressure and temperature.
  - c. Amps and volts.
  - d. Make, type, and model of unit, capacity rating.
  - e. Ambient temperature: WB, DB
  - f. Proper operation of controls: Temperature controllers and safety devices shall be tested during operating tests, with all other controls and devices, except one under test, being by-passed.
  - g. Upon completion of tests, controls and devices shall be returned to their normal operating condition and boiler shall remain in service.
5. Split System Heat Pump Units: (Start-up and initial commissioning by manufacturer only.)
- a. Suction pressure and temperature.
  - b. Discharge pressure and temperature.
  - c. Amps and volts.
  - d. Make, type, and model of unit, capacity rating.
  - e. Ambient temperature: WB, DB

- f. Proper operation of controls: Temperature controllers and safety devices shall be tested during operating tests, with all other controls and devices, except one under test, being by-passed.
- g. Upon completion of tests, controls and devices shall be returned to their normal operating condition and boiler shall remain in service.

6. MISCELLANEOUS:

- a. Electric Heaters:
  - 1. Amperage.
  - 2. Voltage.
  - 3. Make, type, model, and name plate capacity rating.

3.10 VERIFICATION OF HVAC CONTROLS

- A. Agency shall verify in conjunction with CONTRACTOR all control components are installed in accordance with the intent of the Contract Documents and are functioning according to the design intent, including all electrical interlocks, damper sequences, air and water resets, fire stat's, and other safety devices.
- B. CONTRACTOR shall verify all control components are calibrated and set for design operating conditions and intent.

3.11 TEMPERATURE TESTING

- A. To verify system control and operation, agency shall perform a series of three temperature tests taken at approximately two-hour intervals in each separately controlled zone. The resulting temperatures shall not vary more than two (2) degrees Fahrenheit from the thermostat or control set point during the tests. Outside temperature and humidity shall also be recorded during the testing periods.

3.12 KITCHEN HOOD TESTING

- A. Agency shall test and adjust hood total airflow by duct Pitot-tube traverse. If a Pitot-tube traverse is not practical, an explanation of why a traverse was not made must be made in writing to ARCHITECT and subsequently appear on the appropriate data sheet. Face velocities shall be tested under design operating conditions using a maximum of a one square foot grid pattern across the entire open face. CONTRACTOR shall set sash height on hoods to obtain face velocities within 20% of 100 feet per minute unless specified otherwise. Agency shall test and adjust exhaust airflows and make-up air flows to maintain design hood pressures and face velocities, and design room pressurization. Agency shall test for turbulence and proper air flow patterns at the face and inside the hoods using a hand-held smoke puffer or other approved smoke-emitting device.

3.13 FUME HOOD TESTING

- A. Agency shall test and adjust fume hood total airflow by duct Pitot-tube traverse. If a Pitot-tube traverse is not practical, an explanation of why a traverse was not made must be made in writing to ARCHITECT and subsequently appear on the appropriate data sheet. Face velocities shall be tested under design operating conditions using a maximum of a one square foot grid pattern across the entire open face. CONTRACTOR shall set sash height on hoods to obtain face velocities within 20% of 100 feet per minute unless specified otherwise. Agency shall test and adjust VAV controllers to obtain design exhaust airflows and make-up air flows to maintain design hood pressures and face velocities, and design room pressurization. Agency shall test for turbulence and proper air flow patterns at the face and inside the hoods using a hand-held smoke puffer or other approved smoke-emitting device.

### 3.14 BUILDING/ZONE PRESSURIZATION

- A. Agency shall test and adjust building/zone pressurization by setting the design flows to meet the required flow direction and pressure differentials. Positive/Negative area(s) supply air shall be set to design flow and exhaust air rates adjusted to obtain the required pressure differential(s).

### 3.15 FIRE AND SMOKE DAMPER TESTING

- A. This work is to be performed by OWNER and Fire Marshall. Do not include in agency scope of work.

### 3.16 LIFE SAFETY CONTROLS TESTING

- A. This work is to be performed by OWNER and Fire Marshall. Do not include in agency scope of Work.

### 3.17 FINAL TABULATION

- A. After heating, ventilating, and air conditioning components are satisfactorily tested and balanced, entire system shall be put into operation and all pressures, temperatures, gpm, cfm, velocities, etc., shall be recorded and checked against design schedules. Design requirements shall be listed on reports and final tabulation shall be within a tolerance of plus or minus 5% of design requirements.
- B. Readings at various locations as described herein will be made every hour for four (4) hours, during normal working hours for three (3) days. Boilers, forced air furnaces and chillers shall be started up far enough in advance to meet design conditions during period of testing.

### 3.18 VIBRATION TESTING

- A. Furnish instruments and perform vibration measurements if specified in Division 15. Provide measurements for all rotating HVAC equipment half horsepower and larger, including centrifugal/screw compressors, pumps, fans and motors.
- B. Record initial and final measurements for each unit of equipment on test forms. Where vibration readings exceed allowable tolerance and efforts to make corrections have proved unsuccessful, forward a separate report to ARCHITECT.



3.19 SOUND TESTING

- A. Perform and record sound measurements as specified in this section and if specified in Section 15070: Sound Vibration and Seismic Control. Take additional readings if required by ARCHITECT.
- B. Take measurements with a calibrated sound level meter and octave band analyzer of accuracy required by AABC or NEBB.
- C. Sound reference levels, formulae and coefficients shall be according to ASHRAE handbook, Current Systems Volume; Chapter: Sound and Vibration Control.
- D. Determine compliance with the Contract Documents as follows:

- 1. Where sound pressure levels are specified as noise criteria or room criteria in Section 15070: Sound, Vibration and Seismic Control.
  - a. Reduce background noise as much as possible by shutting off unrelated audible equipment.
  - b. Measure octave band sound pressure levels with specified equipment "off".
  - c. Measure octave band sound pressure levels with specified equipment "on".
  - d. Use difference in corresponding readings to determine sound pressure due to equipment.

DIFF. :	0	1	2	3	4	5	9-10 or More
FACTOR:	10	7	4	3	2	1	0

Sound pressure level, due to equipment, equals sound pressure level with equipment "on" minus factor.

- e. Plot octave bands of sound pressure level due to equipment for typical rooms, on a graph, which also shows, noise criteria (NC) curves.
- 2. When sound power levels are specified:
  - a. Perform steps in Section 3.20, D, 1.a. through 1.d.
  - b. For indoor equipment: Determine room attenuating effect; i.e., difference between sound power level and sound pressure level. Determine sound power level will be sum of sound pressure level due to equipment, plus room attenuating effect.
  - c. For outdoor equipment: Use directivity factor and distance from noise source to determine distance factor, i.e., difference between sound power level and sound pressure level. Measured sound power level will be sum of sound pressure level due to equipment, plus distance factor.

3. Where sound pressure levels are specified in terms of dbA, measure sound levels using the "A" scale of meter. Single value readings will be used instead of octave band analysis.
- E. Where measured sound levels exceed specified level, CONTRACTOR shall take all remedial action and necessary sound tests shall be repeated.
- F. Measure and record sound levels in decibels at each diffuser, grille or register in occupied areas. Sound levels shall be measured approximately 5'-0" above floor on a line approximately 45 degrees to center of opening, on the "A" and "C" scales of a General Radio Company sound level meter, or similar instrument.
- G. Report shall also include ambient sound levels of rooms in which above openings are located, taken without air-handling equipment operating. A report shall also be made of any noise caused by mechanical vibration.

END OF SECTION

## SECTION 01500 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

### PART 1 - GENERAL

#### 1.01 SECTION INCLUDES

- A. Temporary utilities, construction facilities and controls to be provided, maintained, relocated, and removed by the CONTRACTOR

#### 1.02 RELATED SECTIONS

- A. Section 01005: Summary of the Work
- B. Section 01010: Phasing of the Work
- C. Section 01020: Project Forms
- D. Section 01050: Schedule of Values
- E. Section 01330: Storm Water Pollution Prevention
- F. Section 01360: Construction Schedule
- G. Section 01420: Testing and Inspection
- H. Section 01450: Test and Balance
- I. Section 01700: Contract Closeout

#### 1.03 PERSONNEL RESTRICTIONS:

- A. Sexual Harassment, defined in its broadest and most inclusive form, immoral, lewd, indecent, disruptive or disorderly behavior or conduct is not allowed. Unauthorized association with any student or teacher on campus is prohibited. The Owner reserves the right to direct the Contractor to immediately eject any person violating this requirement from the Owner's property.
- B. While on School property, construction personnel shall be fully clothed, wearing shirts, shoes, and required safety equipment at all times. Smoking is prohibited on all Fulton County School properties.
- C. All employees of the Contractor shall be required to wear an identification badge for all work on the school campus. These badges will be issued without cost to the Contractor; however, the Contractor will be responsible for returning all badges to the Owner at the completion of the Contract. All badges must be returned.

### PART 2 - PRODUCTS (Not applicable)

### PART 3 - EXECUTION

#### 3.01 QUALITY ASSURANCE

- A. CONTRACTOR shall comply with industry standards and with applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
  - 1. Building Code requirements
  - 2. Governing Federal, State and County authorities having jurisdiction
  - 3. Health and safety regulations

4. Utility company regulations
5. Police, fire department and rescue squad requirements
6. Environmental protection regulations

- B. CONTRACTOR shall arrange for the inspection and testing of each temporary utility prior to use. Obtain required certifications and permits and transmit to OR.

### 3.02 TEMPORARY UTILITIES

- A. CONTRACTOR shall submit to OR reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.

- B. CONTRACTOR shall coordinate with the appropriate utility company to install temporary services. Where the utility company provides only partial service, CONTRACTOR shall provide and install the remainder with matching compatible materials and equipment.

C. Temporary Water:

1. CONTRACTOR shall furnish, install and pay for all necessary permits, inspections, move ins/out, temporary water lines, connections & fees, extensions and distribution, metering devices and use charges, deliveries/pick ups, rentals, storage, transportation, taxes, labor, insurance, bonds, material, equipment and all other miscellaneous items for the temporary water system, and upon Substantial Completion of the Work, removal of all such temporary water system devices and appurtenances.
2. CONTRACTOR shall provide and maintain temporary water service, including water distribution piping and outlet devices of the size and required flow rates in order to provide service to all areas of the Project site.
3. CONTRACTOR shall provide and pay for all potable water needed for construction and all other uses associated with the Work.
4. CONTRACTOR shall at their expense and without limitation, remove, extend and/or relocate temporary water systems as rapidly as required in order to provide for progress of the Work.

D. Temporary Electric:

1. CONTRACTOR shall furnish, install, maintain and pay for all necessary permits, inspections, temporary wiring, metering devices and use charges, move ins/outs, connections & fees, service, extension and distribution, deliveries/pickups, rentals, storage, transportation, taxes, labor, insurance, bonds, materials, equipment and all other required miscellaneous items for the temporary electric systems including on-site electrical generators, and upon Substantial Completion of Work, removal of all such temporary electric systems and appurtenances.
2. CONTRACTOR shall furnish, install, maintain, extend and distribute temporary electric area distribution boxes, so located that individual trades can obtain adequate power and artificial lighting, at all points required for the Work, for inspection and for safety.

3. CONTRACTOR shall provide temporary electric for construction, temporary facilities, and connections for construction equipment requiring power or lighting, at all points required for the Work, for inspection and safety.
4. CONTRACTOR shall provide 20 foot candles minimum lighting levels inside building(s) and 5 foot candles outside for safety and security.
5. CONTRACTOR shall ensure welding equipment is supplied by electrical generators.
6. CONTRACTOR shall at their expense and without limitation remove, extend and/or relocate temporary electric systems as rapidly as required in order to provide for progress of the Work.

E. Temporary Gas:

1. CONTRACTOR shall furnish, install, maintain and pay for all necessary permits, inspections, metering devices and use charges, move ins/out, extension and distribution, deliveries/pickups, rentals, storage, transportation, equipment and piping, rentals, taxes, labor, material, insurance, bonds, and all other required miscellaneous items for the temporary gas systems necessary to perform the Work, and upon Substantial Completion of the Work, removal of all such temporary gas system devices and appurtenances.
2. CONTRACTOR shall at their expense and without limitation remove, extend and/or relocate temporary gas systems as rapidly as required in order to provide for progress of the Work.

F. Temporary Heating, Ventilation and Air Conditioning:

1. CONTRACTOR shall furnish, install, maintain, and pay for all necessary permits, inspections, move ins/out, extensions and distribution, connections and fees, use charges, metering devices and use charges, equipment, rentals, deliveries/pick ups, storage, transportation, taxes, labor, insurance, bonds, material, equipment and all other required miscellaneous items for temporary heat and ventilation needed for proper installation of the Work and to protect materials and finishes from damage due to weather. Upon Substantial Completion of the Work, CONTRACTOR shall remove all such temporary heating and ventilating system devices and appurtenances.
2. CONTRACTOR shall provide, maintain and pay for all temporary ventilation of enclosed Work areas to cure materials, disperse humidity, remove fumes, and to prevent accumulation of dust, irritants, or gases.
3. OWNER will not accept utilization of the permanent HVAC system for temporary HVAC until Substantial Completion.
4. CONTRACTOR shall maintain manufacturer required levels of room and/or space temperature, humidity and ventilation necessary to install products, materials and/or systems of the Work.

5. CONTRACTOR shall at their expense and without limitation, remove, extend and/or relocate temporary heating and ventilating systems as rapidly as required in order to provide for progress of the Work.

G. Temporary Telephone and Data:

1. CONTRACTOR shall furnish, install, maintain and pay for all necessary permits, inspections, move ins/outs, extensions and distribution, devices, connections and fees, use charges, rentals, deliveries/pickups, storage, transportation, taxes, labor, insurance, bonds, material, equipment and all other required miscellaneous items for temporary phone, data service and distribution to Project site temporary offices as required by this Section and Section 01500, 3.03.
2. CONTRACTOR shall at their expense and without limitation, remove, extend and/or relocate temporary phone service and distribution as rapidly as required in order to provide for progress of the Work.
3. Upon Substantial Completion of the Work, CONTRACTOR shall remove all such temporary phone service, distribution, devices and appurtenances.

3.03 CONTRACTOR PROVIDED FACILITIES

- A. CONTRACTOR shall provide temporary offices, Temporary classrooms, utilities, storage units, fencing, barricades, chutes, elevators, hoists, scaffolds, railings and other facilities or services as required. CONTRACTOR shall be responsible for providing, installation, maintenance, supplying, and all use charges for the items provided under Section 01500.
- B. CONTRACTOR shall be responsible for maintaining all transmission lines, equipment and related devices. If equipment and/or transmission equipment becomes inoperable and downtime exceeds two (2) days, CONTRACTOR shall replace and/or provide equivalent interim equipment.
- C. Trailer, furniture, equipment, and related ancillary devices shall remain property of CONTRACTOR. CONTRACTOR shall remove such property upon Final Completion of Work or as otherwise determined in writing by the OR.
- D. At CONTRACTOR expense and without limitation remove and/or relocate temporary office(s) and related facilities as rapidly as required in order to provide for progress of the Work.
- E. Temporary Storage Units:
  1. CONTRACTOR shall provide secure and waterproof storage units for the temporary storage of furniture, equipment and other items requiring protection.
  2. Walls, roof and doors shall be a minimum of 16-gage steel with floors of 1" tongue and groove hardwood or 3/4" minimum exterior type plywood. The undercarriage shall be designed to accommodate forklift blades 42" to 60" long. There shall be doublewide swing out lockable doors at one end equipped with waterproof gaskets.

3. CONTRACTOR shall be responsible for all delivery charges and will install the storage unit in an appropriate area.
4. CONTRACTOR shall remove the storage unit from the Project site when the storage unit is no longer required for the Work or upon Substantial Completion of the Work.
5. CONTRACTOR shall at their expense and without limitation remove and/ or relocate storage units as rapidly as required in order to provide for progress of the Work.

F. Temporary Sanitary Facilities:

1. CONTRACTOR shall provide portable chemical toilet facilities. Quantity of portable chemical toilet facilities shall be based on total number of workers and shall be in accordance with OSHA standards.
2. Portable chemical toilet facilities shall be maintained with adequate supplies and in a clean and sanitary condition and shall be removed from the Project site upon Substantial Completion of the Work.
3. CONTRACTOR employees shall not use school toilet facilities.
4. At CONTRACTOR expense and without limitation remove and/or relocate portable chemical toilet facilities as rapidly as required in order to provide for progress of the Work.
5. CONTRACTOR will contain their breaks and lunch periods to the areas designated by OR or any public area outside the Project site. CONTRACTOR shall provide a suitable container within the break/lunch area for the placement of trash. Areas used for break/lunch must be maintained clean and orderly.

G. Temporary Security Fence/Barricade:

1. CONTRACTOR shall install temporary Project site security barricade(s) indicated on Drawings or as required for safety and as specified herein. New or used material may be furnished. Security of Project site and contents is a continuous obligation of CONTRACTOR.
2. Unless otherwise indicated or specified, security fence shall be constructed of 8'-0" high chain link fencing. Space posts not to exceed 10'-0" on centers. Posts shall be of following nominal pipe dimensions: terminal, corner, and gatepost 2-1/2", line posts 2". Chain link fence shall be not less than #13 gage, 2" mesh, and in one width. Posts, fence and accessories shall be galvanized and as follows:
  - a. Shall be set in the earth a depth of 30" with soil firmly compacted around post, unless required otherwise in writing by OR.
  - b. Fence fabric shall be attached to posts with #14 gage tie wire at 16" on centers. A #6 gage steel tension wire with turnbuckles shall be installed

at top and bottom of barricade fencing. Wire tie fabric to tension wires at 18" centers.

- c. Chain link fencing shall be free from barbs, icicles or other projections resulting from galvanizing process. Fence having such defects will be replaced even if it has been installed.
- d. Gates shall be fabricated of steel pipe with welded corners, and bracing as required. Fence and fabric to be attached to frame at 12" centers. Provide all gate hardware of a strength and quality to perform satisfactorily until barricade is removed upon Substantial Completion of the Work. Each gate shall have a chain and padlock. Provide two (2) gate keys to OR. At Substantial Completion of the Work, remove barricade from Project site, backfill and compact fence footing holes. Existing surface paving that is cut into or removed shall be patched and sealed to match surrounding areas.
- e. At CONTRACTOR expense and without limitation remove and/or relocate fencing, fabric and barricades or other security and protection facilities as rapidly as required in order to provide for progress of the Work.

H. Other Temporary Enclosures & Barricades:

1. Provide protective barriers around trees, plants and other improvements designated to remain.
2. Temporary partitions shall be installed to protect areas, spaces, property, personnel, students and faculty from the work area, and to separate and control dust, debris, noise, access, sight, fire areas, safety and to provide security. Temporary partitions shall be as designated on the Drawings or as specified by ARCHITECT or the OR. At CONTRACTOR expense and without limitation remove and/or relocate enclosures, barriers and temporary partitions as rapidly as required in order to provide for progress of the Work.
3. Since the Work of this Project may be immediately adjacent to existing occupied structures and vehicular and pedestrian right of ways, CONTRACTOR shall, in his sole judgment and in accordance with applicable safety standards, provide all temporary facilities, additional barricades, protection and care to protect existing structures, occupants, property, pedestrians and vehicular traffic. CONTRACTOR is responsible for any damage, which may occur to the property and occupants of the property of OWNER or adjacent private or public properties which in any way results from the acts or neglect of CONTRACTOR.

I. Temporary Storage Yards:

1. CONTRACTOR shall fence and maintain storage yards in an orderly manner.
2. Provide storage units for materials that cannot be stored outside.
3. At CONTRACTOR expense and without limitation remove and/or relocate storage yards and units as rapidly as required in order to provide for progress of the Work.



**J. Temporary De-watering Facilities & Drainage:**

1. For temporary drainage and de-watering facilities and operations not directly associated with construction activities included under individual sections, comply with de-watering requirements of applicable Division 01 sections. CONTRACTOR shall maintain the Work, Project site and related areas free of water.
2. For temporary drainage and de-watering facilities and operations directly associated with new buildings, additions or other construction activities, comply with Division 01 & 02 Sections. CONTRACTOR shall be responsible for, but not limited to, de-watering of excavations, trenches & below grade areas of buildings, structures, the Project site and related areas.

**K. Temporary Protection Facilities Installation:**

1. CONTRACTOR shall not change over from using temporary facilities and controls to permanent facilities until Substantial Completion, except as permitted by OR
2. Until permanent fire protection needs are supplied and approved by authorities having jurisdiction, CONTRACTOR shall provide, install and maintain temporary fire protection facilities of the types needed in order to adequately protect against fire loss. CONTRACTOR shall adequately supervise welding operations, combustion type temporary heating and similar sources of fire ignition.
3. CONTRACTOR shall provide, install and maintain substantial temporary enclosures of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security. Where materials, tools and equipment are stored within the Work area, CONTRACTOR shall provide secure lock up to protect against vandalism, theft and similar violations of security. OWNER accepts no financial responsibility for loss, damage, vandalism or theft.
4. CONTRACTOR operations shall not block, hinder, impede or otherwise inhibit the use of required exits and/or emergency exits to the public way, except as approved by the OR. CONTRACTOR shall maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fire fighting equipment and/or personnel.
5. In the event of an emergency drill or an actual emergency, designated by the sounding of the fire alarm and/or other sounding device, all construction activities must cease. CONTRACTOR shall evacuate the Work area and remain outside the Work area until permitted to return. No Work shall be conducted during the evacuation of a building or during an emergency.

**L. Temporary Security and Safety Measures:**

1. During performance of the Work in or near existing facilities CONTRACTOR shall provide, install and maintain substantial temporary barriers and/or partitions

separating all Work areas from areas occupied by students, faculty and/or administrative staff and the public.

2. During performance of the Work in existing facilities and/or on a Project site occupied by students and where temporary barriers and/or partitions are not physically feasible, CONTRACTOR shall provide an employee to continually supervise and monitor all employees of the CONTRACTOR and Subcontractor. For the purposes of this Section, CONTRACTOR employee shall be someone whom the Department of Justice has ascertained has not been convicted of a violent or serious felony as listed in Penal Code Section 667.5(c) and/or Penal Code Section 1192.7(c). To comply with this Section, CONTRACTOR shall have his employee submit his or her fingerprints to the Department of Justice.
3. Penal Code Sections 290 and 290.4 commonly known as "Megan's Law" require, among other things, individuals convicted of sexually oriented crimes, to register with the chief of police where the convicted individual resides or with a county sheriff or other law enforcement officials. The CONTRACTOR shall check its own employees and require each Subcontractor to check its employees and report to the CONTRACTOR if any such employees are registered sex offenders. The CONTRACTOR shall check monthly during the life of the Contract to ascertain this information and report same to OR. Before starting the Work and monthly thereafter during the life of Contract, CONTRACTOR shall notify the OWNER in writing if any of its employees and/or if any Subcontractor's employees is a registered sex offender. If so, CONTRACTOR shall proceed in accordance with Section 3.03 M.2 above.

M. Temporary Access Roads and Staging Areas:

1. Due to the limited amount of on and off Project site space for the parking of staff and school visitor's vehicles there will be no parking of CONTRACTOR vehicles in areas designated for school use only. CONTRACTOR shall provide legal access to and maintain CONTRACTOR designated areas for the legal parking, loading, off-loading & delivery of all vehicles associated with the Work. CONTRACTOR shall be solely responsible for providing and maintaining these requirements whether on or off the Project site.
2. Temporary access roads are to be installed and maintained by CONTRACTOR to all areas of the Project site.
3. CONTRACTOR shall maintain roads and walkways in a clean condition including removal of debris and/or other deleterious material on a daily basis.

3.04 PROJECT SIGNAGE

- A. CONTRACTOR shall furnish and install a Project sign on the Project site at a location established by ARCHITECT. A graphical layout of the proposed sign shall be submitted to ARCHITECT and OR for review before fabrication.
- B. Sign lettering shall be painted white with exhibit lettering by a professional sign painter, in accordance with details reviewed by ARCHITECT. The following shall be listed on sign:

1. OWNER – Fulton County Schools.
  2. Name of School.
  3. Name of Program Manager
  4. Names of the Architect/Engineer and Consultants.
  5. Contractor
  6. Other prime Subcontractors
  7. Names of all School Board members.
- C. No other signs shall be displayed without approval of OR. At CONTRACTOR expense and without limitation remove and/or relocate Project signage and related facilities as rapidly as required in order to provide for progress of the Work.
- D. CONTRACTOR shall remove Project signage at Substantial Completion of the Work.
- E. Until Substantial Completion of the Work, CONTRACTOR shall remove, as required, all graffiti from buildings, equipment, fences and all other temporary and/or permanent improvements on the Project site.
- F. CONTRACTOR shall provide and install signage to provide directional, identification, and contact information to construction personnel and visitors as follows and as reviewed by OR.
1. For construction traffic control/flow at entrances/exits, and as designated by OR.
  2. To direct visitors.
  3. For construction parking.
  4. To direct deliveries.
  5. For Warning Signs as required.
  6. Per OSHA standards as necessary.
  7. For trailer identification and Project site address.
  8. For "No Smoking" safe work site at designated locations.
  9. Emergency contact information and phone number of CONTRACTOR.
  10. Emergency contact information and phone number of local police, fire, and emergency personnel.

### 3.05 TRENCHES

- A. Open trenches for the removal of utility lines (water, gas, electrical and similar utilities) and open pits outside barricaded working areas shall be barricaded at all times in a legal manner determined by CONTRACTOR. Trenches shall be backfilled and patch-paved within twenty-four (24) hours after removal or shall have "trench plates" installed. Required access to buildings shall be provided and maintained. CONTRACTOR shall comply with all applicable statutes, codes & regulations regarding trenching and

trenching operations. Open trenches deeper than 3'-6", and not located within a public street access, shall be enclosed within an 8'-0" high chain-link fence.

### 3.06 DUST CONTROL

- A. CONTRACTOR is responsible for dust control on and off the Project site. When Work operations produce dust the Project site and/or streets shall be sprinkled with water to minimize the generation of dust. CONTRACTOR shall clean all soils and debris from construction vehicles and cover both earth and debris loads prior to leaving the Project site. CONTRACTOR shall, on a daily basis, clean all streets and/or public improvements within the right of way of any and all debris, dirt, mud and/or other materials attributable to operations of CONTRACTOR.

### 3.07 WASTE DISPOSAL

- A. ACTOR shall provide and maintain trash bins on the Project site. Trash bins shall be serviced on an as needed basis and CONTRACTOR is responsible for the transportation of and the legal disposal of all contents.

### 3.08 ADVERSE WEATHER CONDITIONS

- A. Should warnings of adverse weather conditions such as heavy rain and/or high winds be forecasted, CONTRACTOR shall provide every practical precaution to prevent damage to the Work, Project site and adjacent property. CONTRACTOR precautions shall include, but not be limited to, enclosing all openings, removing and/or securing loose materials, tools, equipment and scaffolding.
- B. CONTRACTOR shall provide and maintain drainage away from buildings and structures.
- C. CONTRACTOR shall implement all required storm water mitigation measures as required under related Division 01 Sections.

### 3.09 DAILY REPORTS

- A. CONTRACTOR shall provide and maintain in the Project site office of CONTRACTOR, a daily sign in sheet for use by all employees of CONTRACTOR and all Subcontractors at whatever tier. At the beginning of each work day, the foreman, project manager, superintendent of CONTRACTOR and/or Subcontractors shall visit the site office of the CONTRACTOR and shall enter onto the daily sign in sheet: all employee names; trade classification; and represented company. The completed sign in sheet shall serve as the basis of and shall be submitted with the daily construction report as set forth in Section 3.10 B.
- B. By the end of each workday, CONTRACTOR shall submit to OR a daily construction report denoting the daily manpower counts and a brief description/location of the workday activities. Manpower shall be broken down by trade classification such as foreman, journeyman or apprentice. The report shall also note the date, day of the week, weather conditions, deliveries, equipment on the Project site whether active and/or idle, visitors, inspections, accidents and unusual events, meetings, stoppages, losses, delays, shortages, strikes, orders and requests of governing agencies, Construction Directive and/or Change Orders received and implemented, services disconnected and/or connected, equipment start up or tests and partial use and/or occupancies.

CONTRACTOR shall also include on the daily construction report the above information for all Subcontractors at whatever tier.

END OF SECTION



## SECTION 01600 MATERIALS AND EQUIPMENT

### PART 1 - GENERAL

#### 1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements governing selection of products for incorporation into the Work.

#### 1.02 RELATED SECTIONS

- |    |                |                        |
|----|----------------|------------------------|
| A. | Section 01020: | Project Forms          |
| B. | Section 01100: | Coordination           |
| C. | Section 01300: | Submittals             |
| D. | Section 01360: | Construction Schedule  |
| E. | Section 01420: | Testing and Inspection |
| F. | Section 01640: | Substitutions          |
| G. | Section 01740: | Warranties             |

#### 1.03 DEFINITIONS

- A. Definitions used in this Section are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and other similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
1. "Products" are items purchased for incorporation into the Work, whether purchased for the Work or taken from previously purchased stock. The term "product" includes the terms "material" and "equipment" and terms of similar intent.
    - a. "Named Products," are items identified by the manufacturer's product name, including make, model number or other designation, shown or listed in the manufacturer's published product literature, current as of the date of the Contract.
    - b. "Foreign Products," as distinguished from "domestic products," are items substantially manufactured (50 percent or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.
  2. "Materials," are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
  3. "Equipment," is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

#### 1.04 SUBMITTALS

- A. Material list: Prepare a list in tabular form acceptable to ARCHITECT and/or OR showing proposed products. Include generic names. Include the manufacturer's name and proprietary names for each item listed.
1. Coordinate material list with the Construction Schedule and the submittal schedule.
  2. Form: Prepare material list with information on each item tabulated under the following column headings.
    - a. Related Specification Section number
    - b. Generic name used in Contract Documents
    - c. Proprietary name, model number, and similar designations
    - d. Manufacturer's name and address
    - e. Supplier's name and address
    - f. Installer's name and address
    - g. Projected delivery date or time span of delivery period
  3. Initial Submittal: Within ten (10) days after execution of each subcontract agreement, as set forth in General Condition Article 6.25, submit three (3) copies of an initial material list to the ARCHITECT with a copy to the OR. Provide a written explanation for omissions of data and for known variations from the Contract Documents.
  4. ARCHITECT Action: ARCHITECT will respond in writing to OR within fourteen (14) days and OR will forward response to CONTRACTOR within sixteen (16) days of receipt of the completed material list. No response outside this period constitutes no objection to listed items but does not constitute a waiver of the requirement that selected items comply with the Contract Documents. ARCHITECT response will include a list of unacceptable item selections, containing a brief explanation of reasons for this action.

#### 1.05 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
1. CONTRACTOR is to verify necessary lead times for all materials; however, when specified products are available only from sources that do not, or cannot, produce a quality adequate to complete Work in a timely manner, consult with the ARCHITECT to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing these qualities, to the fullest extent possible.
- B. Compatibility of Options: When the CONTRACTOR is given the option of selecting between two or more products for use in the Work, the product selected shall be compatible with products previously selected, even if previously selected products were also options.



- C. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion into the Work:
1. No available domestic product complies with the Contract Documents.
  2. Domestic products that comply with the Contract Documents are available only at prices or terms substantially higher than foreign products that comply with the Contract Documents.
- D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed in view in occupied spaces or on the exterior.
1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
  2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
    - a. Name of product and manufacturer
    - b. Model and serial number
    - c. Capacity
    - d. Speed
    - e. Ratings

#### 1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
1. Schedule delivery to minimize long-term storage at the Project site and to prevent overcrowding of Work spaces.
  2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to the Project site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
  5. Store products at the Project site in a manner that will facilitate inspection and

measurement of quantity or counting of units.

6. Store heavy materials away from structures in a manner that will not endanger the structure's supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

## PART 2 - PRODUCTS

### 2.01 MATERIAL SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
  1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
  2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other Projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
  1. Proprietary Specification Requirements: Where Specifications name only a single material or manufacturer, provide the product indicated. No substitutions will be permitted.
  2. Semi-proprietary Specification Requirements: Where Specifications name two or more products or manufacturers, provide one of the products indicated. No substitutions will be permitted.
    - a. Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" comply with General Condition Article 6.14 to obtain approval for use of an unnamed product.
  3. Descriptive Specification Requirements: Where Specifications describe a product or assembly, list exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with the Contract Documents.
  4. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.

- a. Manufacturer's recommendations may be contained in published material literature or by the manufacturer's certification of performance.
5. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes, or regulations specified.
6. Visual Matching: Where Specifications require matching an established Sample, decision of the ARCHITECT will be final on whether a proposed product matches satisfactorily.
7. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard or premium colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The ARCHITECT will select the color, pattern, and texture from the product line selected.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located, and aligned with other Work.
  1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration until Substantial Completion.

END OF SECTION



**SECTION 01640  
SUBSTITUTIONS**

## PART 1 - GENERAL

## 1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for handling requests for substitutions submitted eleven (11) days or more after the date established in the Notice to Proceed.

## 1.02 RELATED SECTIONS

- A. Section 01020: Project Forms
- B. Section 01300: Submittals
- C. Section 01600: Materials and Equipment
- D. Section 01700: Close Out

## PART 2 - PRODUCTS (Not applicable)

## PART 3 - EXECUTION

## 3.01 APPLICATION

- A. CONTRACTOR proposed changes in products or materials required by the Contract Documents eleven (11) days or more after the date established in the Notice to Proceed, are considered to be requests for substitutions. OR will consider requests for substitution if a product is no longer manufactured and/or cannot be acquired from existing inventories. The following are not considered to be valid requests for substitutions:
  - 1. Revisions to the Contract Documents requested by OR or ARCHITECT.
  - 2. Specified options of products included in the Contract Documents.
  - 3. Substitutions requested on a "or equal" basis.

## 3.02 SUBMITTALS

- A. Transmit submittals as described in related Sections for each request for substitution.
  - 1. Identify the product to be replaced in each request. Include related Specification Section and Drawing number.
  - 2. Provide complete documentation denoting compliance with the requirements for substitutions, and the following information, as appropriate.
    - a. A detailed comparison of significant qualities of the proposed substitution with those specified in the Contract Documents. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.

- b. Product Data, including Drawings, descriptions of products, fabrication, and installation procedures.
  - c. Samples, where applicable or requested.
  - d. CONTRACTOR certification the proposed substitution conforms to requirements of the Contract Documents in every respect and is appropriate for the applications indicated.
  - e. CONTRACTOR waiver of rights to an increase in the Contract Amount, Milestones and/or Contract Time that may subsequently become necessary because of the failure of the substitution to adequately perform.
3. If required, ARCHITECT will request additional information or documentation for evaluation. OR will notify CONTRACTOR of acceptance or rejection of the substitution.
  4. ARCHITECT will review and consider request for substitution and provide a recommendation to OR
  5. Where a proposed substitution involves and/or affects more than one Subcontractor, CONTRACTOR shall ensure each Subcontractor cooperates with the other Subcontractor involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of all products.
  6. CONTRACTOR submittal and ARCHITECT review of Shop Drawings, Product Data, material lists or Samples do not constitute an acceptable or valid request for substitution.

END OF SECTION

**SECTION 01700  
CONTRACT CLOSE OUT****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. This Section includes administrative and procedural requirements for Contract Closeout, including but not limited to, the following:
1. Inspection procedures.
  2. Project record documents submittal.
  3. Operation and maintenance manual submittal.
  4. OWNER orientation and instruction.
  5. Final cleaning.
- B. Closeout requirements for specific Work activities are included in the appropriate Sections in Divisions 01 through 16.
- C. The OR emphasizes their need for the Contractor's timely submission of all CORRECT and COMPLETE close-out materials. The Owner reserves the right to impose one or more types of monetary penalties (eg. Credit Change Order, increased Retainage, Negative Line Item entry, etc.) on the Contractor for failure to meet the submission milestone dates outlined below:
1. Provide Operation and Maintenance Manual Notebooks for all systems and equipment no later than ninety (90) days prior to the Project Substantial Completion Date.
  2. Provide all keys, valve schedules, attic stock materials, instruction confirmations, and as-built drawings no later than the Project Substantial Completion Date.
  3. Provide all required warranties, inspection reports, governing certificates, and other remaining required items within thirty (30) days following the Project Substantial Completion Date.

**1.02 RELATED SECTIONS**

- |    |                |  |
|----|----------------|--|
| A. | Section 01020: | Project Forms                                  |
| B. | Section 01080: | Application for Payment                        |
| C. | Section 01300: | Submittals                                     |
| D. | Section 01360: | Construction Schedule                          |
| E. | Section 01450: | Test and Balance                               |
| F. | Section 01500: | Construction Facilities and Temporary Controls |
| G. | Section 01740: | Warranties                                     |

**PART 2 – PRODUCTS (Not applicable)****PART 3 - EXECUTION****3.01 SUBSTANTIAL COMPLETION**

- A. Inspection Procedures: On receipt of a request for a certificate of Substantial Completion, OR will either authorize commencement of inspection or advise CONTRACTOR of unfilled requirements. OR, CONTRACTOR and ARCHITECT will inspect the Work and OR shall prepare a comprehensive punch list of items to be completed.
1. OR will repeat inspection when requested and assure the Work is complete.
  2. Results of the completed inspection will form a partial basis of the requirements for Final Completion.
- B. Re-inspection Procedures: OR, CONTRACTOR and ARCHITECT will inspect the Work upon notice the Work, including final inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to OR.
1. Upon completion of inspection, OR will recommend Final Completion. If the Work is incomplete, OR will advise CONTRACTOR of Work that is incomplete or of obligations that have not been fulfilled but are required for Final Completion.
  2. If necessary, re-inspection will be repeated, but may be assessed against CONTRACTOR if OWNER is subject to additional professional service and or additional costs of inspection.

### 3.02 PROJECT RECORD DOCUMENT SUBMITTAL

- A. General: Do not use project record documents for construction purposes. Protect record documents from deterioration and loss. Provide access to record documents for ARCHITECT and OR reference during normal working hours. Project record document shall be updated on a weekly basis. Prior to submitting each application for payment, secure OR and ARCHITECT approval of project record documents.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white prints of Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which Drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Drawings. Provide detailed and accurate field dimensions for concealed elements that would be difficult to measure and record at a later date.
1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work. Date and number entries in the same format as submitted. Call attention to entry by a "cloud" around the affected areas.
  2. Mark new information important to OWNER but was not shown on Drawings or Shop Drawings.
  3. Utility location and depth below finished grade and/or above ceilings and attic spaces shall be fully dimensioned and indicated on record drawings. Dimensions



- shall be measured from building lines or permanent landmarks and shall be triangulated to those features.
4. Note related Change Order or Construction Directive numbers where applicable. RFI submissions shall be referenced on each affected sheet, Drawing and/or Shop Drawing.
  5. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
  6. Prior to Final Completion of the Work, and review of the project record drawings by ARCHITECT, prepare a final set of project record drawings using reproducible Mylar or vellum. Submit final set of transparencies to ARCHITECT.
- C. Record Specifications: Maintain two complete copies of the Specifications, including Addenda. Include with the Specifications two copies of other written Contract Documents, such as Change Orders and/or Construction Directives issued during construction.
1. Mark these record documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
  2. Give particular attention to substitutions and selection of options and information on concealed Work that cannot otherwise be readily discerned later by direct observation.
  3. Note related record document information with Product Data.
  4. Prior to Final Completion of the Work, submit record Specifications to ARCHITECT for OWNER records.
- D. Record Product Data: Maintain two copies of each Product Data submittal. Note related Change Orders and Construction Directives and mark-up of record drawings and Specifications.
1. Mark these documents to illustrate significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the Project site and from the manufacturer's installation instructions and recommendations.
  2. Provide detailed and accurate information regarding concealed products and portions of Work that cannot otherwise be readily discerned later by direct observation.
  3. Prior to Final Completion of the Work, submit complete set of record Product Data to the ARCHITECT for OWNER records.
- E. Record Samples: Immediately prior to Substantial Completion, CONTRACTOR shall meet with ARCHITECT and OR at the Project site to determine which Samples are to be

transmitted to OWNER for record purposes. Comply with OR instructions regarding delivery to OWNER storage area.

- F. Miscellaneous Records: Refer to other Specification sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date of Final Completion, complete and compile miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to ARCHITECT for OWNER records.
- G. Maintenance Manuals: Prior to Substantial Completion, organize operation and maintenance data into suitable two sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-3", 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Submit to ARCHITECT for OWNER records. Include the following types of information.
1. Emergency instructions
  2. Spare parts list
  3. Copies of warranties
  4. Wiring diagrams
  5. Recommended "turn-around" cycles
  6. Inspection procedures
  7. Shop Drawings and Product Data
  8. Fixture lamping schedule

### 3.03 CLOSEOUT PROCEDURES:

- A. Operation and Maintenance Instructions: Prior to Substantial Completion, arrange for each installer of equipment that requires regular operation and maintenance to meet with designated OWNER personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
1. Maintenance manuals
  2. Record documents
  3. Spare parts and materials
  4. Tools
  5. Lubricants
  6. Fuels
  7. Identification systems
  8. Control sequences
  9. Hazards
  10. Cleaning
  11. Warranties and bonds
  12. Maintenance agreements and similar continuing commitments
- B. As part of instruction for operating equipment, demonstrate the following procedures:
1. Start-up

2. Shutdown
3. Emergency operations
4. Noise and vibration adjustments
5. Safety procedures
6. Economy and efficiency adjustments
7. Effective energy utilization

### 3.04 FINAL CLEANING

- A. General: Related sections of the Contract Documents specify general cleaning during performance of the Work. General cleaning is included in Division 01 Section "Construction Facilities and Temporary Controls".
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
  1. Complete the following cleaning operations before requesting inspection for a certificate of Substantial Completion.
    - a. Remove labels that are not permanent labels.
    - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
    - c. Clean exposed exterior and interior hard-surfaced finished to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
    - d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
    - e. Clean the Project site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

END OF SECTION



## SECTION 01740 WARRANTIES

### PART 1 - GENERAL

#### 1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers and/or installer's standard warranties on products and special product warranties.

1. Refer to the General Conditions for terms of the guarantee period for the Work.

#### 1.02 RELATED SECTIONS

- A. Section 01120: Cutting and Patching  
B. Section 01600: Materials and Equipment  
C. Section 01700: Contract Closeout

### PART 2 - PRODUCTS (Not applicable)

### PART 3 - EXECUTION

#### 3.01 WARRANTY REQUIREMENTS

- A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties shall not relieve CONTRACTOR of the warranty of the Work incorporating such materials, products, and/or equipment. Manufacturer's disclaimers and limitations on warranties do not relieve suppliers, manufacturers, installers, and Subcontractors of the requirement to countersign special warranties with CONTRACTOR.
- B. Standard warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to OWNER.
- C. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for OWNER.
- D. Related Damages and Losses: When correcting failed or defective warranted Work, remove and replace Work that has been damaged as a result of such failure or which must be removed and replaced to provide access for correction of warranted Work.
- E. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement with the reinstated warranty equal to the original warranty.
- F. Replacement Cost: Upon determination the Work covered by a warranty has failed and/or is defective, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. CONTRACTOR is responsible for the

cost of replacing or rebuilding defective Work regardless of whether OWNER has benefited from use of the Work through a portion of its anticipated useful service life.

- G. OWNER Recourse: Expressed warranties made to OWNER are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which OWNER can enforce such other duties, obligations, rights, or remedies.
- H. Rejection of Warranties: OR reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- I. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, OR reserves the right to refuse to accept the Work until CONTRACTOR presents evidence the entities required to countersign such commitments have done so.

### 3.02 SUBMITTALS

- A. Submit written warranties to ARCHITECT prior to Final Completion of the Work. If the certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, submit written warranties as set forth in the certificate of Substantial Completion.
  - 1. When a designated portion of the Work is partially used and/or occupied by OWNER, submit properly executed warranties to ARCHITECT within fifteen (15) days of the Partial Use or Occupancy of the designated portion of the Work.
- B. When the Contract Documents require CONTRACTOR, or CONTRACTOR and a Subcontractor, installer, supplier or manufacturer to execute a special warranty, prepare a written document containing appropriate terms and identification, ready for execution by the required parties. Submit a draft to OR, through the ARCHITECT, for approval prior to final execution.
  - 1. Refer to Divisions 02 through 16 for specific content requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: Prior to Final Completion of the Work, compile two copies of each required warranty properly executed by CONTRACTOR, or by CONTRACTOR and Subcontractor, installer, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the Specifications.
- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8½ by 11" (115 by 280 mm) paper.
  - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the item or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the installer.

2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title and/or name, and name of CONTRACTOR.
3. When warranted Work requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

END OF SECTION





**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 3

CONCRETE



## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Foundation walls.
  - 3. Slabs-on-grade.
  - 4. Equipment pads and bases.
  - 5. Related materials, including vapor retarder.
- B. Related Sections include the following:
  - 1. Division 1 Section "Testing Laboratory Services" for special inspections associated with work in this section.
  - 2. Division 2 Section "Earth Work" for floor slab base material for slabs-on-grade.
  - 3. Division 2 Section "Concrete Paving, Sidewalks, Curb and Gutter" for concrete pavement and walks.

### 1.3 DEFINITIONS

- A. **Cementitious Materials:** Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

### 1.4 SUBMITTALS

- A. **Design Mixtures:** For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. No mixing water shall be added at Project site.
- B. **Steel Reinforcement Shop Drawings:** Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

- C. Samples: For waterstops, vapor retarder, moisture barrier, perimeter insulation, vapor barrier.
- D. Qualification Data: For Installer and manufacturer.
- E. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
  - 1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- F. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.
  - 4. Steel reinforcement and accessories.
  - 5. Waterstops.
  - 6. Curing compounds.
  - 7. Floor and slab treatments.
  - 8. Bonding agents.
  - 9. Adhesives.
  - 10. Vapor retarders.
  - 11. Repair materials.
- G. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.
- H. Field quality-control test and inspection reports.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, and acceptable to the owner, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
  - E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
    - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5 and Section 7, "Lightweight Concrete."
    - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
    - 3. ACI 318, "Building Code Requirements for Reinforced Concrete."
  - F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Products: Subject to compliance with requirements, provide one of the products specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials as required to achieve smooth painted finish.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

### 2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

### 2.4 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

### 2.5 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I, gray. May be supplemented with the following:
    - a. Fly Ash: ASTM C 618, Class F
    - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94 and potable.

## 2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

## 2.7 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape. Use this product unless noted otherwise.

1. Products:
  - a. Fortifiber Corporation; Moistop Ultra.
  - b. Raven Industries Inc.; Vapor Block 10.
  - c. Stego Industries, LLC; Stego Wrap 10 Mil Vapor Retarder.

## 2.8 FLOOR AND SLAB TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces. Product shall be certified by the manufacturer not to interfere with adhesion of floor finishes.

1. Products:
  - a. Burke by Edoco; Titan Hard.
  - b. ChemMasters; Chemisil Plus.
  - c. ChemTec International; ChemTec One.
  - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Intraseal.
  - e. Curecrete Distribution Inc.; Ashford Formula.
  - f. Dayton Superior Corporation; Day-Chem Sure Hard.
  - g. Euclid Chemical Company (The); Euco Diamond Hard.

- h. Kaufman Products, Inc.; SureHard.
- i. L&M Construction Chemicals, Inc.; Seal Hard.
- j. Meadows, W. R., Inc.; Liqui-Hard.
- k. Metalcrete Industries; Floorsaver.
- l. Nox-Crete Products Group, Kinsman Corporation; Duranox.
- m. Symons Corporation, a Dayton Superior Company; Buff Hard.
- n. US Mix Products Company; US Spec Industraseal.
- o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS.

## 2.9 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
  - 1. Products:
    - a. Axim Concrete Technologies; Cimfilm.
    - b. Burke by Edoco; BurkeFilm.
    - c. ChemMasters; Spray-Film.
    - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
    - e. Dayton Superior Corporation; Sure Film.
    - f. Euclid Chemical Company (The); Eucobar.
    - g. Kaufman Products, Inc.; Vapor Aid.
    - h. Lambert Corporation; Lambco Skin.
    - i. L&M Construction Chemicals, Inc.; E-Con.
    - j. MBT Protection and Repair, Div. of ChemRex; Confilm.
    - k. Meadows, W. R., Inc.; Sealtight Evapre.
    - l. Metalcrete Industries; Waterhold.
    - m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
    - n. Sika Corporation, Inc.; SikaFilm.
    - o. Symons Corporation, a Dayton Superior Company; Finishing Aid.
    - p. Unitex; Pro-Film.
    - q. US Mix Products Company; US Spec Monofilm ER.
    - r. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Colored, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315.
  - 1. To be used where concrete is indicated as the exposed floor finish.
  - 2. Products:
    - a. Euclid Chemical Company (The); Super Floor Coat Colored.
    - b. PROSOCO, Inc.; ColorSeal ChemMasters, Colored Polyseal.
    - c. TK Products; TK TRI-SEAL 1315 CCS.



- d. Vexcon Chemicals, Inc.; Starseal 1315 Concrete Stain.

## 2.10 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Construction Joint Form: Provide 0.025 inch- thick minimum, galvanized, pre-shaped key type form for construction joints in slabs on ground.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
  1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Floor Slab Base Material: Floor slab base material shall be #8, #89, or #9 aggregate meeting the Georgia Department of Transportation Specifications for Road and Bridge Construction, Section 800 (1993 Edition).

## 2.11 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
  1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  1. Fly Ash: 25 percent.
  2. Ground Granulated Blast-Furnace Slag: 50 percent.
  3. Combined Fly Ash and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash not exceeding 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
  1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

## 2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

### A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.68.
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content: 3 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.

### B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Minimum Cementitious Materials Content: 520 lb/cu. yd.
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content: 3 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

## 2.13 FABRICATING REINFORCEMENT

- ### A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.14 CONCRETE MIXING

- ### A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 FORMWORK

- ### A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- ### B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
  - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
  1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
  2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.4 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
  1. Lap joints 6 inches and seal with manufacturer's recommended tape.

### 3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. All "continuous" reinforcement shall have minimum "B" type tension laps (ACI 318-02, Section 12.15:1) at all splices unless noted otherwise.
- C. Horizontal wall and footing reinforcement shall be continuous and shall have 90 degree bends and extensions at corners and intersections as shown on typical bar placing details. Corner bars shall be of equal size and spacing as the main reinforcing. Laps shall be "B" type tension laps.
- D. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

- E. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- F. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- G. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
  - 1. Placement of welded wire reinforcement on grade or bottom of form to be "pulled up" after concrete is placed will not be permitted.

### 3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
  - 3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. Sawn Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
  3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

### 3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated or as approved by SER. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  2. Maintain reinforcement in position on chairs during concrete placement.
  3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  4. Slope surfaces uniformly to drains where required.
  5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
- G. Floor Drains: Coordinate the slope of the floor slab to floor drains with the plumbing subcontractor. In general, the floor shall uniformly slope from wall to floor drain 5/8 inches in rooms 10' x 10' or smaller, and 3/4 inches in rooms larger than 10' x 10'. In the case of a floor drain serving a specific piece of equipment, the floor drain and a finish floor surface shall be set 1/2 inch lower than the surrounding floor and "dish-pan" in a 30 inch diameter around the floor drain.

### 3.8 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.
  - B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
    1. Apply to concrete surfaces exposed to public view,.
  - C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.
- 3.9 FINISHING FLOORS AND SLABS
- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
  - B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.
    1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.
  - C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
    1. Apply float finish to surfaces to receive trowel finish.
  - D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
    1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
    2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
      - a. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for slabs-on-grade to receive thin floor coverings or where concrete is to be the exposed finish floor surface.



3. Measurements of F(F) and F(L) shall be made as soon as possible, preferably within 24 hours, but not later than 72 hours after placement of slabs-on-grade, and prior to removal of formwork and shoring for suspended slabs.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
  1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
  1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

### 3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings or as required or recommended by equipment manufacturer. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

### 3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..
  3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
    - a. To be used where concrete is indicated as the exposed floor finish.

### 3.12 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.

2. Do not apply to concrete that is less than seven days' old unless specifically allowed by manufacturer's written instructions.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

### 3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

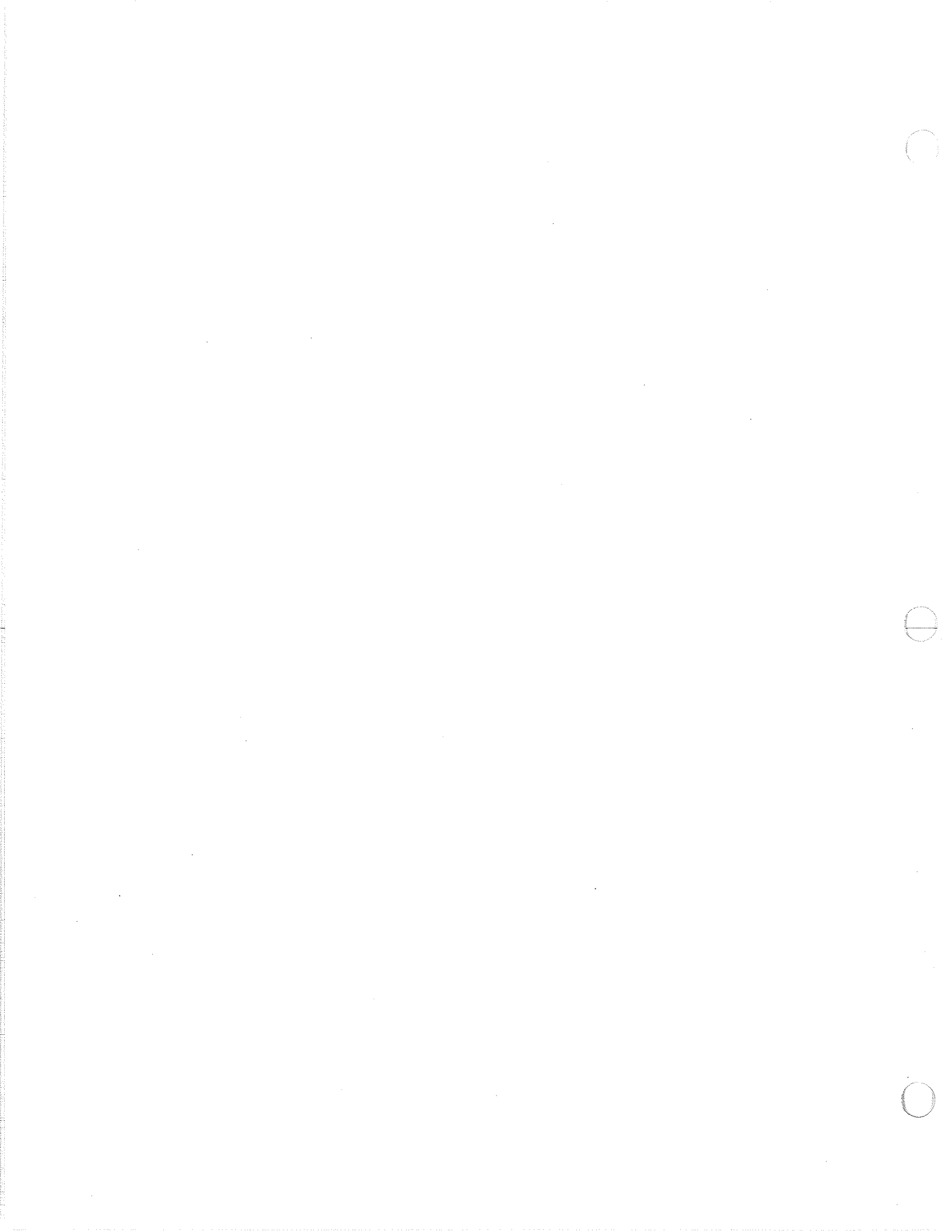
### 3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- B. Inspections:

1. Steel reinforcement placement.
  2. Verification of use of required design mixture.
  3. Concrete placement, including conveying and depositing.
  4. Curing procedures and maintenance of curing temperature.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
  5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  6. Compression Test Specimens: ASTM C 31/C 31M.
    - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
    - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
  8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
  10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
  11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
  12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.
- E. Water Flow / Drainage Test: Perform a water flow / drainage test in all areas to receive resinous flooring finish. After installation of concrete, flood area with water. Test to be performed at 4:00 PM on day of test and floor must self-drain with no ponding water by 9:00 AM the following morning. Coordinate scheduling of test with Owner and Architect.

END OF SECTION 03 3000



## SECTION 03 5216 - LIGHTWIGHT INSULATING CONCRETE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes cast-in-place vermiculite aggregate-type lightweight insulating concrete for roof decks.
- B. Related Sections include the following:
  - 1. Division 5 Section "Steel Roof Deck" for ventilated roof deck.
  - 2. Division 6 Section "Rough Carpentry" for roofing.
  - 3. Division 7 Section "SBS Modified Bituminous Membrane Roofing" and "Roofing Accessories" for roofing, curbs and accessories.
  - 4. Division 23 "Mechanical" for roof deck penetrations.
  - 5. Division 26 "Electrical" for roof deck penetrations.

## 1.3 REFERENCE STANDARDS

- A. References in these specification to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.
  - 1. ASTM : American Society for Testing and Materials, Philadelphia, PA.
  - 2. FM: Factory Mutual Engineering and Research, Norwood, MA.
  - 3. UL: Underwriters Laboratories, Northbrook, IL.

## 1.4 DEFINITIONS

- A. Lightweight Insulating Concrete: Low-density concrete, with an oven-dry unit weight not exceeding 50 lb/cu. ft. placed with embedded rigid insulation board.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include mixing and application instructions for each type of lightweight insulating concrete.
- B. Shop Drawings: Include plans, sections, and details showing roof slopes, lightweight insulating concrete thicknesses, embedded insulation board, roof penetrations, roof perimeter terminations and curbs, control and expansion joints, and roof drains.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Certification:
  - 1. Submit documentation confirming that the specific expanded polystyrene proposed for use in this project is approved by Factory Mutual for use in conjunction with the proposed lightweight insulating concrete system.
  - 2. Submit a letter from the supplier of the proposed lightweight insulating concrete system confirming that the expanded polystyrene used as a component in the lightweight insulating concrete system is to be furnished by the supplier of the proposed lightweight insulating concrete system.
  - 3. Failure to submit all requested qualification data will be grounds for rejection of the manufacturer as an acceptable equal.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that is approved by lightweight insulating concrete manufacturer and has 5 years experience in the installation of insulated concrete deck system.
- B. Fire-Test-Response Characteristics: Where lightweight insulating concrete is part of a fire-resistance-rated roof-deck assembly, provide lightweight insulating concrete identical to that used in assemblies tested for fire resistance per ASTM E 119 by a testing agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory," from ITS's "Directory of Listed Products," or from the listings of another testing and inspecting agency.
- C. Provide a lightweight insulating concrete system meeting the following wind uplift standards.
  - 1. Tested by Factory Mutual Research for windstorm classification 1-90 based on test criteria effective October 1, 1995.
  - 2. Tested by Underwriters Laboratories and listed in the most recent Underwriters Laboratories Roofing Materials Directory.
- D. FMG Listing: Provide lightweight insulating concrete evaluated by FMG as part of a roof assembly and listed in FMG's "Approval Guide" for Class 1 fire and noncombustible rating.
- E. Provide vermiculite aggregates containing no detectable asbestos as determined by method specified in 40 CFR 763, Subpart E, Appendix E, Section 1, "Polarized Light Microscopy."
- F. Preinstallation Conference: Conduct a preinstallation conference at Project site before beginning deck installation.
  - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its



coordination or intergration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Owner of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
  - a. The Contract Documents.
  - b. Related requests for interpretations (RFI's).
  - c. Submittals.
  - d. Possible conflicts.
  - e. Compatibility problems.
  - f. Weather limitations.
  - g. Manufacturer's written recommendations.
  - h. Compatibility of material.
  - i. Acceptability of substrates.
  - j. Space and access limitations.
  - k. Regulations of authorities having jurisdiction.
  - l. Coordination with other work.
  - m. Required performance results.
  - n. Protection of adjacent work.
3. Conference shall not take place until all roof curbs, penetrations and roof nailers have been installed.
4. Record conference discussions, agreements, and disagreements, including required corrective measures and actions.
5. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
6. Do not proceed with installation if the conference cannot be sucessfully concluded. Initiate whatever actions are necessary to resolve impediments to preformance of the work and reconvene to conference at earliest feasible date.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original undamaged packages or acceptable bulk containers.
- B. Store packaged materials to protect them from elements or physical damage.
- C. Do not use cement that shows indications of moisture damage, caking, or other deterioration.

#### 1.9 PROJECT/SITE CONDITIONS

- A. Environmental Requirements
  1. Precipitation: Do not apply materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials and building interiors are protected from possible moisture damage or contamination.
  2. Temperature Restrictions: When air temperatures of 40°F or above are predicted to occur within the first 24 hours after placement, normal mixing and application procedureds may be used. When air temperatures

of 32°F to 40°F are predicted to occur within the first 24 hours after placement, warm water may be used. The mix temperature should not exceed 100°F at point of placement. Do not install the lightweight insulating concrete system when air temperatures are below 32°F.

## 1.10 WARRANTY

- A. Insulation System Warranty: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the insulation system manufacturer's ten (10) year labor and materials warranty. The insulation system warranty shall include the composite roof deck system consisting of aggregate fill and polystyrene insulation panels. All repair or replacement costs covered under the guarantee shall be borne by the insulation system manufacturer. The guarantee shall be a term type, without deductibles or limitations on coverage amount, and be issued at no additional cost to the Owner. Specific items covered during the term of the insulation system warranty include:
1. The actual resistance to heat flow through the roof insulation will be at least 80% of the design thermal resistance, provided that the roofing membrane is free of leaks.
  2. The roof insulation will remain in a refoofable condition should the roof membrane require replacement (excluding damage caused by fastener pullout during removal of the old membrane.)
  3. The Insulating Concrete Warranty will not limit, by geographic location, the owner rights for claims, actions, and/or proceedings.
  4. The roof insulation material will not cause structural damage to the building as a result of expansion from thermal or chemical action.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS:

- A. Basis-of-Design Product: ZIC Roof Insulation System as manufactured by Siplast/Copel, Inc. CPF1 or comparable product by the following:
1. Elastizell.

### 2.2 MATERIALS

- A. Composite deck system shall achieve a minimum thermal value of R-20 unless greater value is shown on the architectural details/drawings.
- B. Cementitious Material: Portland cement, ASTM C 150, Type I, II, I/II or III.
- C. Mineral Aggregate: ASTM C 332, Group I, vermiculite concrete.
- D. Water: Potable water that is clean and free of deleterious amounts of acid, alkali and organic materials.
- E. Expanded Polystyrene Insulation Board: ASTM C 578, Type I, 1 minimum.
1. Provide units with keying slots of approximately 3 percent of board's gross surface area.

2. Each bundle of board shall be delivered to the job site with clear identification as to manufacturer and shall carry the Factory Mutual approval label and the Underwriter's Laboratories Classified label on each bundle.

### 2.3 AGGREGATE LIGHTWEIGHT INSULATING CONCRETE

- A. Produce lightweight insulating concrete using the minimum amount of water necessary to produce a workable mix.
  1. Do not exceed maximum air content recommended by aggregate manufacturer.
- B. Vermiculite Aggregate Mix: Lightweight insulating concrete produced from cementitious materials, water, air-entraining admixture, and vermiculite mineral aggregates with the following physical properties:
  1. As-Cast Unit Weight: 44 to 60 lb/cu. ft. at point of placement, when tested according to ASTM C 138/C 138M.
  2. Oven-Dry Unit Weight: 22 to 28 lb/cu. ft. when tested according to ASTM C 495.
  3. Compressive Strength: Minimum 125 psi when tested according to ASTM C 495.
  4. Cement-to-Aggregate Ratio, by Volume: 1:6.

## PART 3 - EXECUTION

### 3.1 MIXING AND PLACING

- A. Mix and place lightweight insulating concrete according to manufacturer's written instructions, using equipment and procedures to avoid segregation of mixture and loss of air content.
- B. Install insulation board according to lightweight insulating concrete manufacturer's written instructions. Place insulation board in wet, lightweight insulating concrete slurry poured a minimum of 1/8 inch over the structural substrate. Ensure full contact of insulation board with slurry, stagger joints and tightly butt insulation boards.
  1. Install insulation board in a stair-step configuration with a maximum step-down of 1 inch.
- C. Deposit and screed lightweight insulating concrete in a continuous operation until an entire panel or section of roof area is completed. Do not vibrate or work mix except for screeding or floating. Place to depths and slopes indicated.
- D. Finish top surface smooth, free of ridges and depressions, and maintain surface in condition to receive subsequent roofing system.
  1. Slope: Install the specified lightweight insulating concrete system to provide for a minimum positive roof slope of 1/4 inch per foot. See the structural drawings for slope provided by the roof framing system.

- E. Begin curing operations immediately after placement, and air cure for not less than three days according to manufacturer's written instructions.
- F. If ambient temperature falls below 32 deg F protect lightweight insulating concrete from freezing and maintain temperature recommended by manufacturer for 72 hours after placement.

### 3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform field tests and inspections, and prepare test reports.
- B. Testing of samples of lightweight insulating concrete obtained according to ASTM C 172, except as modified by ASTM C 495, shall be performed according to the following requirements:
  - 1. Determine as-cast unit weight during each hour of placement, according to ASTM C 138/C 138M.
  - 2. Determine oven-dry unit weight and compressive strength according to ASTM C 495. Make a set of at least 6 molds for each day's placement, but not less than 1 set of molds for each 5000 sq. ft. of roof area.
  - 3. Perform additional tests when test results indicate as-cast unit weight, oven-dry unit weight, compressive strength, or other requirements have not been met.
    - a. Retest cast-in-place lightweight insulating concrete according to ASTM C 513 for oven-dry unit weight and compressive strength.
    - b. Application Monitoring: Monitor the thickness and wet density of the lightweight insulating concrete at the time of placement to determine conformance to the manufacturer's requirements. Monitor the placement of proper thickness of polystyrene insulation board in accordance with the contract documents.
    - c. Conduct a base ply fastener pull test three (3) or more days following the application of the lightweight insulating concrete to ensure a minimum withdrawal resistance of fifty pounds per fastener.

### 3.3 DEFECTIVE WORK

- A. Refinish, or remove and replace, lightweight insulating concrete if surfaces are excessively scaled or too rough to receive roofing according to roofing membrane manufacturer's written requirements.
- B. Remove and replace lightweight insulating concrete that fails to comply with requirements.

END OF SECTION 03 5216

**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 4

MASONRY



## SECTION 04 2000 - UNIT MASONRY ASSEMBLIES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
  - 1. Concrete masonry units (CMUs).
  - 2. Face brick.
  - 3. Building (common) brick.
  - 4. Mortar and grout.
  - 5. Masonry joint reinforcement.
  - 6. Ties and anchors.
  - 7. Miscellaneous masonry accessories.
- B. Related Sections include the following:
  - 1. Division 7 Section "Bituminous Dampproofing" for dampproofing applied to cavity face of backup wythes of cavity walls.
  - 2. Division 7 Section " -Penetration Firestopping" for firestopping at openings in masonry walls.
  - 3. Division 7 Section "Fire-Resistive Joint Systems" for fire-resistive joint systems at heads of masonry walls.
  - 4. Division 7 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.
- C. Products furnished, but not installed, under this Section include the following:
  - 1. Anchor sections of adjustable masonry anchors for connecting to structural frame, installed under Division 5 Section "Structural Steel."
- D. Products installed, but not furnished, under this Section include the following:
  - 1. Steel lintels for unit masonry, furnished under Division 5 Section "Metal Fabrications."
  - 2. Cavity wall insulation furnished under Division 7 Section "Building Insulation".
  - 3. Cavity drainage requirements furnished under Division 7 Section "Through-Wall Flashing".
  - 4. Manufactured reglets in masonry joints for metal flashing, furnished under Division 7 Section "Sheet Metal Flashing and Trim."

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For the following:

1. Decorative concrete masonry units, in the form of small-scale units.
2. Face brick, in the form of straps of five or more bricks.
3. Colored mortar.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- C. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
- D. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
  1. Build sample panels for typical exterior and interior walls in sizes approximately 96 inches long by 48 inches high by full thickness.
  2. Clean exposed faces of panels with masonry cleaner indicated.
  3. Protect approved sample panels from the elements with weather-resistant membrane.
  4. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
    - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.



- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

## 1.6 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
  - 2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.

## 2.2 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.
  1. Chips or depressions larger than an American Quarter shall not be incorporated into the work.

## 2.3 CONCRETE MASONRY UNITS (CMUs)

- A. Shapes: Provide shapes indicated and as follows:
  1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  2. Provide bullnose units for outside corners, unless otherwise indicated.
    - a. Provide square-edged units at top and bottom of outside corners where base and ceiling molding is to be attached.
- B. Concrete Masonry Units: ASTM C 90.
  1. Weight Classification: Normal weight, unless otherwise indicated.
  2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
  3. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

## 2.4 MASONRY LINTELS

- A. Masonry Lintels: Built-in-place masonry lintels made from bond beam concrete masonry units with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured.

## 2.5 BRICK

- A. General: Provide shapes indicated and as follows:
  1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
  3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
  4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

- B. Face Brick: ASTM C 216, Grade MW or SW, FBX FBS.
1. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
  2. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
  3. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet or shall have a history of successful use in Project's area.
  4. Sizes:
    - a. Accent Brick:
      - 1). Actual Dimensions: 3-5/8 inches wide by 7-5/8 inch high by 7-5/8 inch long.
    - b. Modular Brick:
      - 1). Actual Dimensions: 3-5/8 inches wide by 2-1/4 inch high by 7-5/8 inch long.
  5. Colors:
    - a. Accent Brick: To match existing.
    - b. Modular Brick: To match existing.

## 2.6 MORTAR AND GROUT MATERIALS

- A. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.
- B. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  2. White-Mortar Aggregates: Natural white sand or crushed white stone.
  3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- C. Aggregate for Grout: ASTM C 404.
- D. Water: Potable.

## 2.7 REINFORCEMENT

- A. Masonry Joint Reinforcement, General: ASTM A 951.
1. Interior Walls: Hot-dip galvanized, carbon steel.
  2. Exterior Walls: Hot-dip galvanized, carbon steel.
  3. Wire Size for Side Rods: W2.8 or 0.188-inch diameter.
  4. Wire Size for Cross Rods: W1.7 or 0.148-inch diameter.
  5. Wire Size for Veneer Ties: W2.8 or 0.188-inch diameter.
  6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
  7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

- B. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.
- C. Masonry Joint Reinforcement for Multiwythe Masonry:
  - 1. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate ties that extend into facing wythe. Ties have two hooks that engage eyes or slots in reinforcement and resist movement perpendicular to wall. Ties extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.

## 2.8 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.
  - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
  - 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
  - 3. Stainless-Steel Sheet: ASTM A 666, Type 304.
- B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.
- C. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
  - 2. Tie Section for Steel Frame: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.188-inch diameter, hot-dip galvanized steel wire.
  - 3. Tie Section for Concrete: Corrugated metal ties with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch of masonry face.
- D. Adjustable Masonry-Veneer Anchors
  - 1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
  - 2. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
  - 3. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
    - a. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches wide by 3 inches high; with

- projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.
- b. Fabricate sheet metal anchor sections and other sheet metal parts from 0.097-inch thick, steel sheet, galvanized after fabrication
  - c. Wire Ties: Rectangular- wire ties fabricated from 0.188-inch diameter, hot-dip galvanized steel stainless-steel wire.
  - d. Products:
    - 1). Dayton Superior Corporation, Dur-O-Wal Division; D/A 213.
    - 2). Heckmann Building Products Inc.; 213-D with 282 or Pos-I-Tie.
    - 3). Hohmann & Barnard, Inc.; HB-200.
    - 4). Wire-Bond; RJ-711.
4. Stainless-Steel Drill Screws for Steel Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads.
- a. Products:
    - 1). Dayton Superior Corporation, Dur-O-Wal Division; Stainless Steel SX Fastener.
    - 2). ITW Buildex; Scots long life Tek.

## 2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Fillers: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; or width and thickness indicated; formulated from neoprene.

## 2.10 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

## 2.11 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  1. Do not use calcium chloride in mortar or grout.
  2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type S.
  2. For mortar parge coats, use Type S.
  3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.
- D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Color: To be selected by Architect from manufacturer's full range.
- E. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will completely fill all space intended to be filled.
  2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
1. Verify that foundations are within tolerances specified.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven

saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
  - 1. Mix units from several pallets or cubes as they are placed.
- F. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- G. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
  - 1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
  - 3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch with a maximum thickness limited to 1/2 inch Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
  - 5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
  - 6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
  - 7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

### 3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
  - 1. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c., unless otherwise indicated.
  - 2. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
  - 3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 7 Section "Fire-Resistive Joint Systems."

### 3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units as follows:
  - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
  - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.



### 3.5 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c. unless noted otherwise.
  - 2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
    - a. Reinforcement above is in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated. Provide Z-bar reinforcing at control joints.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

### 3.6 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
  - 1. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
  - 2. Space anchors as indicated, but not more than 16 inches o.c. vertically and 36 inches o.c. horizontally.

### 3.7 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:
  - 1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
  - 2. Embed in masonry joints. Provide not less than 1-1/2- inches of air space between back of masonry veneer and face of sheathing.
  - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  - 4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally, with not less than 1 anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

### 3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:

1. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick made from clay or shale as follows:
  1. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants."
- D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section "Joint Sealants," but not less than 3/8 inch.
  1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

### 3.9 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

### 3.10 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
  1. Maximum spacing of Weep Holes: 24 inches.
- B. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- C. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.

### 3.11 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Protect adjacent non-masonry surfaces from contact with cleaner.
  - 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 4. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
  - 5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

END OF SECTION 04 2000



**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Cast stone trim including the following:
    - a. Wall caps.
- B. Related Sections include the following:
  - 1. Division 4 Section "Unit Masonry Assemblies".
  - 2. Division 5 Section "Metal Fabrications".

**1.3 DEFINITIONS**

- A. Cast Stone: Architectural precast concrete building units intended to simulate natural cut stone.

**1.4 SUBMITTALS**

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for cast stone units.
- B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of supports, reinforcement and anchorages if any, and indication of finished faces.
  - 1. Include building elevations showing layout of units and locations of joints and anchors.
- C. Samples for color and texture selection.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, with sufficient production capacity to manufacture required units.
  - 1. Manufacturer is a producing member of the Cast Stone Institute
- B. Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- C. Source Limitations for Cast Stone: Obtain cast stone units through one source from a single manufacturer.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with unit masonry work to minimize the need for on-site storage and to avoid delaying the Work.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
  - 1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
  - 2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store installation materials on elevated platforms, under cover, and in a dry location.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products by Architectural Ornamental Castings, Inc. or comparable product by the following:
  - 1. Architectural Concrete Company, Inc.
  - 2. ConArt, Inc.
  - 3. Dura Art Stone.
  - 4. Olde World Cast Stone.
  - 5. Continental Cast Stone Manufacturing, Inc.

### 2.2 CAST STONE UNITS

- A. General:
  - 1. Provide cast stone units complying with ASTM C 1364 using the vibrant dry tamp or wet-cast method.
  - 2. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666, Procedure A, as modified by ASTM C 1364, or are made from cast stone that has a history of successful resistance to freezing and thawing.
- B. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated.
  - 1. Slope exposed horizontal surfaces 1:12, unless otherwise indicated.
  - 2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
  - 3. Provide drips on projecting elements, unless otherwise indicated.
  - 4. Provide one-piece units at window lintels and sills.
- C. Fabrication Tolerances:
  - 1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.

2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.
5. Variations in Color and Texture: Cast stone shall have no discernible variation in color and texture when viewed under good typical lighting conditions from a distance of 20 feet.

D. Cure units by one of the following methods:

1. Cure units to comply with one of the following:

- a. Not less than 5 days at mean daily temperature of 70 deg F or above.
- b. Not less than 6 days at mean daily temperature of 60 deg F or above.
- c. Not less than 7 days at mean daily temperature of 50 deg F or above.
- d. Not less than 8 days at mean daily temperature of 45 deg F or above.

E. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

F. Colors and Textures: As selected by Architect from manufacturer's full range.

2.3 MORTAR MIXES

- A. Comply with requirements in Division 4 Section "Unit Masonry Assemblies" for mortar mixes.

2.4 SOURCE QUALITY CONTROL

- A. Employ an independent testing agency to sample and test cast stone units according to ASTM C 1364.

PART 3 - EXECUTION

A. EXAMINATION

- B. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 SETTING CAST STONE IN MORTAR

- A. Install cast stone units to comply with requirements in Division 4 Section "Unit Masonry Assemblies."
- B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
  - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
  - 2. Field cuts shall be permitted provided cut edge is not exposed.
    - a. Chips in field modified edges of cast stone caused by field modifications shall not be permitted if in excess of tolerances established in this section.

### 3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
- B. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except due to warpage of units within tolerances specified.

### 3.4 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Design Professional.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
  - 1. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Design Professional's approval of sample cleaning before proceeding with cleaning of cast stone.



3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
5. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes No. 20.

END OF SECTION 04 7200



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 5

**METALS**



## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Structural steel.
  - 2. Grout.
- B. Related Sections include the following:
  - 1. Division 1 Section "Testing Laboratory Services" for special inspections associated with work in this section.
  - 2. Division 5 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other metal items not defined as structural steel.
  - 3. Division 9 Painting sections for surface preparation and priming requirements.

### 1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

### 1.4 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.
  - 1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction, Allowable Stress Design," Part 4.
    - a. Details shown on the drawings are typical, similar details apply to similar conditions unless otherwise indicated.
    - b. Connections shown on the structural drawings are schematic and are only intended to show the relationship of members connected. Connection details indicated on the drawings shall be incorporated into Fabricator's connection design.
  - 2. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.
  - 3. Connections for beams which cannot conform to AISC typical connection details shall be designed and detailed in accordance with the following:
    - a. Where beam reactions are not shown on the drawings, connections shall be designed for one-half the maximum uniform

- load which the beam will support (as simple span) for the span shown on the drawings for non-composite beams.
- b. Where connections are subject to eccentricity, such eccentricity shall be taken into account when designing the connection.
  - c. Where connections support beams which are subject to concentrated loads, such concentrated loads shall be taken into account when designing the connections.
  - d. End connections of floor members shall accommodate end rotations of simple, unrestrained beams. For this purpose, inelastic action in the connection is permitted.
  - e. Coped or cut ends of members shall be reinforced where required to sustain the specified reactions.
- B. Design Responsibility: The Fabricator shall be responsible for all errors of detailing on the shop drawings, errors in fabrication, and for the correct fitting of the structural steel members.
- C. Construction: Type 2, simple framing.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment drawings. Provide setting drawings, templates, and directions for installation of Anchor Bolts and other Anchorages to be installed as Work of other sections.
  - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
  - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
  - 5. For structural-steel connections indicated to comply with design loads, include structural analysis data prepared by the qualified professional engineer responsible for their preparation.
- C. Qualification Data: For installer, fabricator, and professional engineer.
- D. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
  - 1. Structural steel including chemical and physical properties.
  - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
  - 3. Direct-tension indicators.
  - 4. Tension-control, high-strength bolt-nut-washer assemblies.
  - 5. Shear stud connectors.
  - 6. Shop primers.
  - 7. Nonshrink grout.

- E. Source quality-control test reports conducted on shop and field bolted and welded connections. Include data on type(s) of test conducted and test results.
- F. Partial Submittals: Partial shop drawing submittals (beams only or columns only) shall be clearly marked on the erection plan. Partial submittal of one section is acceptable, but that section must be submitted in its entirety.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer with not less than 5 years experience in the erection of structural steel who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Fabricator Qualifications: Engage an experienced fabricator with not less than 5 years experience in the erection of structural steel who has completed structural steel similar to that indicated for this Project and with a record of successful in-service performance as well as sufficient production capacity to fabricate steel without delaying the work, and who is currently certified by the AISC Quality Certification Program for Structural Steel Fabricators and is designated as AISC Certified Fabricator, Category Sbd.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- D. Comply with applicable provisions of the following specifications and documents:
  - 1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
    - a. Paragraph 4.2.1 of the above Code is hereby modified by deletion of the following sentence: "This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any detail configuration of connections developed by the fabricator as part of his preparation of these shop drawings."
    - b. Paragraph 4.2 of the above is hereby modified by the revision: "The Contractor shall include an allowance of twenty-three (23) days in his schedule for the return of Shop Drawings."
  - 2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
  - 3. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
  - 4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
  - 5. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
  - 6. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
  - 7. AISC's "Quality Criteria and Inspection Standards."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
  - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
  - 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.8 COORDINATION

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.
- B. Obtain any and all field measurements required for proper fabrication and installation of the Work prior to detailing. Precise measurements are the sole responsibility of the Contractor.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels, Angles-Shapes: ASTM A 572/A 572M, Grade 50.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
  - 1. Finish: Plain.
  - 2. Direct-Tension Indicators: ASTM F 959, Type 325 compressible-washer type.
    - a. Finish: Plain.
- B. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers, plain.



1. Direct-Tension Indicators: ASTM F 959, Type 490, compressible-washer type, plain.
  - C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy hex or round head steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
    1. Finish: Plain.
  - D. Headed Anchor Rods: ASTM A 1554, Grade A, straight.
    1. Nuts: ASTM A 563 heavy hex carbon steel.
    2. Plate Washers: ASTM A 36/A 36M carbon steel.
    3. Washers: ASTM F 436 hardened carbon steel.
    4. Finish: Plain.
  - E. Threaded Rods: ASTM A 36/A 36M.
    1. Nuts: ASTM A 563 heavy hex carbon steel.
    2. Washers: ASTM A 36/A 36M carbon steel.
    3. Finish: Plain.
- 2.3 PRIMER
- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
  - B. Primer for Intumescent Coatings: Provide a shop primer compatible with fire-resistant intumescent coatings at locations specified to receive such.
- 2.4 GROUT
- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
- 2.5 FABRICATION
- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
    1. Camber structural-steel members where indicated.
    2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
    3. Mark and match-mark materials for field assembly.
    4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
  - B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
    1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

- C. Bolt Holes: Cut, drill, or punch standard or short-slotted bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning or SSPC-SP 2, "Hand Tool Cleaning."
- F. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
  - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
  - 2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
  - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

## 2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened unless indicated otherwise on the drawings or where pretensioned or slip critical joints are recommended or required by RCSC or AISC.
  - 2. Minimum diameter of bolts shall be 3/4", maximum diameter shall be 1-1/8" unless indicated otherwise on the drawings.
  - 3. Provide at least two (2) bolts per connection.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
  - 1. At areas where structural steel is to remain exposed to view, remove backing bars or runoff tabs, back gouge, and grind steel smooth.
  - 2. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on any exposed steel surfaces to remain uncoated.
    - a. Grind butt welds flush.
    - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

## 2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
  - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
  - 2. Surfaces to be field welded.
  - 3. Surfaces to be high-strength bolted with slip-critical connections.
  - 4. Surfaces to receive sprayed fire-resistive materials.

5. Galvanized surfaces.
  - B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
    1. SSPC-SP 2, "Hand Tool Cleaning."
  - C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
    1. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

#### 3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
- B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
  1. Base plates and anchor bolt layout shall be performed by a Registered Land Surveyor.
  2. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
  3. Weld plate washers to top of base plate.
  4. Snug-tighten (Pretension at frame columns) anchor rods after supported members have been positioned and plumbed. Do not remove wedges or

- shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
5. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  - D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
    1. Level and plumb individual members of structure.
    2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
  - E. Splice members only where indicated.
  - F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
  - G. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.
  - H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
  - I. No holes shall be cut in any steel element unless they are detailed on the drawings.
  - J. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

### 3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  1. Joint Type: Snug tightened unless indicated otherwise on the drawings or where pretensioned or slip critical joints are recommended or required by RCSC or AISC.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
  - a. Grind butt welds flush.
  - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:
  1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
  2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

### 3.6 REPAIRS AND PROTECTION

- A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories and abutting structural steel.
  1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
  2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

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- B. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION 05 1200

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. K-series steel joists.
  - 2. Joist accessories.
  - 3. Joist Girders.
- B. Related Sections include the following:
  - 1. Division 1 Section "Testing Laboratory Services" for special inspections associated with work in this section.
  - 2. Division 9 Painting sections for surface preparation, priming, and painting requirements.

### 1.3 DEFINITIONS

- A. SJI "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
- B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

### 1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated on drawings.
  - 1. Unless noted otherwise on the plan, design special joists for uniform roof loads as follows in addition to indicated concentrated or non-uniform loading:
    - a. Dead Load: 25 PSF
    - b. Live Load: 25 PSF (includes 5 PSF allowance for ponding).
    - c. Net uplift due to wind: 17 PSF
  - 2. It is the Contractor's responsibility to coordinate, verify, and locate all mechanical units and equipment to be supported by the joists. The joist manufacturer shall design for all loads imposed.
- B. Design special joists to withstand design loads with total load deflections no greater than the following:

1. Roof Joists: Vertical deflection of 1/240 of the span.
- C. The Contractor shall coordinate the exact location of all joists and full height interior walls to prevent interference.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product indicated.
- B. Shop Drawings: Show layout, designation, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction.
  1. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.
- C. Welding certificates: Copies of certificates for welding procedures and personnel shall be submitted for review and maintained at the job site at all times.
- D. Manufacturer Certificates: Signed by manufacturers certifying that joists comply with requirements.
- E. Mill Certificates: Signed by bolt manufacturers certifying that bolts comply with requirements.
- F. Qualification Data: For installer, manufacturer, and professional engineer responsible for designing special joists.
- G. Field quality-control test and inspection reports.

#### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing steel joists similar to those indicated for this Project and with a record of successful in-service performance.
  1. Manufacturer must be certified by SJI to manufacture steel joists complying with SJI "Specifications".
  2. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
- B. SJI Specifications: Comply with standard specifications in SJI's "Specifications" that are applicable to types of joists indicated.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."



1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel: Comply with SJI's "Specifications" for web and steel-angle chord members.
- B. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
  - 1. Finish: Plain.
- C. Welding Electrodes: Comply with AWS standards.

2.2 PRIMERS

- A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.3 K-SERIES STEEL JOISTS

- A. Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
  - 1. Joist Type: K-series steel joists.
- B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
- C. Holes in steel joist chords will not be permitted, except for bolted connections at the bearing ends of the steel joist.
- D. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."
- E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."
- F. Camber joists according to SJI's "Specifications."
- G. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

## 2.4 JOIST ACCESSORIES

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
- B. Supply bottom chord extensions, either bottom chord elements or a separate extension unit, where indicated and of sufficient strength to brace the bottom beam flange for a force of 200 pounds unless indicated otherwise.
- C. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

## 2.5 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.
- B. Apply 1 coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.
  - 1. Before installation, splice joists delivered to Project site in more than one piece.
  - 2. Space, adjust, and align joists accurately in location before permanently fastening.
  - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
  - 4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads have been applied.

- C. Field weld joists less than 40 feet in length to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Bolt joists 40 feet and longer to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
- E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.
- F. All items such as mechanical equipment, ductwork, piping, ceiling fixtures, etc., that are to be supported or hung from the steel joists shall be framed with auxiliary members to the panel points of the steel joist chords. Attachments of any kind to steel joist web members will not be permitted.

### 3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.
- B. Field welds will be visually inspected according to AWS D1.1/D1.1M.
- C. Bolted connections will be visually inspected.
- D. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.
- E. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

### 3.4 REPAIRS AND PROTECTION

- A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists[, bearing plates,] [abutting structural steel,] and accessories.
  - 1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
  - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 2100



## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Noncomposite vented form deck.
- B. Related Sections include the following:
  - 1. Division 1 Section "Testing Laboratory Services" for special inspections associated with work in this section.
  - 2. Division 5 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
  - 3. Division 9 Painting sections for painting of exposed underside of deck.

### 1.3 SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- C. Product Certificates: For each type of steel deck, signed by product manufacturer.
- D. Welding certificates: Copies of certificates for all welding procedures and personnel shall be submitted for review. Copies of welding certificates shall also be maintained at the job site at all times during construction.
- E. Field quality-control test and inspection reports.
- F. Qualification Data: For installer and manufacturer
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
  - 1. Power-actuated mechanical fasteners.

### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and

whose work has resulted in construction with a record of successful in-service performance.

- B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E548.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel," and AWS D1.3, "Structural Welding Code - Sheet Steel."
- D. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- E. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class I-90 windstorm ratings.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Steel Deck:
    - a. ASC Profiles, Inc.
    - b. Canam Steel Corp.; The Canam Manac Group.
    - c. Consolidated Systems, Inc.
    - d. DACS, Inc.
    - e. D-Mac Industries Inc.
    - f. Epic Metals Corporation.
    - g. Marlyn Steel Decks, Inc.
    - h. New Millennium Building Systems, LLC.
    - i. Nucor Corp.; Vulcraft Division.
    - j. Roof Deck, Inc.
    - k. United Steel Deck, Inc.
    - l. Valley Joist; Division of EBSCO Industries, Inc.
    - m. Verco Manufacturing Co.
    - n. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

## 2.2 NONCOMPOSITE VENTED FORM DECK

- A. Noncomposite Vented Steel Form Deck: Fabricate ribbed- and vented-steel sheet noncomposite form-deck panels to comply with "SDI Specifications and Commentary for Noncomposite Steel Form Deck," in SDI Publication No. 30, and with the following:
  - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, G60 zinc coating.
  - 2. Profile Depth: As indicated.
  - 3. Design Uncoated-Steel Thickness: As indicated.
  - 4. Span Condition: Triple span or more.
  - 5. Side Laps: Overlapped or interlocking seam at Contractor's option.
  - 6. Vent Slot Area: Manufacturer's standard vent slots providing 1-1/2 percent open area.

## 2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 30 for overhang and slab depth.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory-punched hole of 3/8-inch minimum diameter.
- I. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

#### 3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at all openings greater than 6 inches in diameter as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions and approval from Architect.

#### 3.3 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
  - 1. Weld Diameter: 5/8 inch, nominal.
  - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds as indicated.



3. Weld Washers: Install weld washers at each weld location for all deck with a minimum uncoated steel thickness of 0.028 inches or less.
- B. Side-Lap and Perimeter Edge Fastening: Unless otherwise indicated, fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 18 inches, and as follows:
  1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
  1. End Joints: Lapped 2 inches minimum.
- D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
  1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.
- E. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

#### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field welds will be subject to inspection.
- C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

#### 3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

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1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
- C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 3100

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Exterior non-load-bearing wall framing.
- B. Related Sections include the following:
  - 1. Division 1 Section "Testing Laboratory Services" for special inspections associated with work in this section.
  - 2. Division 5 Section "Metal Fabrications" for masonry shelf angles and connections.

### 1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
  - 1. Design Loads: As indicated.
  - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
    - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/600 of the wall height when supporting brick veneer and 1/240 of the wall height when supporting other finishes.
  - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
  - 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
    - a. Upward and downward movement of L/200 of the adjacent building element.
- B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
  - 1. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
  - 1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Qualification Data: For professional engineer responsible for designing cold-formed metal framing.
- D. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
  - 1. Steel sheet.
  - 2. Expansion anchors.
  - 3. Power-actuated anchors.
  - 4. Mechanical fasteners.
  - 5. Vertical deflection clips.
  - 6. Horizontal drift deflection clips
  - 7. Miscellaneous structural clips and accessories.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.
- D. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield

strength, tensile strength, total elongation, chemical requirements, ductility, and metallic-coating thickness.

- E. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- F. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:
  - 1. Clark Steel Framing.
  - 2. Dale/Incor.
  - 3. Dietrich Metal Framing; a Worthington Industries Company.
  - 4. MarinoWare; a division of Ware Industries.
  - 5. Southeastern Stud & Components, Inc.
  - 6. United Metal Products, Inc.

#### 2.2 MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  - 1. Grade: As required by structural performance.
  - 2. Coating: G90 or equivalent.
- B. Steel Sheet for Vertical Deflection and Drift Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
  - 1. Grade: As required by structural performance.
  - 2. Coating: G90.

#### 2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch.
  2. Flange Width: 1-5/8 inches.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: Matching steel studs.
  2. Flange Width: 1-1/4 inches.
- C. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Dietrich Metal Framing; a Worthington Industries Company.
    - b. MarinoWare, a division of Ware Industries.
    - c. SCAFCO Corporation
    - d. The Steel Network, Inc.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch.
  2. Flange Width: 1 inch plus the design gap.
- E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure.

#### 2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
  2. Bracing, bridging, and solid blocking.
  3. Web stiffeners.
  4. Anchor clips.
  5. End clips.
  6. Foundation clips.
  7. Gusset plates.
  8. Stud kickers, knee braces, and girts.
  9. Joist hangers and end closures.

10. Hole reinforcing plates.
11. Backer plates.

## 2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- B. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- C. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
  1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- D. Welding Electrodes: Comply with AWS standards.

## 2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- C. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

## 2.7 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
  1. Fabricate framing assemblies using jigs or templates.
  2. Cut framing members by sawing or shearing; do not torch cut.
  3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
  1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
  1. Cut framing members by sawing or shearing; do not torch cut.
  2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.



- a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
  - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- H. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

### 3.3 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:
1. Stud Spacing: as required.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
1. Install single-leg deflection tracks and anchor to building structure.

2. Connect vertical deflection clips to bypassing studs and anchor to building structure.
  3. Connect drift clips to cold formed metal framing and anchor to building structure.
  4. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
    - a. Install solid blocking at centers indicated on Shop Drawings.
  5. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
  6. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- E. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

#### 3.4 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

#### 3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 4000

## SECTION 05 5000 - METAL FABRICATIONS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Steel framing and supports for applications where framing and supports are not specified in other sections and steel framing/supports indicated on architectural drawings which are not identified on structural drawings.
  - 2. Loose bearing and leveling plates.
  - 3. Abrasive metal nosings.
  - 4. Metal ladders.
- B. Products furnished, but not installed, under this Section include the following:
  - 1. Loose steel lintels.
  - 2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- C. Related Sections include the following:
  - 1. Division 3 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, wedge-type inserts and other items indicated to be cast into concrete.
  - 2. Division 4 Section "Unit Masonry Assemblies" for installing loose lintels, anchor bolts, and other items indicated to be built into unit masonry.
  - 3. Division 5 Section "Structural Steel."
  - 4. Division 5 Section "Pipe and Tube Railings."

## 1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
  - 2. Metal nosings and treads.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
  - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
  - 2. Provide templates for anchors and bolts specified for installation under other Sections.
  - 3. Provide Engineer's seal for vendor designer products.

## 1.4 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code--Steel."
  - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."

#### 1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
  - 2. Provide allowance for trimming and fitting at site.

#### 1.6 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include products specified.
  - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include manufacturers specified.

#### 2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

#### 2.3 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

## 2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
- B. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- C. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594 .

## 2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## 2.6 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch , unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches , with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

## 2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
  - 1. Furnish inserts if units are installed after concrete is placed.

- C. Galvanize miscellaneous framing and supports where indicated.

## 2.8 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches , unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.

## 2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Prime plates with zinc-rich primer.

## 2.10 METAL LADDERS

- A. General:
  - 1. All ladders shall be vendor designed.
  - 2. Comply with ANSI A14.3, unless otherwise indicated.
  - 3. Space siderails 24 inches apart, unless otherwise indicated.
  - 4. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted brackets, made from same metal as ladder.
- B. Steel Ladders:
  - 1. Siderails: Continuous, 1/2-by-2-1/2-inch steel flat bars, with eased edges.
  - 2. Rungs: 3/4-inch- diameter steel bars. Rebar is not acceptable.
  - 3. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
  - 4. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
  - 5. Platform shall be 1/4 inch checkered steel plate.
  - 6. Galvanize exterior ladders, including brackets and fasteners.
  - 7. Prime interior and exterior ladders including treads, railings, brackets, and fasteners, with zinc-rich primer.

## 2.11 ABRASIVE METAL NOSINGS

- A. Nosing: cross-hatched units, 4 inches wide with 1/4 inch lip, for casting into concrete steps.
  - 1. Basis-of-Design Product: Style 801 as manufactured by American Safety Tread Company, Inc. or comparable product by the following:
    - a. Balco, Inc.
    - b. Barry Pattern & Foundry Company, Inc.

- c. Granite State Casting Co.
  - d. Safe-T-Metal Co.
  - e. Wooster Products Inc.
- B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- C. Apply bituminous paint to concealed bottoms, sides, and edges of cast-metal units set into concrete.

## 2.12 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

## 2.13 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
- 1. ASTM A 123/A 123M, for galvanizing steel and iron products.
  - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
- 1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
- 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade



surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

### 3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

### 3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
  - 1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
  - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### 3.4 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

- A. Center nosings on tread widths. Nosings shall extend to 3 inch minimum from stringers.

- B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.

### 3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 painting Sections.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 5000

## SECTION 05 5213 - PIPE AND TUBE RAILING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Aluminum pipe railings.
- B. Related Sections include the following:
  - 1. Division 6 Section "Rough Carpentry" for wood blocking for anchoring railings.

## 1.3 PERFORMANCE REQUIREMENTS

- A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
  - 1. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
- B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails:
    - a. Uniform load of 50 lbf/ ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 2. Top Rails of Guards:
    - a. Uniform load of 50 lbf/ ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 3. Infill of Guards:
    - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
    - b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental

effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F , ambient; 180 deg F , material surfaces.

- D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

#### 1.4 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- B. Welding certificates.

#### 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing through one source from a single manufacturer.
- B. Welding: Qualify procedures and personnel according to the following:
  1. AWS D1.1, "Structural Welding Code--Steel."

#### 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
  1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
  2. Provide allowance for trimming and fitting at site.

#### 1.7 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

**PART 2 - PRODUCTS****2.1 METALS, GENERAL**

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

**2.2 ALUMINUM**

- A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
  - 1. Yield strength for Alloy 6063-T5/T52 is 15 to 16 ksi (105 to 110 MPa).
- B. Extruded Bars and Tubing: ASTM B 221, Alloy 6063-T5/T52.
- C. Extruded Structural Pipe and Round Tubing: ASTM B 429/B 429M, Alloy 6063-T6.
  - 1. Provide Standard Weight (Schedule 40) pipe, unless otherwise indicated.
- D. Drawn Seamless Tubing: ASTM B 210, Alloy 6063-T832.
- E. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.
- F. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

**2.3 FASTENERS**

- A. General: Provide the following:
  - 1. Aluminum Railings: Type 304 stainless-steel fasteners.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
  - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
- D. Anchors: Provide cast-in-place chemical or torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

## 2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
  - 1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- D. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
  - 1. Water-Resistant Product: At exterior locations and where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

## 2.5 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
  - 1. All railing members shall be 1-1/2 inch diameter unless otherwise noted.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections, unless otherwise indicated.

- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. Form changes in direction as follows:
  - 1. By bending or by inserting prefabricated elbow fittings.
- J. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of railing members with prefabricated end fittings.
- L. Provide wall returns at ends of wall-mounted handrails. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
- N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- O. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.

## 2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

## 2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.

- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
  - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
  - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

### 3.2 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to 1 side, and locate joint within 6 inches of post.

### 3.3 ANCHORING POSTS

- A. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.
- C. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8-inch buildup, sloped away from post.
- D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
  - 1. For aluminum pipe railings, attach posts using fittings designed and engineered for this purpose.



### 3.4 ANCHORING RAILING ENDS

- A. Anchor railing ends to concrete and masonry with round flanges connected to railing ends and anchored to wall construction with anchors and bolts.

### 3.5 ATTACHING HANDRAILS TO WALLS

- A. Attach handrails to wall with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
  - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
  - 2. Use type of bracket with predrilled hole for exposed bolt anchorage.
- B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets to building construction as follows:
  - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
  - 2. For hollow masonry anchorage, use toggle bolts.

### 3.6 ADJUSTING AND CLEANING

- A. Clean aluminum by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

### 3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05 5213



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 6

WOODS, PLASTICS & COMPOSITES



SECTION 06 1053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Wood blocking and nailers.
  - 2. Plywood backing panels.

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NLGA: National Lumber Grades Authority.
  - 2. SPIB - Southern Pine Inspection Bureau.
  - 3. WCLIB: West Coast Lumber Inspection Bureau.
  - 4. WWPA: Western Wood Products Association.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- B. Source Limitations for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

## 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 3. Provide dressed lumber, S4S, unless otherwise indicated.
  - 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
  
- B. Wood Structural and Sheathing Panels:
  - 1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
  - 2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
  - 3. Comply with "Code Plus" provisions in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."
  - 4. Factory mark panels according to indicated standard.

## 2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and one of the following:
    - a. Chromated copper arsenate (CCA).
    - b. Copper bis (dimethyldithiocarbamate) (CDDC).
    - c. Ammoniacal copper citrate (CC).
    - d. Copper azole, Type A (CBA-A).
  - 2. Treatment at roof nailers shall be acceptable to roof manufacturer.
  
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.
  
- C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
  
- D. Application: Treat items indicated on Drawings, and the following:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

### 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Use treatment that does not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  - 4. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. For exposed lumber indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.
- E. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
  - 1. Framing for raised platforms.
  - 2. Concealed blocking.
  - 3. Plywood backing panels.

### 2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
  2. Nailers.
  3. Furring.
  4. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber and the following species:
1. Mixed southern pine; SPIB.
  2. Hem-fir; WCLIB or WWPA.
  3. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
  4. Western woods; WCLIB or WWPA.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:
1. Mixed southern pine, No. 2 grade; SPIB.
  2. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
  3. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
1. Plywood and dimensional lumber used for roof nailers shall be fire-retardant treated unless separated from building interior by continuous non-combustible materials.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.5 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch thick. Boards to be painted on all sides, including back, before installation.

## 2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.



- C. Power-Driven Fasteners: CABO NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1.
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A ; with ASTM A 563 hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- E. Do not splice structural members between supports, unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- G. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

- H. Apply field treatment complying with AWP A M4 to cut surfaces of preservative-treated lumber and plywood.
- I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. CABO NER-272 for power-driven fasteners.
  - 2. Unless otherwise noted, anchor wood blocking to substrate with 1/4" minimum diameter bolts at 24" intervals.
- J. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

### 3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
  - 1. Locations: Provide wood blocking in all walls for backing at toilet compartments, toilet and bath accessories, visual display surfaces, wall mounted cabinetry and casework and as headers over all window openings for window treatments whether in contract or to be installed as future work.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

END OF SECTION 06 1053

## SECTION 06 1645 - SHEATHING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Wall sheathing.
  - 2. Building wrap.
  - 3. Flexible flashing at openings in sheathing.
  - 4. Sheathing joint and penetration treatment.
- B. Related Sections include the following:
  - 1. Division 4 "Unit Masonry Assemblies" for flexible flashing.

#### 1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory."

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

### PART 2 - PRODUCTS

#### 2.1 WALL SHEATHING

- A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.
  - 1. Basis-of-Design Product: Dens-Glass Gold as manufactured by G-P Gypsum Corporation.
    - a. No substitution.
  - 2. Type and Thickness: Regular, 1/2 inch thick.
  - 3. Size: 48 inch wide x longest practical length for vertical installation.
- B. Sheathing must be acceptable to exterior insulation and finish system manufacturer for inclusion in their warranty.

## 2.2 WEATHER-RESISTANT SHEATHING PAPER

- A. Building Wrap: ASTM E 1677, Type I air retarder; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap.
    - b. Raven Industries Inc.; Rufco-Wrap.
    - c. Reemay, Inc.; Typar HouseWrap.
  - 2. Water-Vapor Permeance: Not less than 535 g through 1 sq. m of surface in 24 hours per ASTM E 96, Desiccant Method (Procedure A).
  - 3. Allowable UV Exposure Time: Not less than three months.
- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

## 2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
  - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
  - 1. For steel framing less than 0.0329 inch thick, attach sheathing to comply with ASTM C 1002.
  - 2. For steel framing from 0.033 to 0.112 inch thick, attach sheathing to comply with ASTM C 954.

## 2.4 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
- D. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### 3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
  - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
  - 3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing boards but do not cut into facing.
- C. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
  - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
  - 2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

### 3.3 WEATHER-RESISTANT SHEATHING-PAPER INSTALLATION

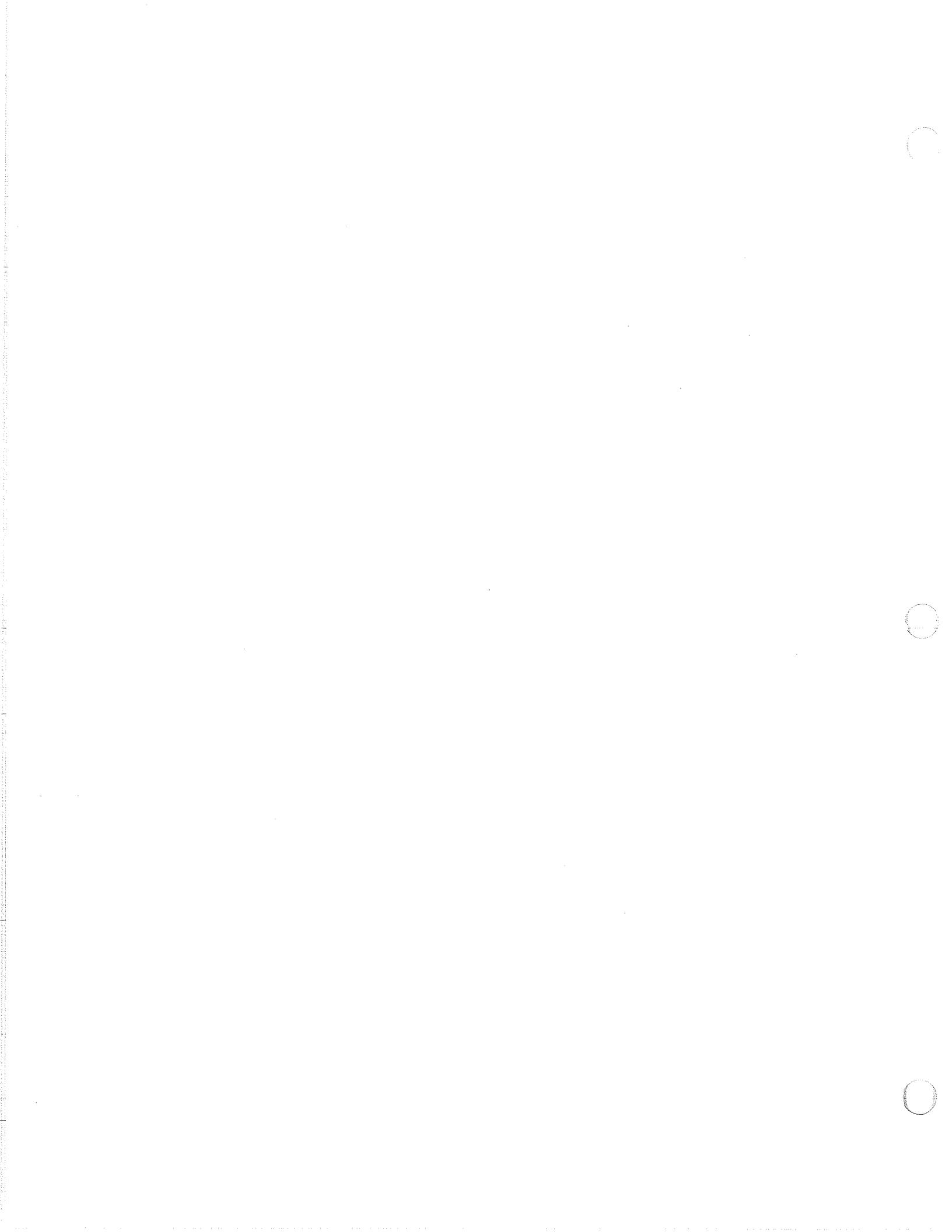
- A. General: Cover sheathing at substrates for face brick with weather-resistant sheathing paper as follows:
  - 1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
  - 2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap, unless otherwise indicated.



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 7

THERMAL & MOISTURE PROTECTION





## SECTION 07 1113 - BITUMINOUS DAMPPROOFING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes cold-applied, emulsified-asphalt dampproofing applied to the following surfaces:
  - 1. Exterior face of inner wythe of exterior masonry cavity walls.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, and coverage or thickness.

## 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

## 1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt dampproofing to be performed according to manufacturers' written instructions.

## 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form for components that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 5 years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following manufacturers:
  - 1. Cold-Applied, Emulsified-Asphalt Dampproofing:
    - a. Karnak Corporation.
    - b. Meadows, W. R., Inc.
    - c. Sonneborn, Div. of ChemRex, Inc.

## 2.2 BITUMINOUS DAMPPROOFING

- A. Cold-Applied, Emulsified-Asphalt Dampproofing:
  - 1. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

## 2.3 MISCELLANEOUS MATERIALS

- A. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Applicator present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.
  - 1. Begin dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

### 3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.
  - 1. Apply additional coats if recommended by manufacturer or required to achieve coverages indicated.
  - 2. Allow each coat of dampproofing to cure 24 hours before applying subsequent coats.
- B. Apply dampproofing to provide continuous plane of protection on exterior face of inner wythe of exterior masonry cavity walls.
  - 1. Lap dampproofing at least 1/4 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
  - 2. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe, and lap dampproofing at least 1/4 inch onto shelf angles supporting veneer.
  - 3. Turn dampproofing into windows, doors and other openings to inside face of window, door or other type frame.

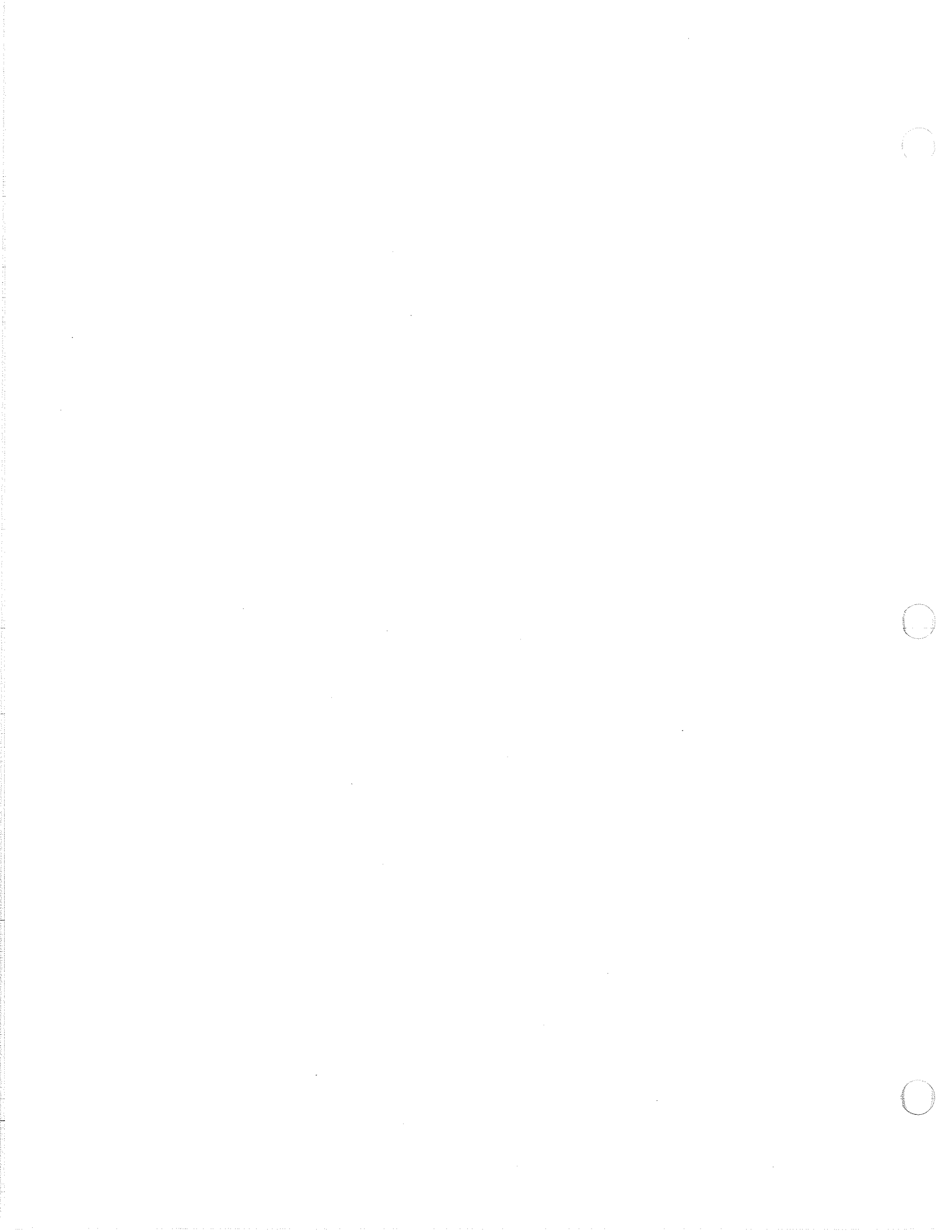
3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. On Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft.

3.5 CLEANING

- A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION 071113



## SECTION 07 2100 - THERMAL INSULATION

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Concealed building insulation.
- B. Related Sections include the following:
  - 1. Division 3 Section "Lightweight Insulating Concrete" for roof insulation specified as part of low-slope roofing construction.
  - 2. Division 7 Section "Fire-Resistive Joint Systems" for insulation installed as part of a perimeter fire-resistive joint system.
  - 3. Division 9 Section "Gypsum Board Assemblies" for installation in metal-framed assemblies of insulation specified by referencing this Section.

## 1.3 PERFORMANCE REQUIREMENTS

- A. Plenum Rating: Provide glass-fiber insulation where indicated in ceiling plenums whose test performance is rated as follows for use in plenums as determined by testing identical products per "Erosion Test" and "Mold Growth and Humidity Test" described in UL 181, or on comparable tests from another standard acceptable to authorities having jurisdiction.
  - 1. Erosion Test Results: Insulation shows no visible evidence of cracking, flaking, peeling, or delamination of interior surface of duct assembly, after testing for 4 hours at 2500-fpm air velocity.
  - 2. Mold Growth and Humidity Test Results: Insulation shows no evidence of mold growth, delamination, or other deterioration due to the effects of high humidity, after inoculation with Chaetomium globosum on all surfaces and storing for 60 days at 100 percent relative humidity in the dark.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing

identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
  1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
  2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
  3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  1. Manufacturers: Subject to compliance with requirements, provide products by manufacturers specified.

### 2.2 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Cavity Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
  1. Manufacturers:
    - a. DiversiFoam Products.
    - b. Dow Chemical Company.
    - c. Owens Corning.
    - d. Pactiv Building Products Division.
  2. Type VI, 1.80 lb/cu. ft.

### 2.3 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers:
  1. CertainTeed Corporation.
  2. Guardian Fiberglass, Inc.
  3. Johns Manville.
  4. Knauf Fiber Glass.

## 5. Owens Corning.

- B. Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil-scrim vapor-retarder membrane on 1 face.

## 2.4 MINERAL FIBER ACOUSTICAL BLANKET INSULATION

## A. Manufacturers.

- 1. Fibrex Insulation, Inc.
- 2. Owen-Corning.
- 3. Thermafiber.

- B. Unfaced, Mineral-Fiber Blanket Insulation: ASTM C665, Type I (blanket without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E136 for combustion characteristics.

C. Thickness: 3 inches.

D. Length: 48 inches.

E. Width: Match stud spacing.

## 2.5 AUXILIARY INSULATING MATERIALS

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

## 3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

#### 3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated.
  - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

#### 3.5 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 2100



## SECTION 07 2419 - WATER-DRAINABLE EXTERIOR INSULATION AND FINISH SYSTEM

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Section includes water-drainage exterior insulation and finish system (EIFS) applied over water-resistive coating over sheathing.
- B. Related Sections include the following:
  - 1. Division 5 Section "Cold-Formed Metal Framing" for metal framing.
  - 2. Division 6 Section "Sheathing" for gypsum sheathing.
  - 3. Division 7 Section "Joint Sealants" for sealing joints in EIFS with elastomeric joint sealants.

## 1.3 SYSTEM DESCRIPTION

- A. Class PB EIFS: A non load bearing, exterior wall cladding system that consists of an insulation board attached either adhesively, mechanically, or both to the substrate; an integrally reinforced base coat; and a textured protective finish coat.
- B. Water-Drainage EIFS: EIFS with a means that allows water entering into an EIFS assembly to drain to the exterior.

## 1.4 PERFORMANCE REQUIREMENTS

- A. Bond Integrity: Free from bond failure within EIFS components or between system and supporting wall construction, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
- B. Weathertightness: Resistant to water penetration from exterior into water-drainage EIFS and assemblies behind it or through them into interior of building that results in deterioration of thermal-insulating effectiveness or other degradation of EIFS and assemblies behind it, including substrates, supporting wall construction, and interior finish, and including a means that allows water entering into an EIFS assembly to drain to the exterior.
- C. Class PB EIFS: Provide EIFS having physical properties and structural performance that comply with the following:
  - 1. Abrasion Resistance: Sample consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board; cured for a minimum of 28 days; and

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- showing no cracking, checking, or loss of film integrity after exposure to 528 quarts of sand when tested per ASTM D 968, Method A.
2. Absorption-Freeze Resistance: No visible deleterious effects and negligible weight loss after 60 cycles per EIMA 101.01
  3. Accelerated Weathering Characteristics: Sample of size suitable for test equipment and consisting of 1-inch- thick EIFS mounted on 1/2-inch-thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination after testing for 2000 hours when viewed under 5 times magnification per ASTM G 153 or ASTM G 154.
  4. Freeze-Thaw: No surface changes, cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination, or indications of delamination between components when viewed under 5 times magnification after 60 cycles per EIMA 101.01.
  5. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch clean glass substrate, cured for 28 days, and showing no growth when tested per ASTM D 3274.
  6. Salt-Spray Resistance: No deleterious affects when tested according to ICC-ES AC235.
  7. Tensile Adhesion: No failure in the EIFS, adhesive, base coat, or finish coat when tested per EIMA 101.03.
  8. Water Penetration: Sample consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board, cured for 28 days, and showing no water penetration into the plane of the base coat to expanded polystyrene board interface of the test specimen after 15 minutes at 6.24 lbf/sq. ft. of air pressure difference or 20 percent of positive design wind pressure, whichever is greater, across the specimen during a test period when tested per EIMA 101.02.
  9. Water Resistance: Sample consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination after testing for 14 days per ASTM D 2247.
  10. Impact Resistance: Sample consisting of 1-inch- thick EIFS when constructed, conditioned, and tested per EIMA 101.86; and meeting or exceeding the following impact classification and range:
    - a. Standard Impact Resistance: 25 to 49 inch-lb.
  11. Drainage: According to ICC-ES AC24.
  12. Structural Performance Testing: EIFS assembly and components shall comply with ICC-ES AC235 when tested per ASTM E 330.

### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type and component of EIFS indicated.
- B. Samples for Initial Selection: For each type of finish-coat color and texture indicated.
- C. Shop Drawings: For EIFS. Include plans, elevations, sections, details of components, details of penetration and termination, flashing details, joint locations and configurations, fastening and anchorage details including mechanical fasteners, and connections and attachments to other work.

- D. Samples for Verification: 24-inch- square panels for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work including custom trim, each profile, an aesthetic reveal, a typical control joint filled with sealant of color selected.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Manufacturer Certificates: Signed by manufacturers certifying that EIFS comply with requirements.
- C. Compatibility and Adhesion Test Reports: For joint sealants from sealant manufacturer indicating the following:
  - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
  - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- D. Field quality-control reports.
- E. SUBMITTALS RECEIVED WITHOUT THE INFORMATION HEREIN WILL BE RETURNED WITHOUT REVIEW.
- F. NO PAYMENT WILL BE AUTHORIZED FOR STORED MATERIALS OR INSTALLED WORK WITHOUT CURRENT FIELD QUALITY CONTROL REPORTS

#### 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualification: Manufacturer shall be from manufacturer with a current ICC Evaluation Report.
- B. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install manufacturer's system using trained workers.
- C. Source Limitations: Obtain EIFS through one source from a single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with system components.
- D. Preinstallation Conference: Conduct conference at Project site to comply with the following:
  - 1. Prior to beginning work, a pre-installation conference will be held to review work to be accomplished.
  - 2. General Contractor, Owner, Architect, EIFS manufacturer, EIFS installer, and all other subcontractors who have materials penetrating the EIFS system shall be present.
  - 3. General Contractor shall notify Architect at least three days prior to time for conference.

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4. General Contractor shall record minutes of meeting and shall distribute copies of minutes to attending parties.
- E. Special Inspections: Contractor shall schedule testing laboratory to perform special required by International Building Code.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.
- B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.
  1. Stack insulation board flat and off the ground.
  2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
  3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## 1.9 PROJECT CONDITIONS

- A. Weather Limitations: Maintain ambient temperatures above 40 deg F for a minimum of 24 hours before, during, and after adhesives or coatings are applied. Do not apply EIFS adhesives or coatings during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Outsulation Plus MD Class PB EIFS as manufactured by Dryvit Systems, Inc. or comparable product by the following:
  1. Senegy Inc.; SKW-MBT Construction Chemicals.
  2. Sto Corp.

## 2.2 MATERIALS

- A. Compatibility: Provide substrates, water-/weather-resistive barriers, adhesive, fasteners, board insulation, reinforcing meshes, base- and finish-coat systems, sealants, and accessories that are compatible with one another and approved for use by EIFS manufacturer for Project.
- B. Water-Resistive Coatings: EIFS manufacturer's standard formulation and accessories for use as water/weather-resistive barriers, compatible with substrate, and complying with physical and performance criteria of ICC-ES AC209.

1. Sheathing Joint Compound and Tape: Type recommended by EIFS manufacturer for sealing joints between and penetrations through sheathing.
- C. Primer/Sealer: EIFS manufacturer's standard substrate conditioner designed to seal substrates from moisture penetration and to improve the bond between substrate of type indicated and adhesive used for application of insulation.
- D. Flexible-Membrane Flashing: Cold-applied, fully self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.
- E. Adhesive for Application of Insulation: EIFS manufacturer's standard formulation designed for indicated use, compatible with substrate, and complying with the following requirements:
  1. Factory-blended dry formulation of portland cement, dry polymer admixture, and fillers specified for base coat.
- F. Molded, Rigid Cellular Polystyrene Board Insulation: Comply with EIFS manufacturer's requirements, ASTM C 578 for Type I, and EIMA's "EIMA Guideline Specification for Expanded Polystyrene (EPS) Insulation Board" for more stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations, and the following:
  1. Aging: Before cutting and shipping, age insulation in block form by air drying for not less than six weeks or by another method approved by EIMA that produces equivalent results.
  2. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, per ASTM E 84.
  3. Dimensions: Provide insulation boards not more than 24 by 48 inches and in thickness indicated but not more than 4 inches thick or less than thickness allowed by ASTM C 1397.
- G. Reinforcing Mesh: Balanced, alkali-resistant, open-weave glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. per EIMA 105.01, complying with ASTM D 578 and the following requirements for minimum weight:
  1. Standard-Impact Reinforcing Mesh: Not less than 4.0 oz./sq. yd.
  2. High-Impact Reinforcing Mesh: Not less than 20 oz./sq.yd.
  3. Strip Reinforcing Mesh: Not less than 3.75 oz./sq. yd.
  4. Detail Reinforcing Mesh: Not less than 4.0 oz./sq. yd.
  5. Corner Reinforcing Mesh: Not less than 7.2 oz./sq. yd.
- H. Base-Coat Materials: EIFS manufacturer's standard mixture complying with the following requirements for material composition and method of combining materials:
  1. Factory-mixed noncementitious formulation of polymer-emulsion adhesive and inert fillers that is ready to use without adding other materials.

- I. Waterproof Adhesive/Base-Coat Materials: EIFS manufacturer's standard waterproof formulation and complying with the following:
  1. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing portland cement.
- J. Primer: EIFS manufacturer's standard factory-mixed elastomeric-polymer primer for preparing base-coat surface for application of finish coat.
- K. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating with enhanced mildew resistance complying with the following requirements for material composition and method of combining materials:
  1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
- L. Colors, Textures, and Patterns of Finish Coat: As selected by Architect from manufacturer's full range.
- M. Water: Potable.
- N. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784, manufacturer's standard Cell Class for use intended, and ASTM C 1063.
  1. Casing Bead: Prefabricated, one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
  2. Drip Screed/Track: Prefabricated, one-piece type for attachment behind insulation with face leg extended to form a drip, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
  3. Weep Screed/Track: Prefabricated, one-piece type for attachment behind insulation with perforated face leg[ extended to form a drip] and weep holes in track bottom, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg; designed to drain incidental moisture that gets into wall construction to the exterior at terminations of EIFS with drainage.
  4. Expansion Joint: Prefabricated one-piece V profile; designed to relieve stress of movement.
  5. Window Sill Flashing: Prefabricated type for both flashing and sloping sill over framing beneath windows; with end and back dams; designed to direct water to exterior.

### 2.3 MIXING

- A. General: Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of EIFS.
- B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Begin coating application only after surfaces are dry.
  - 2. Application of coating indicates acceptance of surfaces and conditions.

**3.2 PREPARATION**

- A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.
- B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind EIFS and deterioration of substrates.
- C. Prepare and clean substrates to comply with EIFS manufacturer's written requirements to obtain optimum bond between substrate and adhesive for insulation.

**3.3 EIFS INSTALLATION, GENERAL**

- A. General: Comply with manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

**3.4 SUBSTRATE PROTECTION APPLICATION**

- A. Primer/Sealer: Apply over gypsum sheathing substrates where required by EIFS manufacturer for improving adhesion of insulation to substrate.
- B. Water-Resistive Coatings: Apply over substrates to protect substrates from degradation and to provide water-/weather-resistive barrier.
  - 1. Tape and seal joints, exposed edges, terminations, and inside and outside corners of sheathing unless otherwise indicated by EIFS manufacturer's written instructions.
- C. Waterproof Adhesive/Base Coat: Apply over sloped surfaces and window sills to protect substrates from degradation.

- D. Flexible-Membrane Flashing: Install over weather-resistive barrier, applied and lapped to shed water; seal at openings, penetrations, terminations, and where indicated by EIFS manufacturer's written instructions to protect wall assembly from degradation. Prime substrates, if required, and install flashing to comply with EIFS manufacturer's written instructions and details.

### 3.5 TRIM APPLICATION

- A. Trim: Apply trim accessories at perimeter of EIFS, at expansion joints, at window sills, and elsewhere as indicated, according to EIFS manufacturer's written instructions. Coordinate with installation of insulation.
1. Weep Screed/Track: Use at bottom termination edges, at window and door heads of water-drainage EIFS unless otherwise indicated.
  2. Window Sill Flashing: Use at windows unless otherwise indicated.
  3. Expansion Joint: Use where indicated on Drawings.
  4. Casing Bead: Use at other locations.

### 3.6 INSULATION INSTALLATION

- A. Board Insulation: Adhesively attach insulation to substrate in compliance with ASTM C 1397, EIFS manufacturer's written requirements, and the following:
1. Apply adhesive to insulation by notched-trowel method in a manner that results in coating the entire surface of sheathing with adhesive once insulation is adhered to sheathing unless EIFS manufacturer's written instructions specify using primer/sealer with ribbon-and-dab method. Apply adhesive to a thickness of not less than 1/4 inch for factory mixed and not less than 3/8 inch for field mixed, measured from surface of insulation before placement
  2. Press and slide insulation into place. Apply pressure over the entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.
  3. Allow adhered insulation to remain undisturbed for period recommended by EIFS manufacturer, but not less than 24 hours, beginning rasping and sanding insulation, or applying base coat and reinforcing mesh.
  4. Apply insulation over dry substrates in courses with long edges of boards oriented horizontally.
  5. Begin first course of insulation from screed/track and work upward. Work from perimeter casing beads toward interior of panels if possible.
  6. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not less than 6 inches from corners of window and door openings and not less than 4 inches from aesthetic reveals.
  7. Adhesive Attachment: Offset joints of insulation not less than 6 inches from horizontal and 4 inches from vertical joints in sheathing.
  8. Interlock ends at internal and external corners.
  9. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch occur, fill with



- insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
10. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
  11. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/16 inch from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch .
  12. Cut aesthetic reveals in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets, and other features that comply with profiles and locations indicated. Do not reduce insulation thickness at aesthetic reveals to less than 3/4 inch.
  13. Interrupt insulation for expansion joints where indicated.
  14. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
  15. After installing insulation and before applying field-applied reinforcing mesh, fully wrap board edges. Cover edges of board and extend encapsulating mesh not less than 2-1/2 inches over front and back face, unless otherwise indicated on Drawings.
  16. Treat exposed edges of insulation as follows:
    - a. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.
    - b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.
    - c. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over face leg of accessories.
  17. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and EIFS protective coating.
- B. Expansion Joints: Install at locations indicated, where required by EIFS manufacturer, and as follows:
1. Where expansion joints are indicated in substrates behind EIFS.
  2. Where EIFS adjoin dissimilar substrates, materials, and construction.
  3. Where wall height changes.

### 3.7 BASE COAT INSTALLATION

- A. Base Coat: Apply to exposed surfaces of insulation in minimum thickness recommended in writing by EIFS manufacturer, but not less than 1/16-inch dry-coat thickness.
- B. Reinforcing Mesh: Embed type indicated below in wet base coat to produce wrinkle-free installation with mesh continuous at corners and overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written requirements. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying

WATER-DRAINABLE EXTERIOR  
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additional base-coat material if necessary, so reinforcing-mesh color and pattern are not visible.

1. Standard-impact reinforcing mesh, unless otherwise indicated.
  2. High-Impact reinforcing mesh within 8 feet of grade and as noted.
- C. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings extending 4 inches beyond perimeter. Apply additional 9-by-12-inch strip reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch- wide strip reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4 inches on each side of corners.
1. At aesthetic reveals, apply strip reinforcing mesh not less than 8 inches wide.
  2. Embed strip reinforcing mesh in base coat before applying first layer of reinforcing mesh.
- D. Shapes: Fully embed reinforcing mesh in base coat.

## 3.8 FINISH COAT INSTALLATION

- A. Primer: Apply over dry base coat according to EIFS manufacturer's written instructions.
- B. Finish Coat: Apply over dry primer, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.
1. Texture: Sand finish.

## 3.9 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Authorized representative of the manufacturer will review the installation of the Work at an interval of not less than two weeks.
1. PAYMENT FOR INSTALLATION AND/OR STORED MATERIALS SHALL NOT BE APPROVED UNTIL MANUFACTURER'S FIELD REPORT IS RECEIVED.
- B. Special Inspections: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
1. Remove and replace EIFS where test results indicate that EIFS do not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

## 3.10 CLEANING AND PROTECTION

- A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

- B. Provide final protection and maintain conditions, in a manner acceptable to Installer and EIFS manufacturer that ensure that EIFS are without damage or deterioration at time of Substantial Completion.

END OF SECTION 072413



**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Underslab Vapor Retarder.
- B. Related Sections:
  - 1. Division 3 - Section "Cast-In-Place Concrete".

**1.3 SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean dry area in accordance with manufacturer's instructions.
- C. Stack membrane on smooth ground or wood platform to eliminate warping.
- D. Protect materials during handling and application to prevent damage or contamination.
- E. Ensure membrane is stamped with manufacturer's name, product name and membrane thickness at intervals of no more than 85".

**1.5 PROJECT CONDITIONS**

- A. Do not install products to substrates that are wet or frozen.
- B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of concrete slab-on-grade without prolong exposure of vapor retarder.

**PART 2 - PRODUCTS****2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Basis-of-Design Product: The design for each membrane specified is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

## 2.2 VAPOR RETARDERS

- A. Products: Basis-of-Design Product: Perminator Underslab Vapor Mat 10 mil underslab vapor retarder or comparable product by the following:
  1. Fortifiber Corporation.
  2. Raven Industries.
  3. Stego Industries, Inc.
  4. Stratas Systems, Inc.
  5. W. R. Grace Construction Products.
- B. Plastic Vapor Retarder:
  1. Vapor Retarder membrane must meet or exceed all requirements of ASTM E1745 Classes A, B, & C.
    - a. Maximum Permeance ASTM E96: 0.024 Perms
    - b. Water Vapor Transmission Rate ASTM F1249 calibrated to ASTM E96 (water method): 0.012 grains/ft<sup>2</sup>/hr
    - c. Resistance to Organisms and Substrates in Contact with Soil ASTM E154, Section 13: 0.051 Perms
    - d. Tensile Strength ASTM E154, Section 9: 52 LBS. Force/Inch
    - e. Puncture Resistance ASTM D1709, Method B: 3,770 Grams
    - f. Water Vapor Retarder ASTM E1745: Meets or exceeds Class A, B & C
    - g. Thickness of Retarder (plastic) ACI 302.1R-96: Not less than 10 mils.

## 2.3 ACCESSORIES

- A. Seam Tape
  1. High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 4 inches.
- B. Pipe Boots
  1. Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

### 3.2 SURFACE PREPARATION

- A. Prepare surfaces in accordance with manufacturers instructions.

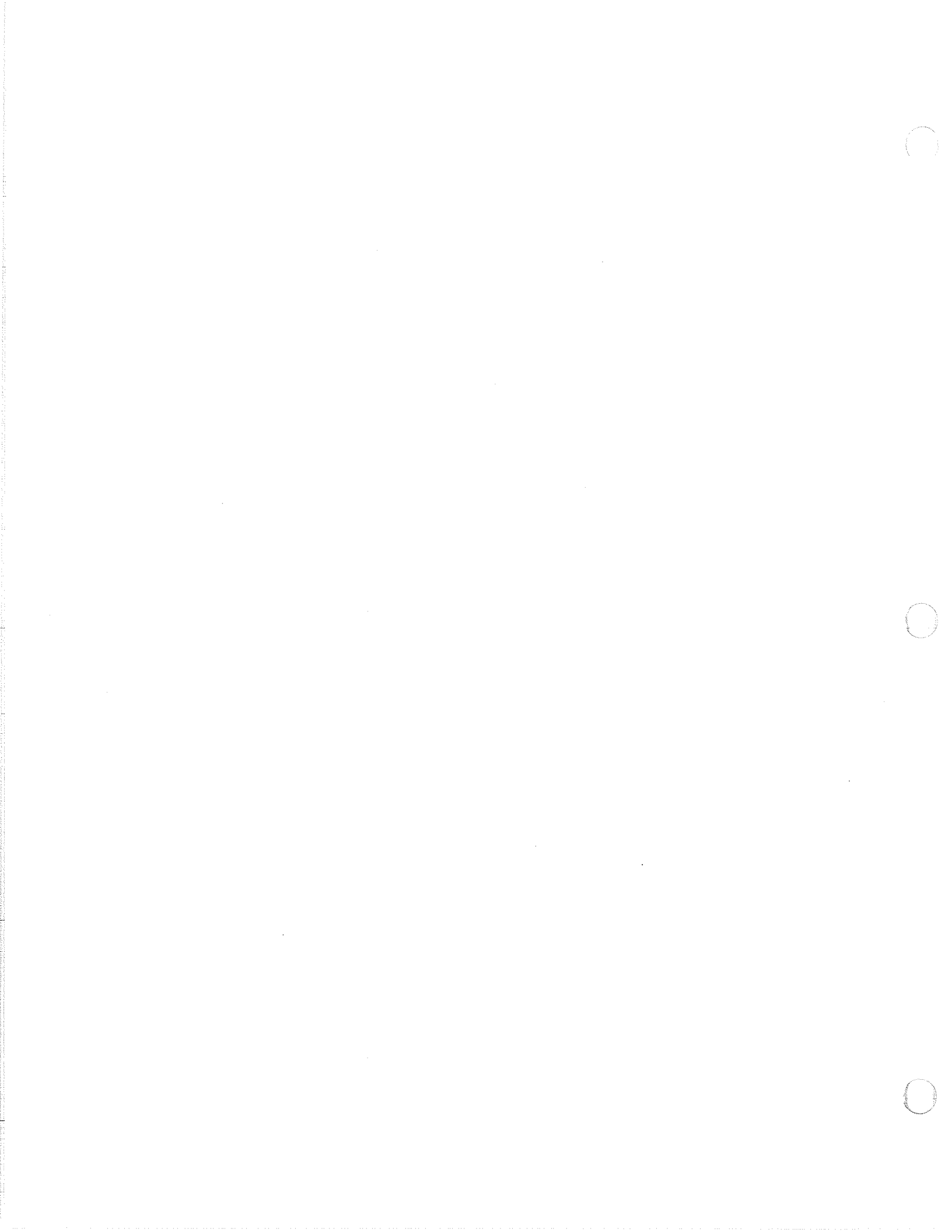
3.3 VAPOR RETARDER APPLICATION

- A. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98.
- B. Unroll vapor barrier with the longest dimension parallel with the direction of the pour.
- C. Lap vapor barrier over footings and seal to foundation walls.
- D. Overlap joints 6 inches and seal with manufacturer's tape.
- E. Seal all penetrations (including pipes) with manufacturer's pipe boot.
- F. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
- G. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with tape.

3.4 SCHEDULE

- A. Vapor Retarder: Install under all interior slabs-on-grade.

END OF SECTION 07 2616





## SECTION 07 5216 - SBS MODIFIED BITUMINOUS MEMBRANE ROOFING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. SBS-modified bituminous membrane roofing on new insulated concrete substrate.
- B. Related Sections include the following:
  - 1. Division 3 Section "Lightweight Insulating Concrete".
  - 2. Division 6 Section "Rough Carpentry" for wood nailers, cants, curbs, and blocking.
  - 3. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
  - 4. Division 22 Section for roof penetrations associated with plumbing work.
  - 5. Division 23 Section for roof penetrations associated with HVAC work.
  - 6. Division 26 Section for roof penetrations associated with electrical work.

## 1.3 PERFORMANCE REQUIREMENTS

- A. Agency Approvals: The proposed roof system shall conform to the following requirements. No other testing agency approvals will be accepted.
  - 1. Underwriters Laboratories Class A acceptance of the proposed roofing system (including mopping asphalt or cold adhesive) without additional requirements for gravel or coatings.
  - 2. Factory Mutual Approval Standard 4470 listing for the proposed membrane system. The roof membrane configuration shall be approved by FM for Class 1-SH (severe hail) exposure.
    - a. The roof configuration (including fastening of base sheet or insulation) shall be approved by FM for minimum 1-90 windstorm construction at the base bid.

## 1.4 SUBMITTALS

- A. Certifications:
  - 1. Manufacturer's:
    - a. Letter from the proposed primary roofing manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system.
    - b. Letter from the primary roofing manufacturer stating that the proposed application will comply with the manufacturer's

- requirements in order to qualify the project for the specified guarantee.
2. Qualification Data: For Installer and manufacturer.
  3. Submittals recieved without these certifications will be returned without review.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
1. Base flashings, cants, and membrane terminations.
- D. Submittals Prior to Project Close-out:
1. Certificate Of Analysis from the testing laboratory of the primary roofing materials manufacturer, confirming the physical and mechanical properties of the roofing membrane components. Testing shall be in accordance with the parameters published in ASTM D 5147 and ASTM D 6298\* and indicate Quality Assurance/Quality Control data as required to meet the specified properties. A separate Certificate Of Analysis for each production run of material shall indicate the following information:
    - a. Material type
    - b. Lot number
    - c. Production date
    - d. Dimensions and Mass (indicate the lowest values recorded during the production run);
      - 1). Roll length
      - 2). Roll width
      - 3). Selvage width
      - 4). Total thickness
      - 5). Thickness at selvage (coating thickness)
      - 6). Weight
    - e. Physical and Mechanical Properties;
      - 1). Low temperature flexibility
      - 2). Maximum load
      - 3). Elongation @ 5% Maximum Load (ultimate elongation)
      - 4). Dimensional stability
      - 5). High Temperature Stability
      - 6). Granule embedment
      - 7). Resistance to thermal shock\* (foil faced products)
  2. Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.

## 1.5 QUALITY ASSURANCE

- A. Product Quality Assurance Program: Primary roofing materials shall be manufactured under a quality management system that is monitored regularly by a third party auditor under the ISO 9001:2000 audit process. A certificate of analysis for reporting/confirming the tested values of the actual material being supplied for the project will be required prior to project close-out.

- B. **Acceptable Contractor:** Contractor shall have a minimum of 2 years experience in successfully installing the same or similar roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products.
- C. **Scope of Work:** The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractor's Association, amended to include the acceptance of a phased roof system installation.
- D. **Local Regulations:** Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.
- E. **Manufacturer Requirements:** Ensure that the primary roofing materials manufacturer provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.
- F. **Preinstallation Conference:** Conduct conference at Project site. Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
  2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  5. Review structural loading limitations of roof deck during and after roofing.
  6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
  7. Review governing regulations and requirements for insurance and certificates if applicable.
  8. Review temporary protection requirements for roofing system during and after installation.
  9. Review roof observation and repair procedures after roofing installation.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. **Delivery:** Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.
- B. **Storage:** Store materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored on the roof overnight shall be stored on pallets. Rolls of roofing must be stored on ends. Store materials on the roof in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents, adhesives and asphalt cutback products away from open flames, sparks or excessive heat. Cover all material using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings are not acceptable.
- C. **Handling:** Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.
- D. **Damaged Material:** Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, removed and replaced at the Contractor's expense.

## 1.7 PROJECT CONDITIONS

- A. **Environmental Requirements**
  - 1. **Precipitation:** Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.
- B. **Protection Requirements**
  - 1. **Membrane Protection:** Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.

## 1.8 WARRANTY

- A. **Manufacturer's Warranty:** Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the roof system manufacturer's labor and materials roof system guarantee. The roof system guarantee shall include both the roofing and flashing membranes. All repair or replacement costs covered under the guarantee shall be borne by the roofing membrane manufacturer. The guarantee shall be a term type, without deductibles or limitations on coverage amount, and be issued at no additional cost to the Owner.
  - 1. **Length of Warranty:** 20 years from the date of Substantial Completion.
- B. **Installer's Warranty:** The contractor agrees to maintain the roofing, flashing, and expansion control systems in a weathertight condition. During the

maintenance period, the contractor agrees that within twenty-four hours of receipt of notice from the Owner, they will inspect and make emergency repairs to defects or to leaks in the roofing, expansion joints, and flashing systems.

1. They further agree that, within a reasonable time, they will restore the affected items to the standard of the original specifications.
2. All emergency and permanent work during the life of this agreement shall be done without cost to the Owner, except in the event it is determined that such leaks were caused by abuse, lightning, hurricane, tornado, hail storm, or other unusual climatic phenomena of the elements.
3. Maintenance and Warranty Agreement shall be in written form acceptable to the Owner.
4. Length of Warranty: Two years from the date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Specification Paradiene 20 TS/30 FR TG as manufactured by Siplast, Inc. or comparable product by one of the following:
  1. GAF
  2. Soprema.
  3. Tamko Roofing Products, Inc.

### 2.2 DESCRIPTION OF SYSTEMS

- A. Roofing Membrane Assembly: A roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared substrate. Both reinforcement mats shall be impregnated/saturated and coated each side with an SBS modified bitumen blend. The modified bitumen base ply shall be coated with factory applied asphalt-adhesive strips staggered diagonally on the back surface of the sheet to provide a bonded area of 50% of the total surface area. The modified bitumen finish ply shall be coated on one side with a high quality torch grade SBS bitumen blend. The asphalt-adhesive strips of the base ply and the adhesive layer of the finish ply shall be manufactured using a process that embosses the surface with a grooved pattern to provide optimum burn-off of the plastic film and to maximize application rates. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F. Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.
  1. Base Sheet:
    - a. A fiberglass reinforced, asphalt coated sheet with a polyolefin film backing, having a minimum weight of 20 lb/sq. The sheet shall conform to ASTM D 4601, Type II requirements.

- b. Basis-of-Design Product: Siplast Parabase FS
2. Siplast Paradiene 20 TS/30 FR TG torchable roof system
    - a. Modified Bitumen Base Ply
      - 1). Siplast Paradiene 20 TS
        - a). Thickness (avg): 91 mils (ASTM D 5147)
        - b). Thickness (min): 87 mils (ASTM D 5147)
        - c). Weight (min per 100 ft<sup>2</sup> of coverage): 74 lb
        - d). Maximum filler content in elastomeric blend - 35% by weight
        - e). Low temperature flexibility @ -13°F: PASS (ASTM D 5147)
        - f). Maximum Load (avg) @ 73°F: 30 lbf/inch (ASTM D 5147)
        - g). Maximum Load (avg) @ 0°F: 70 lbf/inch (ASTM D 5147)
        - h). Elongation @ 5% Maximum Load (avg.) @ 73°F: 50% (ASTM D 5147)
        - i). Dimensional Stability (max): 0.1% (ASTM D 5147)
        - j). High Temperature Stability (min): 250°F
        - k). Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
        - l). Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
    - b. Modified Bitumen Stripping Ply and Flashing Reinforcing Sheet
      - 1). Siplast Paradiene 20 - torchable grade
        - a). Thickness (avg): 114 mils (ASTM D 5147)
        - b). Thickness (min): 110 mils (ASTM D 5147)
        - c). Weight (min per 100 ft<sup>2</sup> of coverage): 76 lb
        - d). Maximum filler content in elastomeric blend: 35% by weight
        - e). Low temperature flexibility @ -13° F - PASS (ASTM D 5147)
        - f). Maximum Load (avg) @ 73°F: 30 lbf/inch (ASTM D 5147)
        - g). Maximum Load (avg) @ 0°F: 75 lbf/inch (ASTM D 5147)
        - h). Elongation @ 5% Maximum Load (avg.) @ 73°F: 50% (ASTM D 5147)
        - i). Dimensional Stability (max): 0.1% (ASTM D 5147)
        - j). High Temperature Stability (min): 250°F (ASTM D 5147)
        - k). Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
        - l). Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
  - c. Modified Bitumen Finish Ply
    - 1). Siplast Paradiene 30 FR - torchable grade
      - a). Thickness (avg): 150 mils (ASTM D 5147)
      - b). Thickness at selvage (coating thickness) (avg): 118 mils (ASTM D 5147)

- c). Thickness at selvage (coating thickness) (min): 114 mils (ASTM D 5147)
  - d). Weight (min per 100 ft<sup>2</sup> of coverage): 112 lb
  - e). Maximum filler content in elastomeric blend: 35% by weight
  - f). Low temperature flexibility @ -13°F: PASS (ASTM D 5147)
  - g). Maximum Load (avg) @ 73°F: 30 lbf/inch (ASTM D 5147)
  - h). Maximum Load (avg) @ 0°F: 75 lbf/inch (ASTM D 5147)
  - i). Elongation @ 5% Maximum Load (avg.) @ 73°F: 55% (ASTM D 5147)
  - j). Dimensional Stability (max): 0.1% (ASTM D 5147)
  - k). High Temperature Stability (min): 250°F (ASTM D 5147)
  - l). Granule Embedment (max loss): 2.0 grams per sample (ASTM D 5147)
  - m). Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
  - n). Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
  - o). Surfacing: ceramic granules
- B. Flashing Membrane Assembly: A flashing membrane assembly consisting of a prefabricated, reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. The finish ply shall conform to ASTM D 6298 and the following physical and mechanical property requirements.
- 1. Siplast Veral flashing system, aluminum finish
    - a. Cant Backing Sheet for Wood/Plywood Surfaces to Receive Flashing Coverage
      - 1). Siplast Paradiene 20 SA
        - a). Thickness (avg): 102 mils (ASTM D 5147)
        - b). Thickness (min): 98 mils (ASTM D 5147)
        - c). Weight (min per 100 ft<sup>2</sup> of coverage): 72 lb
        - d). Maximum filler content in elastomeric blend: 35% by weight
        - e). Low temperature flexibility @ -13° F - PASS (ASTM D 5147)
        - f). Maximum Load (avg) @ 73°F: 30 lbf/inch (ASTM D 5147)
        - g). Maximum Load (avg) @ 0°F: 75 lbf/inch (ASTM D 5147)
        - h). Elongation @ 5% Maximum Load (avg.) @ 73°F: 50% (ASTM D 5147)
        - i). Dimensional Stability (max): 0.1% (ASTM D 5147)
        - j). High Temperature Stability (min - sheet): 250°F (ASTM D 5147)
        - k). High Temperature Stability (min - adhesive coating): 212°F (ASTM D 5147)

- l). Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
- m). Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
- n). Back Surfacing: polyolefin film
- b. Metal-Clad Modified Bitumen Flashing Sheet
  - 1). Siplast Veral Aluminum
    - a). Thickness (avg): 142 mils (ASTM D 5147)
    - b). Thickness (min): 138 mils (ASTM D 5147)
    - c). Weight (min per 100 ft<sup>2</sup> of coverage): 92 lb
    - d). Coating Thickness - back surface (min): 40 mils (ASTM D 5147)
    - e). Maximum filler content in elastomeric blend: 35% by weight
    - f). Low temperature flexibility @ 0° F: PASS (ASTM D 5147)
    - g). Maximum Load (avg) @ 73°F: 85 lbf/inch (ASTM D 5147)
    - h). Maximum Load (avg) @ 0°F: 180 lbf/inch (ASTM D 5147)
    - i). Elongation @ 5% Maximum Load (avg) @ 73°F: 45% (ASTM D 5147)
    - j). Tear-Strength (avg): 120 lbf (ASTM D 5147)
    - k). Dimensional Stability (max): 0.2% (ASTM D 5147)
    - l). High Temperature Stability (min): 225°F (ASTM D 5147)
    - m). Cyclic Thermal Shock Stability (maximum): 0.2% (ASTM D 6298)
    - n). Approvals: UL Approved, FM Approved (products shall bear seals of approval)
    - o). Reinforcement: fiberglass scrim mat or other meeting the performance and dimensional stability criteria
    - p). Surfacing: aluminum metal foil

### 2.3 ROOFING ACCESSORIES

- A. Bituminous Cutback Materials:
  - 1. Primer: An asphalt, solvent blend conforming to ASTM D 41 requirements.
    - a. Siplast PA-1125 Asphalt Primer by Siplast; Irving, TX
  - 2. Mastics: An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D 4586 Type II requirements.
    - a. Siplast PA-1021 Plastic Cement by Siplast; Irving, TX
- B. Sealant: A moisture-curing, non-slump elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:
  - 1. Siplast PS-304 Elastomeric Sealant by Siplast; Irving, TX



- C. Ceramic Granules: No. 11 grade specification ceramic granules of color scheme matching the granule surfacing of the finish ply.
- D. Metallic Powder: A finely graded metal dust as supplied or approved by the membrane manufacturer, used for covering of bitumen overruns over the foil surfaced membrane.
- E. Perlite Cant Strips: A cant strip composed of expanded volcanic minerals combined with waterproofing binders. The top surface shall be pre-treated with an asphalt based coating. The face of the cant shall have a nominal 4 inch dimension.
- F. Fasteners
  - 1. Insulation Fasteners: Insulation fasteners and plates shall be FM Approved, and/or approved by the manufacturer of the primary roofing products. The insulation fasteners shall provide attachment required to meet the specified uplift performance and to restrain the insulation panels against the potential for ridging, etc. The fastening pattern for each insulation panel to be used shall be as recommended by the insulation manufacturer and approved by the manufacturer of the primary roofing products. Acceptable insulation fastener manufacturers for specific deck types are listed below.
    - a. Lightweight Concrete Decks: Fasteners and metal plates for lightweight decks shall be factory coated for corrosion resistance, and when subjected to 30 Kesternich cycles, must show less than 10% red rust, conforming to Factory Mutual 4470. Acceptable insulation fastener types are listed below.
      - 1). A preassembled, single unit precision formed auger threaded nylon fastener having a galvanized steel wire barb designed to facilitate a reverse hook action into the specified deck. The head of the fastener shall be a minimum of two (2) inches.
        - a). NTB Fastener by NTB, Inc.
        - b). Equal product furnished by roofing manufacturers listed herein.
      - 2). The fastener shall be used with a nylon disk having a diameter of three and one-half inches, specifically manufactured for use with the gypsum fastener.
        - a). NTB Fastener Disk by NTB, Inc.
        - b). Equal product furnished by roofing manufacturers listed herein.
      - 3). A preassembled two (2) piece, precision formed threadless fastener. The body of the fastener is constructed of high magnesium aluminum alloy; the inner mandrel is zinc plated carbon steel passivated with yellow dichromate. The fastener is designed to fully penetrate the deck, allowing the mandrel to curl the fastener body, facilitating a reverse hook action on the underside of the deck unit. The fastener shall be used with a twenty-five (25) gauge galvanized steel disk having

- a diameter of three (3) inches, specifically manufactured for use with the gypsum fastener.
- a). The Peel Rivet & Disk, TPR by Subcon Products, Inc.
  - b). Equal product furnished by roofing manufacturers listed herein.
- 4). A single unit, precision formed, glass reinforced nylon, auger type fastener having a eleven sixteenths (11/16) inch shank and a factory produced spiral thread. The corresponding plate used shall be a metal type, having a minimum three (3) inch diameter, specially manufactured for use with the nylon fastener.
- a). Polymer Gyptec Fasteners with Galvalume Plates by ITW Buildex.
  - b). Equal product furnished by roofing manufacturers listed herein.
- 5). A single unit, precision formed, glass reinforced nylon, auger type fastener having a three-eighths (3/8) inch base shank and a factory produced spiral thread. The corresponding plate used shall be a metal type, which is barbed on the underside, having a minimum three (3) inch diameter, specially manufactured for use with the nylon fastener.
- a). Rawlite Non-Penetrating Fasteners with Galvalume Plates by the Rawlplug Company.
  - b). Equal product furnished by roofing manufacturers listed herein.
- 6). A single unit, precision formed, fluorocarbon coated screw type roofing fastener having a minimum three-eighths (3/8) inch diameter shank and a minimum seventy-one hundredths (.710) inches diameter head. The corresponding plate used shall be a metal type, having a minimum three (3) inch diameter, specially manufactured for use with the screw fastener.
- a). Lite-Deck Fasteners with G-90 3 inch plates by Olympic Fasteners.
  - b). Equal product furnished by roofing manufacturers listed herein.
2. Flashing Reinforcing Sheet Fasteners for Wood/Plywood Substrates to Receive Flashing Coverage: Fasteners shall be approved by the manufacturer of the primary roofing products. Acceptable fasteners for specific substrate types are listed below.
- a. Wood/Plywood Substrates
    - 1). A 12 gauge, spiral or annular threaded shank, zinc coated steel roofing fastener having a minimum 1 inch head.
      - a). Square Cap by W.H. Maze Co.
      - b). 12 Gauge Simplex Nail by the Simplex Nail and Manufacturing Co.
      - c). Equal product furnished by roofing manufacturers listed herein.

- G. Walktread: A prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface.
1. Paratread Roof Protection Material by Siplast
    - a. Thickness: 0.217 in
    - b. Weight: 1.8 lb/ft<sup>2</sup>
    - c. Width: 30 inches.
  2. Products furnished by roofing manufacturers listed herein complying with properties listed above are acceptable. Additional layer of finish ply shall not be acceptable.

### PART 3 - EXECUTION

#### 3.1 ACCEPTABLE INSTALLERS

- A. Roofing applicator shall have three years experience installing this type roofing system, shall be approved by the material manufacturer and have successfully completed three projects of similar design using the system specified.

#### 3.2 PREPARATION

- A. General: Sweep or vacuum all surfaces, removing all loose aggregate and foreign substances prior to commencement of roofing.

#### 3.3 SUBSTRATE PREPARATION

- A. Base Sheet: Lay the base sheet over entire area to be roofed, lapping sides and ends four (4) inches. Using the specified fasteners, fasten each sheet every seven and one half (7 1/2) inches through laps and stagger fasten the remainder of the sheet in two (2) rows, each on ten (10) inch centers.
- B. Preparation of Wood/Plywood Substrates to Receive Flashing Coverage: Mechanically attach the gypsum sheathing panels to all wood/plywood substrates that will be covered with the specified flashing membrane, using the specified screws/plates, at 12 inches o.c. staggered. Cut the cant backing sheet into 12 inch widths and peel the release film from the back of the sheet. Set the sheet into place extending 6 inches onto the field of the roof area and 6 inches up the gypsum sheathing panel surface utilizing minimum 3 inch side laps. Set the cant into place prior to installation of the roof membrane base ply.

#### 3.4 ROOF MEMBRANE INSTALLATION

- A. Membrane Application: Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Application of roofing membrane components shall immediately follow application of base sheet and/or insulation as a continuous operation.
- B. Aesthetic Considerations: An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the

specified materials including granules and metallic powder, and exercise care in ensuring that the finished application is acceptable to the Owner.

- C. Priming: Prime metal and concrete and masonry surfaces with a uniform coating of the specified asphalt primer.
- D. Bitumen Consistency: Cutting or alterations of bitumen, primer, and sealants will not be permitted.
- E. Roofing Application: Apply all layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.
  - 1. Apply all layers of roofing perpendicular to the slope of the deck.
  - 2. Torch apply the Paradiene 20 TS base ply to the prepared substrate, utilizing minimum 3 inch side laps. Butt the end laps of each sheet and torch apply a 12 inch wide strip of the Paradiene 20 TG stripping ply material centered over each end lap.
  - 3. Fully bond the finish ply to the base ply, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the torch applicator. Stagger end laps of the finish ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger side laps of the finish ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3 feet from end laps in the underlying base ply.
- F. Granule Embedment: Broadcast mineral granules over all bitumen overruns on the finish ply surface, while the bitumen is still hot or the adhesive is soft, to ensure a monolithic surface color.
- G. Flashing Application - masonry surfaces: Flash masonry parapet walls and curbs using the reinforcing sheet and the metal foil flashing membrane. After the base ply has been applied to the top of the cant, fully adhere the reinforcing sheet, utilizing minimum 3 inch side laps and extend a minimum of 3 inches onto the base ply surface and 3 inches up the parapet wall above the cant. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the metal foil flashing layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).
- H. Flashing Application - surfaces sheathed with gypsum sheathing panels: After the gypsum sheathing panel and cant backing sheet have been installed, flash

parapet walls and curbs with the specified reinforcing sheet and the metal foil flashing membrane. The reinforcing sheet shall have minimum 3 inch side laps and extend a minimum of 3 inches onto the base ply surface and to the top of the parapet wall or curb. Using the specified fasteners, mechanically attach the reinforcing sheet through the field of the sheet to the vertical flashing surface on 12 inch centers from the top of the cant to the top of the wall or curb. Fully adhere the remainder of the flashing reinforcing sheet that extends over the cant and roof level. Using a Leister Hand Welding Tool, seal the laps between flashing reinforcing sheets. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the metal foil flashing layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).

- I. Use of Metallic Powder: Broadcast metallic powder over all bitumen overruns on the metal foil membrane surface while the bitumen is still hot to ensure a monolithic surface color.
- J. Water Cut-Off: At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

### 3.5 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS

- A. Edge Metal: Completely prime metal flanges and allow to dry prior to installation. Turn the base ply down 2 inches past the roof edge and over the nailer. After the base ply and continuous cleat (if applicable) have been installed, set the flange in mastic and stagger nail every 3 inches on center. Strip-in the flange using the stripping-ply material, extending a minimum of 4 inches beyond the edge of the flange. Terminate the finish ply at the gravel-stop rise of the edge metal. SEE ITEM: SEALANT, for finish of this detail.
- B. Lead Pipe Flashings: Completely prime the lead flanges and allow to dry prior to installation. After the base ply has been applied, set the flange in mastic and strip-in the flange using the stripping-ply material, extending a minimum of 4 inches beyond the edge of the flange. Terminate the finish ply at the flange-sleeve juncture of the pipe flashing. SEE ITEM: SEALANT for finish of this detail.

- C. **Lead Drain Flashings:** Completely prime the lead drain flashing and allow to dry prior to installation. After the base ply has been applied, set the lead flashing sheet in mastic and form to turn down inside of the drain bowl. Ply-in the perimeter of the lead flashing using an additional layer of the base ply material, overlapping the perimeter of the lead a minimum of 4 inches. Terminate the finish ply to extend beneath the clamping ring seal. Install the clamping ring with all bolts in place.
- D. **Walktread:** Cut the walktread into maximum 5 foot lengths and allow to relax until flat. Adhere the sheet using the specified plastic cement. Apply the specified cement in a 3/8 inch thickness to the back of the product in 5 inch by 5 inch spots in accordance with the pattern as supplied by the walktread manufacturer. Walk-in each sheet after application to ensure proper adhesion. Use a minimum spacing of 2 inches between sheets to allow for proper drainage.
  - 1. Provide walk treads 36 wide minimum around entire perimeter of roof-mounted HVAC equipment. Locate 12 inches minimum from outermost point of base flashing membrane.
  - 2. Provide 36 inch x 48 inch minimum walktread at base and top of ladders.
- E. **Sealant:** Apply a smooth continuous bead of the specified sealant at the exposed finish ply edge transition to metal flashings incorporated into the roof system.

### 3.6 FIELD QUALITY CONTROL AND INSPECTIONS

- A. Manufacturer shall perform minimum weekly inspections during the installation of the roofing system. Manufacturer shall submit a written report to the Contractor, Architect and Owner after each inspection. Progress payments shall not be made on work not observed by the manufacturer.
  - 1. Report shall clearly delineate areas observed, weather conditions, substrate conditions, suitability of anchorage of roofing system, quality of workmanship, and other items which could impact the issuance of the roof warranty or affect the endurance of the roofing system.
  - 2. Manufacturer's representative shall review all labels of products present and confirm their compliance with project requirements. If incidental materials are present which are not specified, submit recommendation to Architect as to the acceptability of material to the roofing manufacturer.
- B. **Notification Of Completion:** Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.
- C. **Final Inspection**
  - 1. **Post-Installation Meeting:** Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative.

Complete, sign, and mail the punch list form to the manufacturer's headquarters.

- D. Issuance Of The Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

3.7 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

- 3.8 Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 5216





## SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Manufactured Products:
    - a. Manufactured reglets and counterflashing.
  - 2. Formed Products:
    - a. Formed low-slope roof sheet metal fabrications.
- B. Related Sections:
  - 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
  - 2. Division 07 Section "SBS Modified Bituminous Membrane Roofing" for installing sheet metal flashing and trim integral with membrane roofing.
  - 3. Division 07 Section "Roof Accessories" for set-on-type curbs, and other manufactured roof accessory units.
  - 4. Division 07 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.

## 1.3 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Fabricate and install roof edge flashing and copings capable of resisting forces according to recommendations in FMG Loss Prevention Data Sheet 1-49.
- C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
1. Identification of material, thickness, weight, and finish for each item and location in Project.
  2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
  3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  4. Details of termination points and assemblies, including fixed points.
  5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
  6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
  7. Details of special conditions.
  8. Details of connections to adjoining work.
  9. Detail formed flashing and trim at a scale of not less than 3 inches per 12 inches.
- C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.

## 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

## 1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim

that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
  - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
  - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
  - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.
  1. Finish: 4 (polished directional satin).
  2. Surface: Smooth, flat.
- C. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
  1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.
  2. Surface: Smooth, flat.
  3. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  4. Color: To match existing.
  5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

### 2.2 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- B. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.

## 2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
    - d. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
    - e. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

## 2.4 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and

compatible with flashing indicated with interlocking counterflashing on exterior face, of same metal as reglet.

1. Basis-of-Design Product: Model No. MA, SM and ST reglets with Springlok counterflashing as manufactured by Fry Reglet Corporation or comparable product by the following:
  - a. Heckmann Building Products Inc.
  - b. Hickman, W. P. Company.
  - c. Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
  - d. Sandell Manufacturing Company, Inc.
2. Material: Stainless steel, 0.019 inch thick.
3. Masonry Type (MA): Provide with offset top flange for embedment in masonry mortar joint.
4. Surface-Mounted Type (SM): Provide with for fastening to substrate, with neoprene or other suitable washer, and with channel for sealant at top edge.
5. Stucco Type (ST): Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
6. Finish: Mill.

## 2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
  1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  2. Obtain field measurements for accurate fit before shop fabrication.
  3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
  4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- E. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

- F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- G. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
- H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- I. Do not use graphite pencils to mark metal surfaces.

## 2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof-Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96 inch long, but not exceeding 10 foot long, sections. Furnish with 6 inch wide, joint cover plates.
  - 1. Joint Style: Butt, with 12 inch wide, exposed cover plate.
  - 2. Fabricate from the following materials:
    - a. Pre-Coated Galvanized Steel: 0.028 inch thick.
- B. Copings: Fabricate in minimum 96 inch long, but not exceeding 10 foot long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, seal, and solder or weld watertight.
  - 1. Coping Profile: SMACNA figure designation 3-4D.
  - 2. Joint Style: Butt, with 12-inch- wide, concealed backup plate.
  - 3. Fabricate from the following materials:
  - 4. Pre-coated Galvanized Steel: 0.040 inch thick.
- C. Counterflashing: Fabricate from the following materials:
  - 1. Stainless Steel: 0.019 inch thick where not exposed to view from ground.
  - 2. Pre-coated Galvanized Steel: 0.022 inch thick from metal roofing manufacturer where exposed to view from ground.

## 2.7 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers and gutter accessories from same metal as gutters.
  - 1. Gutter Style: Match existing.
  - 2. Size:
    - a. Height: 6 inches.
    - b. Depth: 6 inches.
  - 3. Fabricate from the following materials:
    - a. Prefinished Galvanized Steel, 0.0386 inch thick.

4. Expansion Joints: Butt type with cover plate.
  5. Accessories: Wire ball downspout strainer.
- B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Style: Smooth rectangular.
  2. Size:
    - a. Width: 5 inches.
    - b. Depth: 4 inches.
  3. Fabricated Hanger Style: SMACNA figure designation 34-A.
  4. Fabricate from the following materials:
    - a. Prefinished Galvanized Steel, 0.0276 inch thick minimum.
- C. Splashblocks: Minimum 4000 psi precast concrete, smooth formed, approximate 12 inch width by 18 inch length.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
1. Verify compliance with requirements for installation tolerances of substrates.
  2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

#### 3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
  4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
  5. Install sealant tape where indicated.
  6. Torch cutting of sheet metal flashing and trim is not permitted.
  7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
1. Coat back side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
  2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
1. Maximum Expansion - Roof Drainage:
    - a. Gutters: 50 feet or midpoint between downspouts, whichever is less.
    - b. Downspouts: 20 feet.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal joints as shown and as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
  2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."



### 3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 24-inch centers.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for wind zone indicated.
  - 1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
  - 2. Anchor interior leg of coping with screw fasteners and washers 20-inch centers.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.

### 3.5 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

### 3.6 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 6200

## SECTION 07 6500 - THROUGH-WALL FLASHING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Self-sealing membrane through-wall flashing.
  - 2. Cavity drainage materials and weeps.
- B. Related Sections include the following:
  - 1. Division 4 Section "Concrete Unit Masonry" for brick veneer requirements.

## 1.3 SYSTEM DESCRIPTION

- A. Performance Requirements:
  - 1. Water Vapor Transmission: ASTM E96. Method B -2.9ng/m<sup>2</sup>sPa (0.05 perms) maximum.
  - 2. Water Absorption: ASTM D570 - Max. 0.1% by weight.
  - 3. Puncture Resistance: ASTM E154 - 178 N (40 lbs.)
  - 4. Tear Resistance:
    - a. Propagation - ASTM D1938 - min. 40 N (9.0 lbs.) M.D.
    - b. Lap Adhesion at -4°C (25°F): ASTM D1876 - 880 N/M (5.0 lbs./in.) of width.
  - 5. Low Temperature Flexibility - ASTM D1970 - Unaffected to -43°C (-45°F).
  - 6. Tensile Strength: ASTM D412, Die C Modified - Min. 5.5 MPa (800 psi).
  - 7. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C - Min. 200%.

## 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's literature for all products specified herein.

## 1.5 QUALITY ASSURANCE

- A. Mock-Up: Through-Wall Flashing shall be incorporated into brick/CMU sample panel as specified in Division 4 - Masonry.

## 1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Install flashing to dry surfaces at air and surface temperature of -4°C (25°F) and above and in accordance with manufacturer's

recommendations at locations indicated on drawings.

## 1.7 WARRANTY

- A. Warranty: Provide two year full material and labor warranty against failure in material and/or workmanship.

## PART 2 - PRODUCTS

### 2.1 THROUGH-WALL FLASHING

- A. Basis-of-Design Product: Subject to compliance with requirements, Rubber Seal flexible flashing as manufactured by Sandell Manufacturing Company or comparable product by the following:
1. Carlisle Coating and Waterproofing.
  2. Fortifiber Building Systems Group.
  3. Grace Construction Products.
  4. W. R. Meadow, Inc.
- B. Flashing Material:
1. Self-adhesive rubberized asphalt integrally bonded to cross-laminated, high-density polyethylene film to provide a continuous membrane.
    - a. Asphalt Thickness: 32 mil.
    - b. Film Thickness: 8 mil.
    - c. Total Thickness: 40 mil.
  2. Provide factory-formed interior, exterior corners and end dams.
  3. Membrane shall be interleaved with disposable silicone-coated release paper until installed.
- C. Accessories:
1. Surface Conditioner: Surface Conditioner water-based conditioning for substrate preparation as recommended by flashing manufacturer.
  2. Termination Mastic: Bituthene Mastic rubberized asphalt-based mastic with 2000 g/l max. VOC Content.
  3. Primer: Bituthene P-3000 Primer rubber-based primer in solvent with 680 grams/liter max. VOC Content.

### 2.2 DRAINAGE ACCESSORIES

- A. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Basis-of-Design Product: Mortar Net free draining cavity material as manufactured by Mortar Net USA, Ltd. or comparable product by the following:
    - a. Dayton Superior Corporation, Dur-O-Wal Division.
    - b. Hohmann & Barnard, Inc.
    - c. Wire Bond.
  2. Provide one of the following configurations:
    - a. Strips, full-depth of cavity and 10 inches wide, with dovetail shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings.

- B. Weep/Vent Products: Use the following, unless otherwise indicated:
1. Basis-of-Design Product: Mortar Net Weep Vents as manufactured by Mortar Net USA, Ltd. or comparable product by the following:
    - a. Advanced Building Products Inc.
    - b. Dayton Superior Corporation, Dur-O-Wal Division.
    - c. Heckmann Building Products Inc.
    - d. Hohmann & Barnard, Inc.
    - e. Wire-Bond.
  2. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Flexible Wall Flashing:
1. Remove silicone-coated release paper and position flashing carefully before placing it against the substrate.
  2. Flashing shall be installed to extend 1" beyond face of exterior wythe, extend through cavity, rising not less than 8", and terminate at a depth 4" into the bed joint of the exterior backup. Neatly trim excess flashing after entire installation has been reviewed by the Design Professional.
  3. When properly positioned, place against surface by pressing firmly into place with a hand roller. Fully adhere flashing to substrate to prevent water from migrating under flashing.
  4. Overlap adjacent pieces 2" and roll all seams with a steel hand roller.
  5. At heads, sills and all flashing terminations, turn up ends a minimum of 2" and make careful folds to form an end dam, with the seams sealed.
  6. Weeps: Install at 24 inch intervals at base of veneer and over any opening.
- B. Special care shall be taken at corners to maintain full width of flashing from back-up wall to beyond face of brick. Seal laps as recommended by manufacturer.
- C. Carefully trim flashing at steel columns. Adhere to column and seal top edge of flashing with mastic.
- D. Do not allow the rubberized asphalt surface of the flashing membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.
- E. Do not expose flashing membrane to sunlight for more than thirty days prior to enclosures.
- F. Accessories:
1. When required by dirty or dusty site conditions or by surfaces having irregular or rough texture, apply surface conditioner by spray, at the

rate recommended by the manufacturer, prior to flashing installation. Allow surface conditioners to dry completely before flashing application.

2. Apply primer by brush or heavy nap, natural-material roller at rate recommended by manufacturer prior to flashing installation. Allow primer to dry completely before flashing application.
3. Apply a bead or trowel coat of mastic along flashing top edge, seams, cuts, and penetrations.

### 3.2 CLEANING

- A. Clean-Up: Contractor shall omit bricks at weep holes until entire panel is completed. At the end of each day's work, excess mortar shall be removed from flashing surface. Install brick and weep only after panel is completed.

End of Section 07 6500

## SECTION 07 7200 - ROOF ACCESSORIES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Roof curbs.
- B. Related Sections include the following:
  - 1. Division 6 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
  - 2. Division 7 Section "SBS Modified Bituminous Membrane Roofing" for installing sheet metal flashing and trim integral with roofing membrane.
  - 3. Division 7 Section "Standing Seam Metal Roofing System" for roof curbs and equipment supports integral with metal roofing.
  - 4. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
  - 5. Division 7 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.

## 1.3 SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions and profiles, and finishes.

## 1.4 QUALITY ASSURANCE

- A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication.

## 1.7 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
  - 1. With Architect's approval, adjust location of roof accessories that would interrupt roof drainage routes and/or roof expansion joints.

## 1.8 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation.
  - 1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil .
  - 2. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A 755/A 755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
- B. Stainless Steel Sheet: ASTM A666, Type 304, stretcher-leveled standard of flatness, minimum 0.015 inch.
  - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, hot-dip zinc-coating designation G90, stretcher-leveled standard of flatness and either commercial or forming steel, minimum 0.019 inch thick.



- C. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for type of use and mill finish.
- D. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized to comply with ASTM A 123/A 123M, unless otherwise indicated.
- E. Galvanized Steel Tube: ASTM A 500, round tube, hot-dip galvanized to comply with ASTM A 123/A 123M.

### 2.3 MISCELLANEOUS MATERIALS

- A. Glass-Fiber Board Insulation: ASTM C 726, 1 inch thick.
- B. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.
- C. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- D. Polyethylene Sheet: 6-mil- thick, polyethylene sheet complying with ASTM D 4397.
- E. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, non perforated.
  - 1. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.
- F. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other non corrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide non removable fastener heads to exterior exposed fasteners.
- G. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- H. Elastomeric Sealant: ASTM C 920, silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- I. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.
- J. Silicone Extrusions: Classified according to ASTM D 2000, UV stabilized, and do not propagate flame.
- K. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.

1. Exposed penetrating fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

#### 2.4 ROOF CURBS

- A. Roof Curbs: Provide metal roof curbs, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Fabricate with welded or sealed mechanical corner joints, with stepped integral metal cant raised the thickness of roof insulation and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
  1. Basis-of-Design Products: P100-B-UU-N-IL insulated roof curb as manufactured by Custom Solution Roof and Metal Products or comparable product by the following:
    - a. A.E.S. Industries, Inc.
    - b. Roof Products & Systems Corporation.
    - c. Thybar Corporation.
  2. Load Requirements: Contractor coordinate all equipment weights.
  3. Material: Galvanized steel sheet, 0.079 inch thick.
  4. Finish: Prime painted.
  5. Factory install wood nailers at tops of curbs.
  6. Factory insulate curbs with 1-1/2 inch thick, glass-fiber board insulation on interior face.
  7. Curb height may be determined by adding thickness of roof insulation and 10" minimum base flashing height.
  8. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with integral cricket and with height tapered to match slope to level tops of units.

#### 2.5 EQUIPMENT SUPPORTS

- A. Equipment Supports: Provide metal equipment supports, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Fabricate with welded or sealed mechanical corner joints, with stepped integral metal cant raised the thickness of roof insulation and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
  1. Basis-of-Design Products: P500-B-UU-N-IL equipment rail as manufactured by Custom Solution Roof and Metal Products or comparable product by the following:
    - a. A.E.S. Industries, Inc.
    - b. Roof Products & Systems Corporation.
    - c. Thybar Corporation.
  2. Load Requirements: Contractor coordinates all equipment weights.
  3. Material: Galvanized steel sheet, 0.079 inch thick.
  4. Finish: Prime painted.
  5. Factory-install continuous wood nailers 3-1/2 inches wide at tops of equipment supports.

6. Metal Counterflashing: Manufacturer's standard removable counterflashing, fabricated of same metal and finish as equipment support.
7. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
8. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
9. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
  1. Verify that substrate is sound, dry, smooth, and clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
  2. Verify dimensions of roof openings for roof accessories.
  3. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Install roof accessories to fit substrates and to result in watertight performance.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  2. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
  3. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.

- D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
  - E. Roof Curb Installation:
    - 1. Set roof curb so top surface of roof curb is level.
  - F. Seal joints with elastomeric sealant as required by manufacturer of roof accessories.
- 3.3 TOUCH UP
- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.
- 3.4 CLEANING
- A. Clean exposed surfaces according to manufacturer's written instructions.
- 3.5 PROTECTION
- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensures that roof accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 07 7200

## SECTION 07 8200 - BOARD FIRE PROTECTION

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Mineral-fiber board fire protection.
- B. Related Sections include the following:
  - 1. Division 7 Section "Building Insulation" for slag-wool-/rock-wool-fiber board and blanket insulation.
  - 2. Division 7 Section "Sprayed Fire-Resistive Materials" for applied coatings.
  - 3. Division 7 Section "Through-Penetration Firestop Systems."
  - 4. Division 9 Section "Gypsum Board Assemblies" for gypsum wallboard fire-resistive assemblies, finishing and repair of calcium silicate board assemblies, and non-fire-rated gypsum-board covering assemblies over mineral-fiber board fire-protection assemblies.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Certificates: For each type of board fire protection, signed by product manufacturer.

## 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain board fire-protection materials through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide board fire protection with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 1. Surface-Burning Characteristics: ASTM E 84.
  - 2. Fire-Resistance Ratings: ASTM E 119.
  - 3. Combustion Characteristics: ASTM E 136.
  - 4. Fire-resistance-rated assemblies are indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.

## 1.5 COORDINATION

- A. Coordinate installation of board fire protection with other construction specified in other Sections to comply with the following:
  - 1. Avoid unnecessary exposure of board fire protection to abrasion and other damage likely to occur during construction operations subsequent to its application.
  - 2. Do not install board fire protection on structural members until piping and other construction behind fire-resistive materials have been completed, uninterrupted coverage of fire-resistive materials can be provided, and the need for subsequent cutting and patching of fire-resistive materials has been eliminated.
  - 3. Expedite installation of board fire protection to minimize the time structural members are exposed without fire-resistive materials.
  - 4. Do not install enclosing or concealing construction until after board fire protection has been applied and inspected by authorities having jurisdiction.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: DriClad mineral-fiber board fire protection as manufactured by Albi Manufacturing, Division of StanChem Inc. or comparable product by the following:
  - 1. Isolatek International.

### 2.2 MATERIALS

- A. Unfaced Mineral-Fiber Board: Rigid board produced by combining slag-wool/rock-wool fibers with thermosetting resin binders passing ASTM E 136 for combustion characteristics; and as follows per ASTM C 612:
  - 1. Average Density: 10.5 lb/cu. ft.
  - 2. Thermal Performance: R-Value of 4.2 ft<sup>2</sup> x h x °F per ASTM C 158.
  - 3. Sheet Size: 48 by 72 inches by thickness required to produce fire-resistance rating indicated.
  - 4. Surface-Burning Characteristics: Flame-spread and smoke-developed indexes of 0 and 0, respectively per ASTM E 84.
- B. Anchorage Accessories: Provide manufacturer's standard board-anchorage components complying with related design of UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Where welded-stud anchorage system is used, remove rust and scale from steel substrates at locations to receive steel studs.

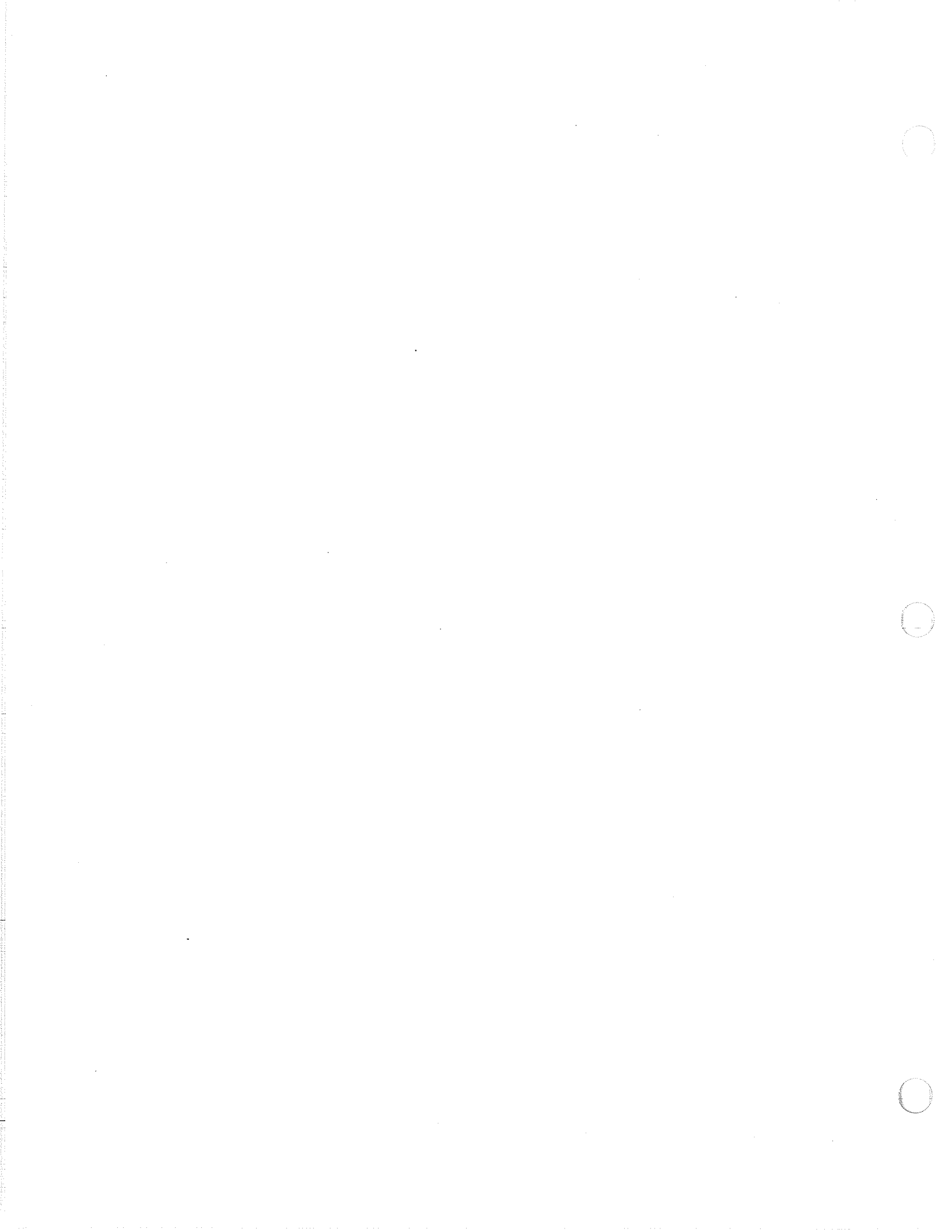
### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for particular conditions of installation in each case.
- B. Install board fire protection to comply with requirements for thicknesses, number of courses (layers), construction of joints and corners, and anchorage methods applicable to fire-resistance-rated assemblies indicated.

### 3.3 PROTECTION

- A. Coordinate installation of board fire protection with other construction to minimize cutting into, or removal of, installed fire-resistive materials. As other construction is successively completed, replace or repair board fire protection that has been cut away to facilitate this other construction. Maintain complete coverage of full thickness on members and substrates protected by board fire protection.
- B. Provide final protection and maintain conditions in a manner acceptable to installer, manufacturer, and authorities having jurisdiction that ensure that board fire protection is without damage or deterioration at time of Substantial Completion.

END OF SECTION 07 8200





## SECTION 07 8413 - PENETRATION FIRESTOPPING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
- B. Related Sections include the following:
  - 1. Division 7 Section "Fire-Resistive Joint Systems."
  - 2. Division 22 Sections for piping and other penetrations.
  - 3. Division 23 Sections specifying duct, and other piping penetrations.
  - 4. Division 26 Sections specifying cable and conduit penetrations.

## 1.3 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
  - 1. Fire-resistance-rated walls including fire walls, fire partitions, fire barriers, and smoke barriers.
  - 2. Fire-resistance-rated horizontal assemblies including floors.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per UL 1479:
  - 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
  - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
  1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
  2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. Qualification Data: For Installer.
- D. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
  - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
  - 2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:
    - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
    - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
      - 1). UL in its "Fire Resistance Directory."

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

## 1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by building inspector, Architect and the Owner.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hilti, Inc.
  - 2. Nelson Firestop Products.
  - 3. 3M; Fire Protection Products Division.

### 2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
  - 1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-/rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Fillers for sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.
  - 4. Collars.
  - 5. Steel sleeves.

- C. Systems or devices must be asbestos free.
- D. Systems or devices shall be listed in the U.L. Fire Resistance Directory under categories XHCR and XHEZ. System selected shall conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall penetrations.
- E. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the U.L. system or device, and designed to perform this function.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

### 3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

END OF SECTION 07 8413

## SECTION 07 8446 - FIRE-RESISTIVE JOINT SYSTEM

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes fire-resistive joint systems for the following:
  - 1. Floor-to-floor joints.
  - 2. Floor-to-wall joints.
  - 3. Head-of-wall joints.
  - 4. Wall-to-wall joints.
- B. Related Sections include the following:
  - 1. Division 7 Section "Architectural Joint Systems" for fire-resistive joint systems consisting of metal frames and covers.
  - 2. Division 7 Section "Through-Penetration Firestop Systems" for systems installed in openings in walls and floors with and without penetrating items.
  - 3. Division 7 Section "Joint Sealants" for non-fire-resistive joint sealants.

## 1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.
- B. Joint Systems in and between Fire-Resistance-Rated Constructions: Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of construction that they join, and L-ratings indicated as determined by UL 2079.
- C. Design Requirements: Maintain barrier and structural floor fire resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces or types of construction, at separations required to permit building movement and sound or vibration absorption, and at other construction gaps.
- D. For fire-resistive systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each fire-resistive joint system, show each kind of construction condition in which joints are installed; also show relationships to adjoining construction. Include fire-resistive joint system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.
  - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. SUBMITTALS RECEIVED WITHOUT QUALIFICATION DATA SHALL BE RETURNED WITHOUT REVIEW.

#### 1.6 QUALITY ASSURANCE

- A. Joint system for the entire project shall be detailed by single source. It shall be the responsibility of the detailer to coordinate with all affected trades.
- B. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."
- C. Installation Responsibility: Assign installation of fire-resistive joint systems in Project to a single qualified installer.
- D. Source Limitations: Obtain fire-resistive joint systems, for each kind of joint and construction condition indicated, through one source from a single manufacturer.
- E. Fire-Test-Response Characteristics: Provide fire-resistive joint systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
  - 1. Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.
  - 2. Fire-resistive joint systems are identical to those tested per methods indicated in Part 1 "Performance Requirements" Article and comply with the following:
    - a. Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.
    - b. Fire-resistive joint systems correspond to those indicated by referencing system designations of the qualified testing and inspecting agency.



### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fire-resistive joint system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

### 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.

### 1.9 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hilti, Inc.
  - 2. Nelson Firestop Products.
  - 3. 3M; Fire Protection Products Division.

### 2.2 FIRE-RESISTIVE JOINT SYSTEMS

- A. Compatibility: Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.
- B. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components

specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of work.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
  - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
  - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistive joint system materials. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates or damaging adjoining surfaces.

#### 3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.
- B. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
2. Apply fill materials so they contact and adhere to substrates formed by joints.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

#### 3.4 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

#### 3.5 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

- A. Designation System for Joints in or between Fire-Resistance-Rated Constructions: Alphanumeric systems listed in UL's "Fire Resistance Directory" under Product Category XHBN.
- B. It shall be the responsibility of the Vendor to thoroughly schedule the project to maintain fire resistant assemblies for construction types and fire rated assemblies indicated on Drawings.
  1. Joints shall be Type "D" at expansion joints. or at joints with dissimilar materials.
  2. Joints at other location shall be Type "S" or "D" as determine by Vendor.
- C. Floor-to-Wall Fire-Resistive Joint Systems:
  1. UL-Classified Systems: As selected by vendor for wall and floor construction indicated.
  2. Assembly Rating: 1 or 2 hours as indicated.
  3. Joint Width: 1 inch.
- D. Head-of-Wall Fire-Resistive Joint Systems:
  1. UL-Classified Systems: As selected by vendor for wall and deck construction indicated.
  2. Assembly Rating: 1 or 2 hours as indicated.
  3. Joint Width: 1 inch.
- E. Wall-to-Wall Fire-Resistive Joint Systems:
  1. UL-Classified Systems: As selected by vendor for wall construction indicated.

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FIRE-RESISTIVE JOINT SYSTEM

BRPH Architects - Engineers, Inc.

School Code: 0392

2. Assembly Rating: 1 or 2 hours as indicated.
3. Joint Width: 1 inch.

END OF SECTION 07 8446

## SECTION 07 9500 - JOINT SEALANTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
  - 1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
    - a. Control and expansion joints in unit masonry.
    - b. Joints between different materials.
    - c. Perimeter joints between materials listed above and frames of doors, windows and louvers.
    - d. Penetrations of exterior horizontal and vertical surfaces.
    - e. Building expansion joints as indicated.
    - f. Other joints as indicated.
  - 2. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Vertical joints on exposed surfaces of interior unit masonry, concrete, walls and partitions.
    - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
    - e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - f. Other joints as indicated.
- B. Related Sections include the following:
  - 1. Division 4 Section "Unit Masonry Assemblies" for masonry control and expansion joint fillers and gaskets.
  - 2. Division 7 Section "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
  - 3. Division 8 Section "Glazing" for glazing sealants.
  - 4. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
  - 5. Division 9 Section "Ceramic Tile" for tile control and expansion joints.

### 1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

### 1.4 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
  - 1. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
  - 2. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
- D. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

### 1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.7 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
  - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
  - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Tremco or comparable product by the following:
  - 1. Dow Corning Corporation.
  - 2. Sonneborn, Division of ChemRex Inc.
  - 3. Pecora Corporation.

### 2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

### 2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

- C. Single-Component Neutral-Curing Silicone Sealant:
1. Basis-of-Design Product: Spectrum 2.
  2. Type and Grade: S (single component) and NS (nonsag).
  3. Class: 100/50.
  4. Use Related to Exposure: NT (nontraffic).
  5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
    - a. Use O Joint Substrates: color anodic aluminum galvanized steel, brick and other O substrates where indicated.
  6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
- D. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:
1. Basis-of-Design Product: Tremsil 200.
  2. Type and Grade: S (single component) and NS (nonsag).
  3. Class: 25.
  4. Use Related to Exposure: NT (nontraffic).
  5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
    - a. Use O Joint Substrates: ceramic tile and porcelean.

#### 2.4 LATEX JOINT SEALANTS

- A. Latex: Comply with ASTM C 834, Type P, Grade NF.
1. Basis-of-Design Product: Tremco; Tremflex 834.

#### 2.5 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

#### 2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and



adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include, but are not limited to, the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include, but are not limited to, the following:
    - a. Metal.
    - b. Glass.
    - c. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's

written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

### 3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.5 PROTECTION

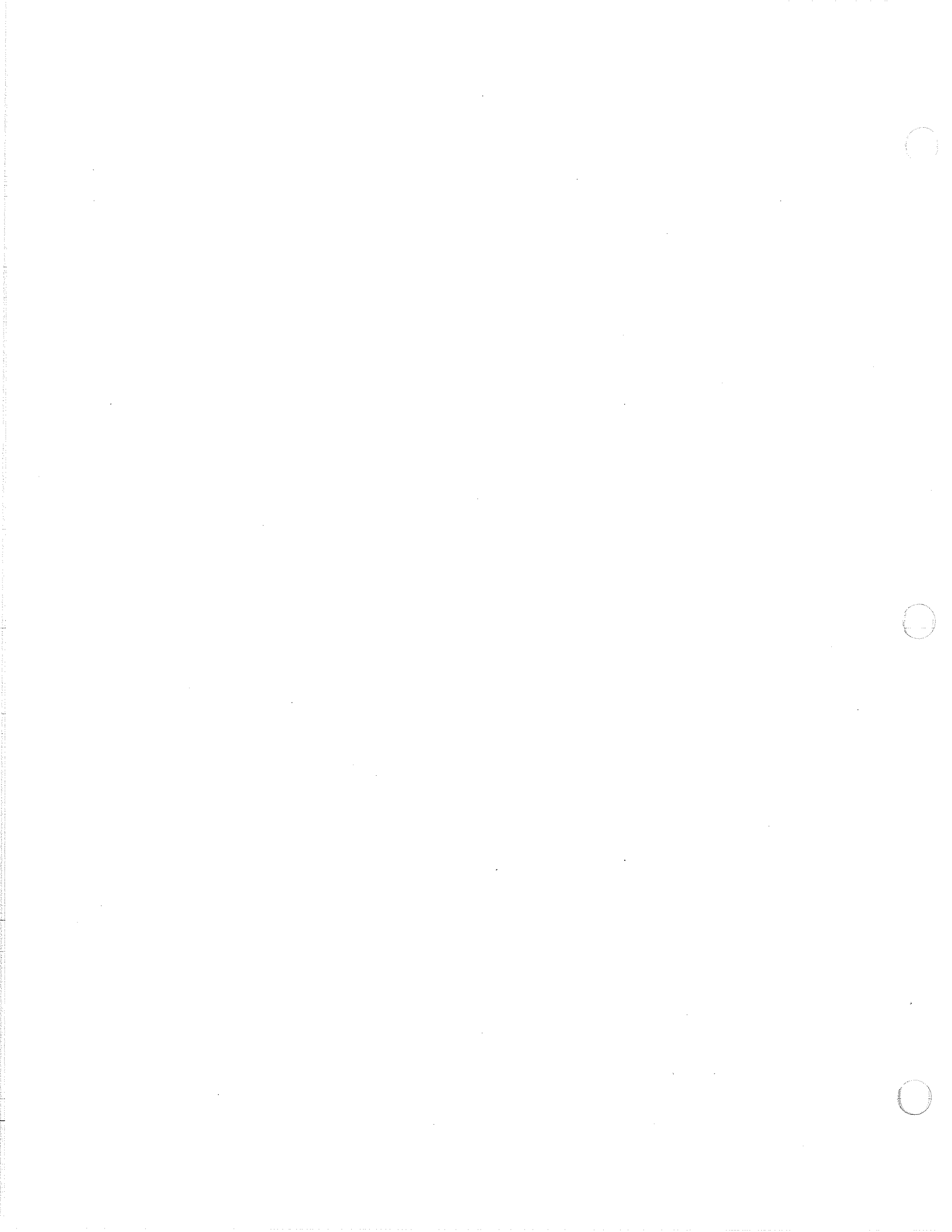
- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint

sealants immediately so installations with repaired areas are indistinguishable from original work.

### 3.6 SCHEDULE

- A. Exterior and interior joints, expansion joints, control joints and other joints where movement of joint is anticipated:
  - 1. Joint Sealant: Single-component neutral-curing silicone sealant.
  - 2. Colors: As selected by Architect from manufacturer's full range. Limit of four colors.
  
- B. Interior joints between plumbing fixtures and adjoining walls, floors, and counters:
  - 1. Joint Sealant: Single-component mildew-resistant neutral-curing silicone sealant.
  - 2. Color: White.
  
- C. Interior joints between wall surfaces and adjoining countertops, penetrations of walls and partitions for piping, ductwork and similar items, and around perimeter of interior door frames, and other locations where movement of joint is not anticipated.
  - 1. Joint Sealant: Latex sealant.
  - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 07 9500



## SECTION 07 9513 - ARCHITECTURAL JOINT SYSTEMS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Types of joints for which architectural joint systems are specified include the following:
  - 1. Exterior wall joints.
  - 2. Interior wall and ceiling joints.
- B. Related Sections include the following:
  - 1. Division 7 Section "Sheet Metal Flashing and Trim" for sheet metal roof and wall joint systems.
  - 2. Division 7 Section "Joint Sealants" for elastomeric sealants and preformed compressed-foam sealants without metal frames.

## 1.3 DEFINITIONS

- A. Architectural Joint System: Any filler or cover used to span, fill, cover, or seal a joint, except expanding foam seals and poured or foamed in-place sealants.
- B. Maximum Joint Width: Widest linear gap a joint system tolerates and performs its designed function without damaging its functional capabilities.
- C. Minimum Joint Width: Narrowest linear gap a joint system tolerates and performs its designed function without damaging its functional capabilities.
- D. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage of nominal value of joint width.
- E. Nominal Joint Width: Width of linear gap indicated as representing the conditions existing when architectural joint systems will be installed or, if no nominal joint width is indicated, a width equal to the sum of maximum and minimum joint widths divided by two.

## 1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide factory-fabricated architectural joint systems capable of withstanding the types of loads and of accommodating the kinds of movement, and the other functions for which they are designed including those specified below, without failure. Types of failure include those listed in Appendix X3 of ASTM E 1399.

1. Exterior Joints: Maintain continuity of weather enclosure.
2. Other Joints: Where indicated, provide joint systems that prevent penetration of water, moisture, and other substances deleterious to building components or content.
3. Joints in Surfaces with Architectural Finishes: Serve as finished architectural joint closures.

## 1.5 ACTION SUBMITTALS

- A. Product Data: Include manufacturer's product specifications, construction details, material and finish descriptions, and dimensions of individual components and seals.
- B. Shop Drawings: For each joint system specified, provide the following:
  1. Placement Drawings: Include line diagrams showing entire route of each joint system, plans, elevations, sections, details, joints, splices, locations of joints and splices, and attachments to other Work. Where joint systems change planes, provide Isometric Drawings depicting how components interconnect to achieve continuity of joint covers and fillers.
- C. Samples for Verification: Full-size units 6 inches long of each type of joint system indicated; in sets for each finish, color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products by MM Systems Corporation or comparable product by the following:
  1. Balco, Inc.
  2. Construction Specialties, Inc.

### 2.2 MATERIALS

- A. Aluminum: ASTM B 221 , alloy 6063-T5 for extrusions; ASTM B 209 , alloy 6061-T6 for sheet and plate.
  1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
- B. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, flexible moisture barrier and filler materials, drain tubes, lubricants, adhesives, and other accessories compatible with material in contact, as indicated or required for complete installations.

### 2.3 ARCHITECTURAL JOINT SYSTEMS

- A. General: Provide joint systems of design, basic profile, materials, and operation indicated. Provide units with the capability to accommodate joint widths indicated and variations in adjacent surfaces.
  - 1. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline mitered corners where joint changes directions or abuts other materials.
  - 2. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.
  - 3. Public Area Seals: Non-slip seals designed for installation on treads and risers and to lie flat with adjacent surfaces, and complying with ADA guidelines for public areas.
  
- B. Interior Walls and Exterior Soffits Joint System: Metal frames and covers.
  - 1. Corner:
    - a. Basis-of-Design Product: MM Systems Corporation, No. X-N1M.
    - b. Type of Movement Capability: Expansion and contraction.
    - c. Exposed Cover Material: Aluminum.
    - d. Exposed Frame Material: Same material and finish as exposed cover material.
  - 2. Flush:
    - a. Basis-of-Design Product: MM Systems Corporation, No. ASH-6-3, exposed cover only.
    - b. Type of Movement Capability: None.
    - c. Exposed Cover Material: Aluminum.
  
- C. Interior Ceiling Joint System: Metal frames and covers.
  - 1. Basis-of-Design Product: MM Systems Corporation, No. DX-100 at non rated joints, and shall be dual durometer PVC; the vertical legs shall be rigid material for positive anchoring; the exposed bellows shall be flexible PVC; color to be white.
  
- D. Exterior Wall Joint System: Engineered silicone sealing system.
  - 1. Basis-of-Design Product: MM Systems Corporation, No. ESS-200.
  - 2. Type of Movement Capability: Expansion and contraction.
  - 3. Color: To be selected by Architect from manufacturer's full range.

### 2.4 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

### 2.5 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

- B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Prepare substrates according to architectural joint system manufacturer's written instructions.
- B. Coordinate and furnish anchorages, Placement Drawings, and instructions for installing joint systems to be embedded in or anchored to concrete or to have recesses formed into edges of concrete slab for later placement and grouting-in of frames.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary to secure joint systems to in-place construction, including threaded fasteners with drilled-in expansion shields for masonry and concrete where anchoring members are not embedded in concrete. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for handling and installing architectural joint assemblies and materials, unless more stringent requirements are indicated.
- B. Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.
- C. Terminate exposed ends of exterior architectural joint assemblies with factory-fabricated termination devices to maintain waterproof system.
- D. Install factory-fabricated transitions between building expansion-joint cover assemblies and roof expansion-joint assemblies, specified in Division 7 Section "Roof Expansion Assemblies," to provide continuous, uninterrupted, watertight construction.
- E. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required to install joint systems.
  - 1. Install joint cover assemblies in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
  - 2. Allow adequate free movement for thermal expansion and contraction of metal to avoid buckling.
  - 3. Set covers in horizontal surfaces at elevations that place exposed surfaces flush with adjoining finishes.

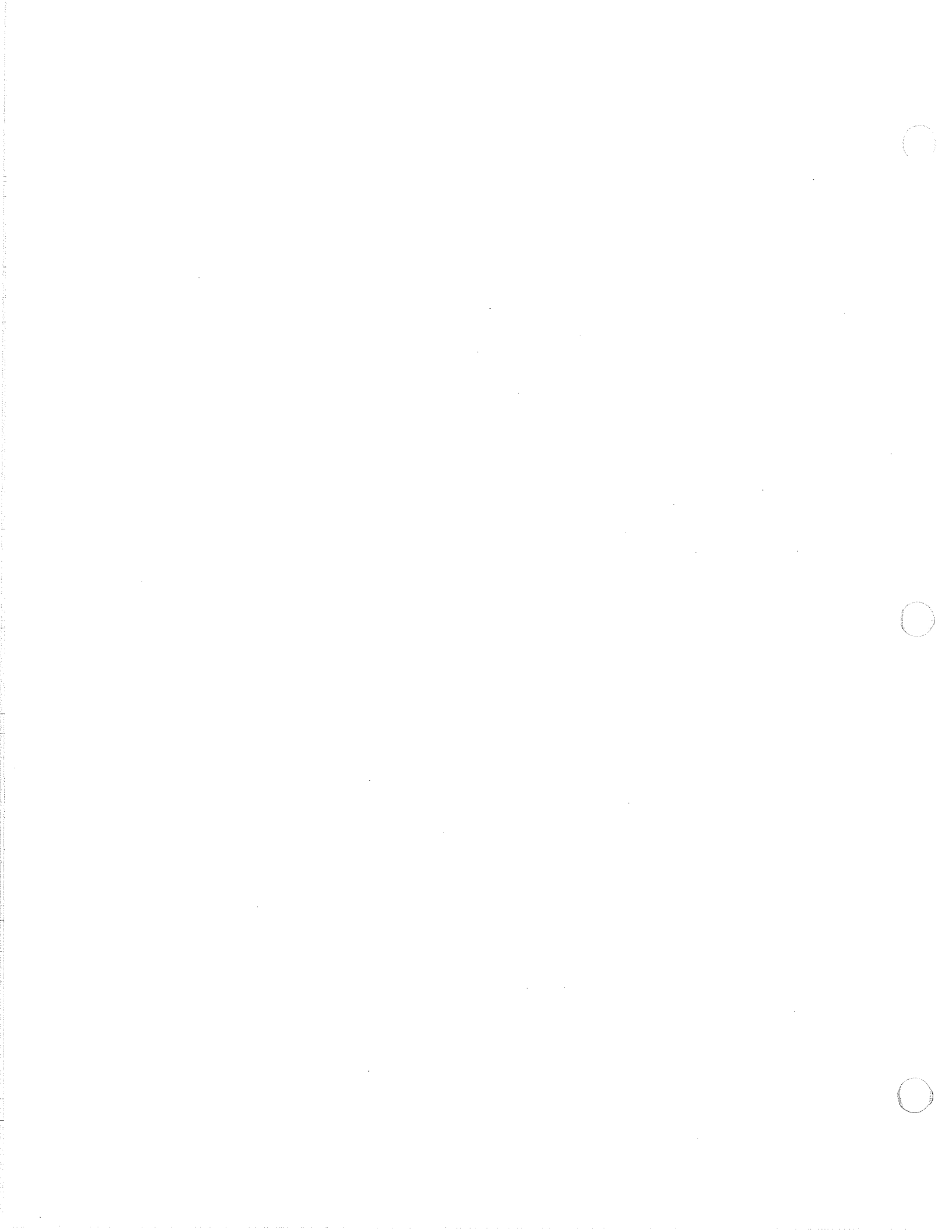


4. Locate soffit, wall and ceiling covers in continuous contact with adjacent surfaces.
  5. Securely attach in place with required accessories.
  6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- F. Continuity: Maintain continuity of joint systems with a minimum number of end joints and align metal members. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames. Adhere flexible filler materials, if any, to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- G. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and end joints.

### 3.3 CLEANING AND PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

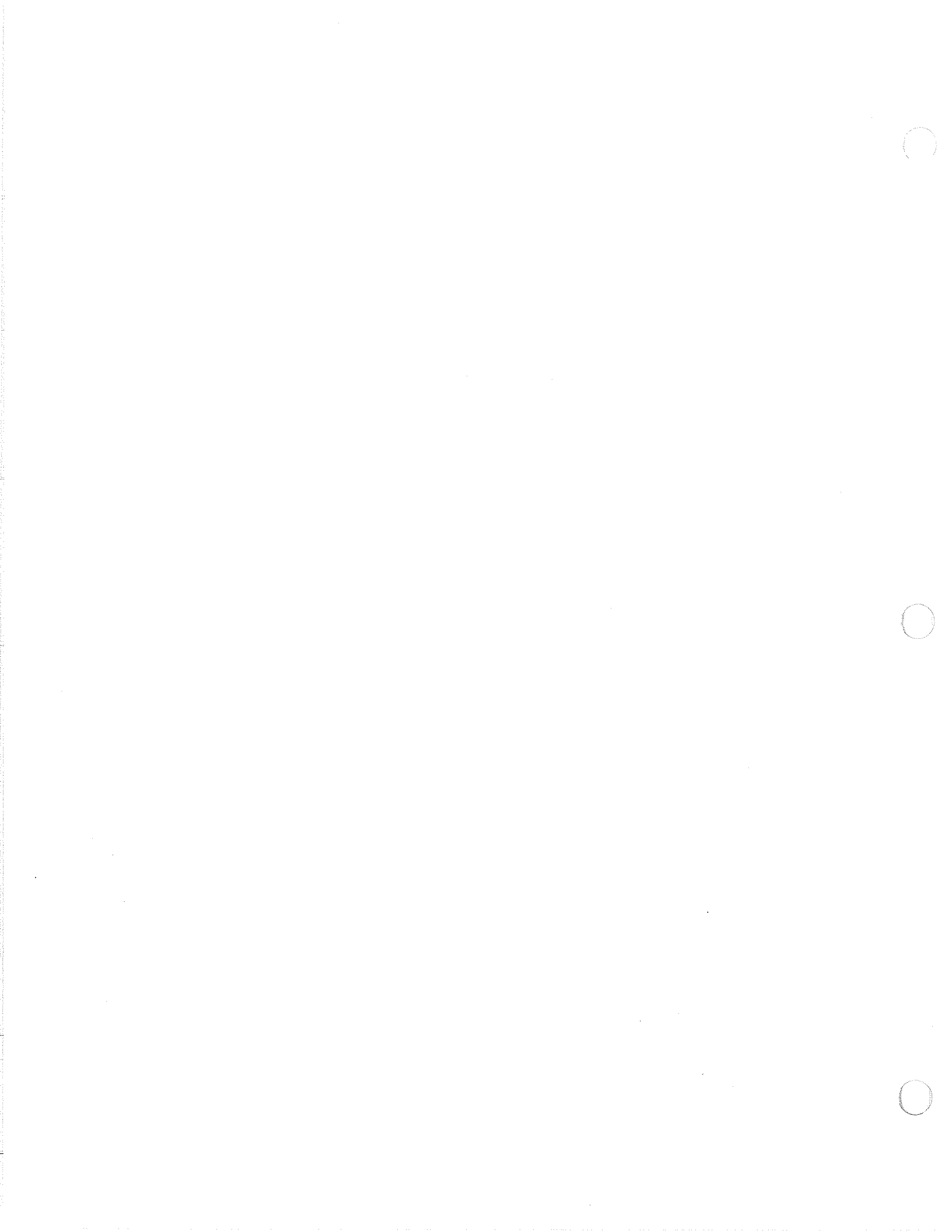
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**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 8

OPENINGS



## SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Standard hollow-metal steel doors.
  - 2. Standard hollow-metal steel frames.
- B. Related Sections include the following:
  - 1. Division 4 Section "Unit Masonry Assemblies" for building anchors into and grouting standard steel frames in masonry construction.
  - 2. Division 8 Section "Glazing" for glazed lites in steel doors and frames.
  - 3. Division 8 Section "Door Hardware" for door hardware for standard steel doors and frames.
  - 4. Division 9 Painting Sections for field painting standard steel doors and frames.

## 1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.

## 1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating, and finishes for each type of steel door and frame specified.
- B. Qualification Data: For Installer and testing agency.
- C. Product Test Reports: Based on evaluation of comprehensive fire tests performed by a qualified testing agency, for each type of standard steel door and frame.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain standard steel doors and frames through one source from a single manufacturer.

- C. Fire-Rated Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated.
  - 1. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, the neutral pressure level in furnace shall be established at level required by code.
- D. Regulatory Requirements:
  - 1. Comply with applicable provisions of Florida Building Code.
  - 2. Products shall comply with applicable Dade County Protocols.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store doors and frames under cover at Project site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber.
  - 1. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

#### 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating standard steel frames without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

#### 1.8 COORDINATION

- A. Coordinate installation of anchorages for standard steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in masonry. Deliver such items to Project site in time for installation.

### PART 2 - PRODUCTS

#### 2.1 GENERAL REQUIREMENTS FOR FRAMES AND DOORS

- A. The Contractor shall engage the services of an independent testing laboratory to field check, from random units supplied for this contract, for conformance

with the contract documents. Test results shall be submitted to the Contractor, Architect and Owner. If the initial sampling fail to meet the requirements of the Contract Documents, all doors and frames shall be verified:

1. All exterior doors and frames shall be verified for material thickness, galvanization, mortar boxes, and other requirements of the Contract Documents.
2. A minimum of 15% of interior doors and frames selected at random shall be verified for material thickness and other requirements of the Contract Documents.

## 2.2 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Ceco Door Products; an ASSA ABLOY Group Company or comparable product by the following:
  1. D&D Specialties, Inc
  2. Habersham Metal Products
  3. Kewanee Corporation (The).
  4. Steelcraft; an Ingersoll-Rand Company.

## 2.3 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.
- D. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Commercial Steel (CS), Class B coating; mill phosphatized.
- E. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153/A 153M, Class B.
- F. Inserts, Bolts, and Fasteners: Provide items to be built into exterior walls, hot-dip galvanized according to ASTM A 153/A 153M.
- G. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching standard steel door frames of type indicated.
- H. Glazing: Comply with requirements in Division 8 Section "Glazing."
- I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.4 STANDARD STEEL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces, unless otherwise indicated. Comply with ANSI A250.8.
1. Design: Flush panel.
  2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, mineral-board, or vertical steel-stiffener core that produces doors complying with ANSI A250.8.
    - a. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
      - 1) Locations: Exterior doors.
  3. Vertical Edges for Single-Acting Doors: Beveled edge unless square edge is indicated.
    - a. Beveled Edge: 1/8 inch in 2 inches .
  4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick end closures or channels of same material as face sheets.
  5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush).
  2. All exterior doors shall have their tops and bottom edge closed, welded flush with minimum 16 gauge metal. Provide weeps in bottom edge.
- C. Hardware Reinforcement: Fabricate reinforcement plates from same material as door face sheets to comply with the following minimum sizes:
1. Hinges: Minimum 0.123 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
  2. Lock Face, Flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch thick.
  3. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick.
  4. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
  5. Provide reinforcement for both regular and parallel arm closers at all door frames.

## 2.5 STANDARD STEEL FRAMES

- A. General: Comply with ANSI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
1. Fabricate frames as full profile welded.
  2. Frames: 0.067 inch thick steel sheet, unless otherwise indicated.



- C. Interior Frames: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.
  - 1. Fabricate frames as full profile welded.
  - 2. Frames for Steel Doors: 0.053 inch thick steel sheet, unless otherwise indicated.
  - 3. Frames for Wood Doors: 0.053 inch thick steel sheet, unless otherwise indicated.
  - 4. Frames for Borrowed Lights: 0.053 inch thick steel sheet.
- D. Hardware Reinforcement: Fabricate reinforcement plates from same material as frames to comply with the following minimum sizes:
  - 1. Hinges: Minimum 0.123 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
  - 2. Pivots: Minimum 0.167 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
  - 3. Lock Face, Flush Bolts, and Concealed Holders: Minimum 0.067 inch thick.
  - 4. Closers: Provide reinforcing for both PA And RA closers at all frames whether scheduled or not.
  - 5. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick.
- E. Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.
- F. Jamb Anchors:
  - 1. Quantity:
    - a. Three anchors per jamb from 60 to 90 inches.
    - b. Four anchors per jamb from 90 to 120 inches.
  - 2. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
- G. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
  - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.
- H. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
- I. Plaster Guards: Formed from same material as frames, not less than 0.016-inch thick.

## 2.6 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.

- B. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 5/8 inch high, unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

## 2.7 FABRICATION

- A. General: Fabricate standard steel doors and frames to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Standard Steel Doors:
  - 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
  - 2. Glazed Lites: Factory cut openings in doors.
- C. Standard Steel Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Welded Frames: Fully weld joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  - 2. Sidelight Frames: Provide closed tubular members with no visible face seams or joints; fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  - 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners, unless otherwise indicated.
  - 4. Plaster Guards: Weld guards to frame at back of hardware mortises in frames installed in concrete or masonry.
  - 5. Where installed in masonry, leave vertical mullions in frames open at top for grouting.
  - 6. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  - 7. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Two anchors per jamb up to 60 inches in height.
      - 2) Three anchors per jamb from 60 to 90 inches in height.
      - 3) Four anchors per jamb from 90 to 120 inches in height.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 120 inches in height.
  - 8. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.

- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
  - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Hardware Preparation: Factory prepare standard steel doors and frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."
1. Reinforce doors and frames to receive nontemplated mortised and surface-mounted door hardware.
  2. Comply with applicable requirements in ANSI A250.6 and ANSI/DHI A115 Series specifications for door and frame preparation for hardware. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.
- E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of door or frame.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings such that each glazed lite is capable of being removed independently.
  3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  4. Provide loose stops and moldings on inside of doors and frames.
  5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

## 2.8 STEEL FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
1. Finish standard steel door and frames after assembly.
- B. Metallic-Coated Steel Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
1. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- C. Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel; comply with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- D. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. Apply a smooth coat

of even consistency to provide a uniform dry film thickness of not less than 0.7 mils.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of standard steel doors and frames.
  1. Examine roughing-in for embedded and built-in anchors to verify actual locations of standard steel frame connections before frame installation.
  2. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory.
- B. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
  1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
  3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated mortised and surface-mounted door hardware.

#### 3.3 INSTALLATION

- A. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install standard steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Standard Steel Frames: Install standard steel frames for doors, sidelights, borrowed lights, and other openings, of size and profile indicated. Comply with SDI 105.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable glazing stops located on secure side of opening.
    - d. Install door silencers in frames before grouting.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Apply bituminous coating to backs of frames that are filled with mortar, grout, and plaster containing antifreezing agents.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar as specified in Division 4 Section "Unit Masonry Assemblies."
  4. Installation Tolerances: Adjust standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Standard Steel Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors according to NFPA 105.

- D. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with standard steel door and frame manufacturer's written instructions.
  - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.

#### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including standard steel doors or frames that are warped, bowed, or otherwise unacceptable.
- B. Clean grout and other bonding material off standard steel doors and frames immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
- D. Galvanized Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08 1113

## SECTION 08 1416 - FLUSH WOOD DOORS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Solid-core doors with wood-veneer faces.
  - 2. Factory-finishing flush wood doors.
- B. Related Sections include the following:
  - 1. Division 8 Section "Glazing" for glass view panels in flush wood doors.

## 1.3 SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings.

## 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
  - 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
  - 1. Test Pressure: All doors are to comply with positive pressure listing "Category A". All required intumescent or seals shall be provided by the wood door supplier.
  - 2. Oversize, Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide oversize fire door label or certificate of inspection, from a testing and inspecting agency acceptable to authorities having jurisdiction, stating that doors comply with requirements of design, materials, and construction.
  - 3. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

## 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 1. Warranty shall be in effect during the following period of time from date of Substantial Completion:
    - a. Solid-Core Interior Doors: Life of Installation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Eggers Industries; Architectural Door Division or comparable product by the following:
  - 1. Algoma Hardwoods Inc.
  - 2. Buell Door Company.
  - 3. Graham.

### 2.2 DOOR CONSTRUCTION, GENERAL

- A. Adhesives: Do not use adhesives containing urea formaldehyde.
- B. Doors for Transparent Finish:
  - 1. Grade: Premium, with Grade AA faces.
  - 2. Species and Cut: White maple, rotary cut.
  - 3. Match between Veneer Leaves: Book match.
  - 4. Assembly of Veneer Leaves on Door Faces: Balance match.
  - 5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
  - 6. Stiles: Same species as faces.
  - 7. Plys: Five.



### 2.3 SOLID-CORE DOORS

#### A. Interior Veneer-Faced Doors:

1. Core: Either glued block or structural composite lumber.
2. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

#### B. Fire-Rated Doors:

1. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as needed to provide fire rating indicated.
2. Blocking: For mineral-core doors, provide composite blocking approved for use in doors of fire ratings indicated.
3. Edge Construction: At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer.
4. Pairs: Furnish formed-steel edges and astragals with intumescent seals for pairs of fire-rated doors, unless otherwise indicated.
  - a. Steel edges and astragals may be omitted if door pairs has been tested for required rating without steel edges.
  - b. Finish steel edges and astragals with baked enamel same color as doors.

### 2.4 LIGHT FRAMES

- #### A. Metal Frames for Light Openings in Fire Doors: Manufacturer's standard frame formed of 0.0478-inch- thick, cold-rolled steel sheet; factory primed and approved for use in doors of fire rating indicated.

### 2.5 FABRICATION

- #### A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.
- #### B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  2. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
  3. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
  4. Light Openings: Trim openings with moldings of material and profile indicated.

## 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
  - 2. Finish doors at factory.
- B. Transparent Finish:
  - 1. Grade: Premium.
  - 2. Finish: AWI TR-6 catalyzed polyurethane system.
  - 3. Staining: Custom color to match existing doors.
  - 4. Sheen: Semigloss.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
  - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."
- B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
  - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

### 3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.

END OF SECTION 081416

## SECTION 08 3473 - SOUND CONTROL DOOR ASSEMBLIES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Sound-control door assemblies consisting of swinging wood doors, sound-control seals, and related accessories to achieve STC ratings indicated.
  - 2. Factory finishing.
- B. Related Sections include the following:
  - 1. Division 8 "Standard Steel Doors and Frames".
  - 2. Division 8 Section "Flush Wood Doors" for non-sound-control wood doors.
  - 3. Division 8 Section "Door Hardware" for hardware to the extent not specified in this Section, including locksets and cylinders.

## 1.3 PERFORMANCE REQUIREMENTS

- A. Sound Rating: Provide sound-control door assemblies that have been fabricated and tested as sound-retardant units, are identical to assemblies tested according to ASTM E 90 by an independent testing agency, and have the following minimum certified STC rating according to ASTM E 413:
  - 1. STC Rating:
    - a. Single Door with lite: 42.
    - b. Pair Doors with lites: 40.

## 1.4 ACTION SUBMITTALS

- A. Product Data: Include sound ratings, construction and hardware preparation details, material and gasketing descriptions, core descriptions, label compliance, fire-resistance rating, dimensions of individual components and profiles, and finishes for sound-control door assemblies.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain sound-control door assemblies, including doors, frames, sound-control seals, hinges (when integral for sound control), thresholds, and other items essential for sound control, through one source from a single manufacturer.

- C. Safety Glass: Category I or II materials complying with testing requirements in 16 CFR 1201.
- D. Fire-Rated, Sound-Control Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated.
  - 1. Test Pressure: Test according to NFPA 252 or UL 10C After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.
- E. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-protection-rated door assemblies except for size.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
  - 1. Provide additional protection to prevent damage to finish of factory-finished wood doors.
- B. Store doors under cover at Project site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high, wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber.
  - 1. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install sound-control wood doors until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sound-control door assemblies that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to meet sound rating requirements.
    - b. Faulty operation of sound seals.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal use or weathering.
    - d. Wood doors that are warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, or show telegraphing of core

construction in face veneers exceeding 0.01 inch in a 3-inch span.

- B. Warranty Period for Wood Doors: Two years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Acoustical door as manufactured by Egger Industries or comparable product by the following:
  1. Ambico Limited.
  2. Kreiger Steel Products Co.

### 2.2 MATERIALS

- A. Glazing: As required by sound-control door assembly manufacturer to comply with sound-control and fire-rated-door labeling requirements.

### 2.3 WOOD DOORS

- A. Provide flush-design wood doors, not less than 1-3/4 inches thick; with manufacturer's standard sound-retardant core as required to provide STC and fire rating indicated. Fabricate wood doors with tolerances according to WDMA 1.S.1-A.
- B. Comply with Division 8 Section "Flush Wood Doors" for grade, faces, veneer matching, fabrication, finishing, and other requirements, unless otherwise indicated.
  1. Stiles: Same species as faces.

### 2.4 STOPS AND MOLDINGS

- A. Stops for Glazed Lites: Minimum 0.032 inch thick, formed of same material as door.

### 2.5 HARDWARE

- A. General: Provide manufacturer's standard sound-control system, including head and jamb seals, door bottoms, cam-lift hinges, and thresholds, as required by testing to achieve STC rating indicated.
- B. Compression Seals: One-piece units; consisting of closed-cell sponge neoprene seal held in place by metal retainer; with retainer cover of same material as door frame; attached to door frame with concealed screws.
- C. Automatic Door Bottoms: Neoprene or silicone gasket, held in place by metal housing, that automatically drops to form seal when door is closed; mounted to bottom edge of door with screws.

1. Mounting: Surface mounted on face of door as required by testing to achieve STC rating indicated.
- D. Thresholds: Flat, smooth, unfluted type as recommended by manufacturer; fabricated from aluminum.
  1. Finish: Clear anodic finish.

## 2.6 FABRICATION

- A. General: Fabricate sound-control door assemblies to be rigid and free of defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
  1. Glazed Lites: Factory cut openings in sound-control doors.
- B. Wood Doors: Factory fit doors to suit frame-opening sizes indicated, with uniform clearances and bevels according to referenced quality standard, unless otherwise indicated. Comply with final door hardware schedules and hardware templates.
  1. Comply with clearance requirements in NFPA 80 for fire-rated doors.
- C. Hardware Preparation:
  1. Wood Doors: Locate door hardware as indicated, or if not indicated, according to DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
  2. Coordinate measurements of hardware mortises in steel frames to verify dimensions and alignment before factory machining.
  3. Glazing: Factory install glazed lites according to requirements of tested assembly to achieve STC rating indicated.
- D. Stops and Moldings: Provide stops and moldings around glazed lite where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
  1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of door.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings such that each glazed lite is capable of being removed independently.
  3. Coordinate rabbet width between fixed and removable stops with type of glass and type of installation indicated.

## 2.7 SHOP PRIMING

- A. Doors for Transparent Finish: Shop prime doors with stain (if required), other required pretreatments, and first coat of finish as specified in Division 09 Section Painting." Seal all four edges, edges of cutouts, and mortises with first coat of finish.

## 2.8 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
  - 2. Finish doors at factory.
- B. Transparent Finish:
  - 1. Grade: Premium.
  - 2. Finish: AWI TR-6 catalyzed polyurethane system.
  - 3. Staining: Custom color to match existing doors.
  - 4. Sheen: Semigloss.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of sound-control door assemblies.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
  - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install sound-control door assemblies plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Doors: Fit sound-control doors accurately in frames, within clearances indicated below. Shim as necessary.
  - 1. Fire-Rated Doors: Install fire-rated doors with clearances according to NFPA 80.
- C. Sound-Control Seals: Where seals have been prefit and preinstalled in the factory and subsequently removed for shipping, reinstall seals and adjust according to manufacturer's written instructions.
- D. Thresholds: Set thresholds in full bed of sealant complying with requirements in Division 7 Section "Joint Sealants."
- E. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and sound-control door assembly manufacturer's written instructions.

- F. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.

### 3.3 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and adjust operating hardware items just before final inspection. Leave work in complete and proper operating condition.
- B. Remove and replace defective work, including defective or damaged sound seals and doors and frames that are warped, bowed, or otherwise unacceptable.
  - 1. Adjust gaskets, gasket retainers, and retainer covers to provide contact required to achieve STC rating.

END OF SECTION 08 3473



## SECTION 08 5113 - ALUMINUM WINDOWS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes fixed aluminum-framed windows for exterior locations.

## 1.3 DEFINITIONS

- A. Performance class designations according to AAMA/WDMA 101/I.S.2/NAFS:
  - 1. AW: Architectural.
- B. Performance grade number according to AAMA/WDMA 101/I.S.2/NAFS:
  - 1. Design pressure number in pounds force per square foot used to determine the structural test pressure and water test pressure.
- C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
- D. Minimum Test Size: Smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

## 1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size indicated below:
  - 1. Test Unit shall be 6'-0" x 4'-0".
- B. AAMA/NWWDA Performance Requirements: Provide aluminum windows of the performance class and grade indicated that comply with AAMA/NWWDA 101/I.S.2.
  - 1. Performance Class: AW.
  - 2. Performance Grade: Minimum for performance class indicated.
  - 3. Performance Grade: 80
- C. Condensation-Resistance Factor: Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 56.

- D. Thermal Transmittance: Provide aluminum windows with a whole-window U-value maximum indicated at 15-mph exterior wind velocity and winter condition temperatures when tested according to AAMA 1503.
- E. Thermal Movements: Provide aluminum windows, including anchorage, that accommodate thermal movements of units resulting from the following maximum change (range) in ambient and surface temperatures without buckling, distortion, opening of joints, failure of joint sealants, damaging loads and stresses on glazing and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.

### 1.5 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, installation details, and the following:
  - 1. Joinery details.
  - 2. Expansion provisions.
  - 3. Flashing and drainage details.
  - 4. Weather-stripping details.
  - 5. Thermal-break details.
  - 6. Glazing details.
  - 7. Window cleaning provisions.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
  - 1. Include similar Samples of hardware and accessories involving color selection.

### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
- C. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.

- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Do not modify size and dimensional requirements.
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Fenestration Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
  - 1. Provide AAMA WDMA-certified aluminum windows with an attached label.
- F. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

## 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to meet performance requirements.
    - b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
    - c. Faulty operation of movable sash and hardware.
    - d. Deterioration of metals, other materials, and metal finishes beyond normal weathering.
    - e. Failure of insulating glass.
  - 2. Warranty Period:
    - a. Window: Five years from date of Substantial Completion.
    - b. Glazing: Five years from date of Substantial Completion.
    - c. Metal Finish: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: 6600 series thermally broken fixed windows as manufactured by EFCO Corporation or comparable product by one of the following:

1. Kawneer; an Alcoa Company.
2. Vistawall Modu-Line.

## 2.2 FIXED WINDOW

- A. Window Type: Fixed.
- B. AAMA/WDMA Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA 101/1.S.2/NAFS.
  1. Performance Class and Grade: AW80.
- C. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 68.
- D. Thermal Transmittance: Provide aluminum windows with a whole-window, U-factor maximum indicated at 15-mph exterior wind velocity and winter condition temperatures when tested according to AAMA 1503.
- E. U-Factor: 0.60 Btu/sq. ft. x h x deg F or less.

## 2.3 GLAZING

- A. Glass and Glazing Materials: Refer to Division 08 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.

## 2.4 HARDWARE

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows, and sized to accommodate sash or ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals. Where exposed, provide nonmagnetic stainless steel.
- B. Counterbalancing Mechanism: Comply with AAMA 902.
  1. Sash Balance: Concealed, spiral-tube type, of size and capacity to hold sash stationary at any open position.
- C. Locks and Latches: Designed to allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.

## 2.5 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.

- C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
  - 1. Provide thermal-break construction that has been in use for not less than three years and has been tested to demonstrate resistance to thermal conductance and condensation and to show adequate strength and security of glass retention.
  - 2. Provide thermal barriers tested according to AAMA 505; determine the allowable design shear flow per the appendix in AAMA 505.
  - 3. Provide hardware with low conductivity or nonmetallic material for hardware bridging thermal breaks at frame or vent sash.
- D. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.
- E. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- F. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- G. Subframes: Provide subframes and subsills with anchors for window units of profile and dimensions indicated but not less than 0.062 inch thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
- H. Factory-Glazed Fabrication: Glaze aluminum windows in the factory. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA 101/I.S.2/NAFS.
- I. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

## 2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within

the range of approved Samples and are assembled or installed to minimize contrast.

## 2.7 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. High-Performance Organic Finish (2-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions.
- C. Color and Gloss: Custom finish to match existing windows.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set subsill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and ventilators, screens, hardware, operators, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

END OF SECTION 08 5113





## SECTION 08 7100 - DOOR HARDWARE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Commercial door hardware for the following:
    - a. Swinging doors.
- B. Related Sections include the following:
  - 1. Division 8, Section "Standard Steel Doors and Frames".
  - 2. Division 8, Section "Flush Wood Doors".

## 1.3 REFERENCES

- A. Standards of the following as referenced:
  - 1. American National Standards Institute (ANSI)
  - 2. Door and Hardware Institute (DHI)
  - 3. Factory Mutual (FM)
  - 4. National Fire Protection Association (NFPA)
  - 5. Underwriters' Laboratories, Inc. (UL)
  - 6. Warnock Hersey
- B. Regulatory standards of the following as referenced:
  - 1. Department of Justice, Office of the Attorney General, Americans with Disabilities Act, Public Law 101-336 (ADA).
  - 2. CABO/ANSI A117.1: Providing Accessibility and Usability for Physically Handicap People, 1992 edition.

## 1.4 SYSTEM DESCRIPTION

- A. Refer to applicable Headings for system description for electric hardware products.

## 1.5 ACTION SUBMITTALS

- A. General:
  - 1. The Contractor shall submit Finish Hardware Schedule prepared by a competent Architectural Hardware Consultant (AHC) for the entire project in one submittal complete with all catalog cuts.
  - 2. Architect's review of the schedule will not relieve the hardware

supplier of the responsibility to furnish hardware in all quantities required and in conformance with the all applicable codes and the Contract Documents.

- B. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Use specification Heading numbers with any variations suffixed a, b, etc. Include the following information:
    - a. Type, style, function, size, and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
    - d. Explanation of all abbreviations, symbols, and codes contained in schedule.
    - e. Mounting locations for hardware.
    - f. Door and frame sizes and materials.
  - 2. Submittal Sequence:
    - a. Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
  - 3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

#### 1.6 CLOSEOUT SUBMITTALS

- A. The contractor shall contact the hardware manufacturers' representative to schedule an inspection of the hardware installation to confirm that all products are installed and adjusted according to manufacturers' recommendations.
  - 1. Notify Owner 7 days prior to inspection.
  - 2. AHC shall review the finished application and certify that all hardware required by the Contract Documents has been installed and is functioning properly.
  - 3. FIVE PERCENT of total cost of hardware material and installation shall be withheld until receipt of AHC's certification. This money is IN ADDITION to general retainage on Contract Sum.

#### 1.7 INFORMATIONAL SUBMITTALS

- A. Certifications: Submittal received without AHC certification shall be return without review.

- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware.

#### 1.8 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, exit devices, closers, etc.) from a single manufacturer.
  - 1. Refer to the characteristics section for each product. Manufacturers will be considered provided they meet all the performance criteria listed therein.
- B. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction whether scheduled or not. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.
- C. The finish hardware supplier shall employ an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the work, for consultation.
  - 1. It is the responsibility of the AHC to detail the entire project thoroughly to assure a complete installation.
    - a. Provide any special mounting plate, drop shoe, adapter or other item necessary for the coordination of the hardware installation.
    - b. Minimum Hardware: The following minimum hardware shall be provided for any openings indicated on the Drawings which may not be scheduled in this section:
      - 1) Hinges.
      - 2) Lockset with cylinder and core.
      - 3) Stop.
      - 4) Closer if at rated opening.
      - 5) Flushbolts at door pairs.
      - 6) Weatherstripping and thresholds at exterior doors.

#### 1.9 QUALITY CRITERIA

- A. Supplier Qualifications:
  - 1. The finish hardware supplier shall be a factory authorized distributor with office and warehouse facilities within a 50 mile radius of Fulton County, Georgia.

2. The finish hardware supplier shall have a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.
- B. The contractor shall contact the hardware manufacturers' representative to schedule an inspection of the hardware installation to confirm that all products are installed and adjusted according to manufacturers recommendations. A certificate of compliance shall be submitted with the project closeout documents.
1. Notify Owner 7 days prior to inspection.
  2. AHC shall review the finished application and certify that all hardware required by the Contract Documents has been installed and is functioning properly.

#### 1.10 PRODUCT HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

#### 1.11 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fails in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking or breakage.
    - b. Faulty operation of operators and door hardware.
    - c. Deterioration of metal, metal finishes, and other materials beyond normal weathering and use.
  2. Warranty Period: Three years from the date of Substantial Completion, except as follows:

- a. Door Closers: Ten years from the date of Substantial Completion.
- b. Exit Devices: Three years from the date of Substantial Completion.

## 1.12 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

### 2.2 HINGES, GENERAL

- A. Quantity: Provide the following, unless otherwise indicated:
  1. Two Hinges: For doors with heights up to 60 inches.
  2. Three Hinges: For doors with heights 61 to 90 inches.
  3. Four Hinges: For doors with heights 91 to 120 inches.
  4. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
- B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- C. Hinge Weight: Unless otherwise indicated, provide the following:
  1. Entrance Doors: Continuous hinges.
  2. Doors with Closers: Antifriction-bearing hinges.
  3. Interior Doors: Standard-weight antifriction-bearing hinges.
- D. Hinge Base Metal: Unless otherwise indicated, provide the following:
  1. Exterior Hinges: Stainless steel, with stainless-steel pin.
  2. Interior Hinges: Steel, with steel pin.
  3. Hinges for Fire-Rated Assemblies: Steel, with steel pin.
- E. Hinge Options: Where indicated in door hardware sets or on Drawings:
  1. Flat button and matching plug. Finished to match leaves.
  2. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging corridor doors with locks.
  3. Corners: Square.
- F. Fasteners: Comply with the following:

1. For metal doors and frames install machine screws into drilled and tapped holes.
2. For wood doors install threaded-to-the-head wood screws.
3. For fire-rated wood doors install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.
4. Finish screw heads to match surface of hinges or pivots.

### 2.3 HINGES

- A. Basis-of-Design Manufacturer: Ives or comparable product by the following:
  1. Bommer Industries, Inc.
  2. Hager Company
  3. Stanley Works
- B. General: Provide only five-knuckle, ball-bearing, template-produced units.
- C. Size: Where hinges are specified, unless otherwise noted, they shall be of types and sizes as follows:
  1. Interior Doors:
    - a. 1-3/4" thick - up to 3'-0" wide, 4-1/2 inches high.
    - b. 1-3/4" thick - over 3'-0" wide, 5 inches high.
  2. The width of hinges shall be sufficient to clear trim.

### 2.4 CONTINUOUS HINGES

- A. Basis-of-Design Manufacturer: Ives or comparable product by the following:
  1. Makar Products
  2. Select Products.
- B. Continuous hinges shall be pinless type consisting of three interlocking cam action aluminum extrusions.

### 2.5 LOCKS AND LATCHES

- A. Basis-of-Design Product: L9000 series mortise sets as manufactured by Schlage or compatible products by the following:
  1. Best Access Systems.
  2. Sargent.
- B. Characteristics:
  1. All locksets and latchsets shall have barrier free lever handles. Lever shall match existing school.
  2. Locksets and latchsets shall have a US26D finish for interior use and a US32D finish for exterior use.
- C. Mortise Locksets and Latchsets: as scheduled.
  1. Chassis: cold-rolled steel, handing field-changeable without disassembly.

2. Latchbolts: 3/4-inch throw stainless steel two-piece mechanical anti-friction type. Nylon inserts are not acceptable.
3. Lever Trim: through-bolted, accessible design, cast or solid rod lever as scheduled. Spindles: independent break-away.
4. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
5. Deadbolts: stainless steel 1-inch throw.
6. Strikes: 16 gage curved stainless steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
7. Certifications:
  - a. ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
  - b. ANSI/ASTM F476-84 Grade 30 UL Listed.

## 2.6 EXIT DEVICES

### A. Exit Devices:

1. Basis-of Design Product: Von Duprin CD99 Series.
  - a. No substitution allowed.
2. Characteristics:
  - a. All exit devices shall have US32D touchpads. All finished parts that are not US32D shall be US26D, US28, or powder coated to the standard architectural finishes. No painted finish shall be allowed.
  - b. All exit devices shall be flush mounted. Provide manufacturer's standard shim kit to accommodate moulding for glass and vision lites. Exit devices that are not flush mounted must provide a filler bar on those doors where conflict with moulding for glass vision lites is not an issue.
  - c. Lever handle operating trim for exit devices shall be of heavy duty construction, incorporating cast or heavy solid forged escutcheons and levers. Where listed in the hardware sets, provide "breakaway" lever incorporating an internal clutch mechanism allowing the lever to break away and drop into a "down" position when more than 35 pounds of torque are applied. Lever shall be easily reset to its operating position by a simple uplift motion. Lever shall match locksets.
  - d. Exit devices shall be "UL" listed for life safety. All exit devices for fire rated openings shall have "UL" labels for "Fire Exit Hardware."
  - e. All exit devices shall be made of brass, bronze, stainless steel, or aluminum material, plated or powder coated to the standard architectural finishes to match the balance of the door hardware.
  - f. Dogging mechanism shall be "hook and eye" type. No plastic dogging cams or friction type dogging mechanism shall be allowed.
  - g. Equip rim exit devices with a roller strike.
  - h. All exit devices shall be non-handed.

- i. Touchpad shall extend a minimum of 1/2 of the door width. Touchpad height shall exceed height of mechanism case or rail assembly to eliminate pinch points. If touchpad height does not exceed height of mechanism case/rail assembly provide factory installed insert/filler on top and bottom of touchpad along mechanism case/rail assembly to prevent pinch point. Plastic touchpads are not acceptable.
  - j. All latchbolts to be the deadlocking type. Latchbolts shall have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable.
  - k. Equip exit devices with a fluid dampening device to reduce noise associated with the operation of the exit device.
  - l. Exit devices shall include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap shall be of heavy-duty metal alloy construction and provide horizontal adjustment to provide alignment with device cover plate. When exit device end cap is installed, no raised edges will protrude.
3. Fastening:
- a. Exit devices shall be attached with sex nuts and bolts on all doors. Finish on all exposed fasteners shall match devices.
  - b. All exit devices mounted on labeled wood doors shall be mounted on the door per the door manufacturers requirements.
  - c. All trim shall be thru-bolted to the lock stile case.
  - d. Provide glass bead conversion kits to shim exit devices on doors with raised glass heads.

B. Removable Mullions:

1. Manufacturers:
  - a. Same as exit device manufacturer.
2. Removable mullions shall be KR9954 at rated doors, KR4954 at other locations. Provide cylinder and core.
3. Length shall match frame opening.
4. Provide 154 stabilizers at all removable and intermediate hollow metal mullions.
5. Mullions shall have SP28 sprayed aluminum.

2.7 KEYING AND KEY CONTROL

A. Manufacturers: Match Owner's existing Best keying.

B. Characteristics:

1. The Contractor shall provide temporary construction cylinders in all locksets, removable mullions and exit devices.
2. Provide all locksets, removable mullions, exit devices and cylinders with housings and Best interchangeable cores. Master key all locksets



- and cylinders into existing Best factory registered Grand Master Key System.
3. Installation of the permanent cores and keys shall be coordinated with the owner. All work shall be provided by Best Lock Company or a subcontractor trained and approved by Best Lock Company.
  4. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
  5. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
    - a. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
  6. Key Material: Provide keys of nickel silver only.
  7. Key Quantity: Furnish 3 change keys for each lock, 2 control keys. Provide 10 construction master keys and 2 each control keys.
  8. Deliver keys to Owner. Contact Maintenance Coordinator, Mike Peek at (770) 969-3434.
  9. Prior to final inspection, the Contractor shall schedule directly with Best Locking Systems of Georgia, Inc. to install permanent cores and to set up key cabinet. This price shall be included in the Contract.

## 2.8 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.5, Grade 1] 2]; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.
  1. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
  2. Basis-of-Design Product: Aristocrat Series as manufactured by Telkee, Inc or comparable product by the following:
    - a. P. O. Moore
    - b. Alladin
  3. Contractor to include all keys, including keys furnished under other sections of these specifications in key cabinet. All keys must include tag indicating room number and location of associated lock. Other keys shall include, but are not limited to, the following:
    - a. Cabinetry.
    - b. Energy Management panels.
    - c. Electrical panels.
    - d. Fire alarm panels.
    - e. Intercom panels.
    - f. Equipment keys.
- B. Cross-Index System: Multiple-index system for recording key information. Include three receipt forms for each key-holding hook. Set up by key control manufacturer.

- C. Key Lock Boxes: Designed for storage of two keys.
  - 1. Manufacturer: Knox Company (To be coordinated with local fire officials).

## 2.9 CLOSERS AND DOOR CONTROL DEVICES

- A. Basis-of-Design Product: 4011/4111 X MC (Metal Covers) as manufactured by LCN.
  - 1. No substitution allowed.
- B. Characteristics:
  - 1. Door closers shall be overhead type and have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
  - 2. All closers shall be attached using sex nuts and bolts only.
  - 3. All closers shall have metal covers.
  - 4. All fire rated doors shall have closers.
  - 5. Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
  - 6. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check. Closers shall be sized in accordance with manufacturer's recommendation.
  - 7. Closers incorporating pressure relief valves are not acceptable.
  - 8. All closers shall have solid forged steel main arms (and forearms for parallel arm closers) and where specified shall have a cast-in solid stop on the closer shoe ("CUSH").
  - 9. All closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) shall be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).
  - 10. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
  - 11. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.
  - 12. Provide powder coated finish, certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification. Lacquer or painted finish on metal components is not acceptable.

## 2.10 PROTECTIVE TRIM UNITS

- A. Fasteners: Manufacturer's standard machine or self-tapping screws.

- B. Metal Protective Trim Units: BHMA A156.6; beveled all sides; fabricated from the following material:
  - 1. Material: 0.050 inch thick stainless steel.
  - 2. Basis-of-Design Manufacturer: IVES Hardware; an Ingersoll-Rand Company or comparable product by the following:
    - a. Baldwin Hardware Corporation.
    - b. Rockwood Manufacturing Company.
    - c. Trimco.

## 2.11 STOPS AND HOLDERS

- A. Overhead Door Stops:
  - 1. Basis-of-Design: Glynn Johnson.
    - a. Subject to compliance with requirements, products by one of the following are acceptable:
      - 1) Rixson Firemark.
  - 2. Characteristics:
    - a. Provide heavy duty door stops of stainless steel.
    - b. Holder to be installed with the jamb bracket mounted on the stop.
- B. Wall Bumpers:
  - 1. Basis-of-Design: Ives or comparable model by the following:
    - a. Rockwood
    - b. Trimco
  - 2. Characteristics: Refer to Headings.
- C. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch; fabricated for drilled-in application to frame.
  - 1. Basis-of-Design Manufacturer: Ives or comparable product by the following:
    - a. Hager
    - b. Rockwood Manufacturing
  - 2. Provide three for each single doors; two for pairs of doors.

## 2.12 DOOR GASKETING

- A. Weatherstripping:
  - 1. Basis-of-Design Manufacturer: National Guard Products, Inc. or comparable product by the following:
    - a. Reese Enterprises.
    - b. Zero Weatherstripping Co., Inc.
  - 2. Types: Silicone rubber seals as indicated in hardware headings.
- B. Types: Indicated in hardware headings, and shown in sill details.

### 2.13 THRESHOLDS

- A. Standard: BHMA A156.21.
- B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
  - 1. Bevel raised thresholds with a slope of not more than 1:2.
- C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch high.
  - 1. Basis-of-Design Manufacturer: National Guard Products, Inc. or comparable product by the following:
    - a. Reese Enterprises.
    - b. Zero Weatherstripping Co., Inc.

### 2.14 FABRICATION

- A. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- B. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
  - 1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
  - 2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
  - 3. All surface mounted hardware shall be attached with thru-bolts.

### 2.15 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).
- B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's

standards, but in no case less than specified by referenced standards for the applicable units of hardware.

- D. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
1. Hinges (Exterior): 630 (US32D) Satin Stainless Steel
  2. Hinges (Interior wood doors): 652 (US26D) Satin Chrome Plated Steel
  3. Continuous Hinges: (US28) Aluminum
  4. Locks: 630 Satin Stainless Steel
  5. Exit Devices: 626 (US26D), 630 (US32D), 628 (US28)
  6. Door Closers: 689 (Powder Coated)
  7. Protective Plates: 630 (US32D) Satin Stainless Steel
  8. Door Stops: 630 (US32D) Satin Stainless Steel or 626 Satin Chrome Plated Brass/Bronze
  9. Overhead Holders: 630 (US32D) Satin Stainless Steel
  10. Thresholds: 627 (US27) Mill Finish Aluminum
  11. Weatherstrip: Brown

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect:
1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers."

- F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

### 3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
  - 1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Door Hardware Supplier's AHC Field Service
  - 1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
  - 2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
  - 3. File written report of this inspection to Architect.
    - a.

### 3.3 HARDWARE SCHEDULE

HW SET: 1

DOOR NUMBER:

AA60A

EACH TO HAVE:

2	CONTINUOUS HINGES	224HD	IVE
1	MULLION	KR9954	VON
1	FIRE EXIT DEVICE	99L-F	VON
1	FIRE EXIT DEVICE	99EO-F	VON
2	RIM CYLINDERS	1E72	BES
1	MORTISE CYLINDER	1E74 (FOR KR)	BES
2	SURFACE CLOSERS	4111 EDA X MC	LCN
2	MAGNETIC HOLD-OPENS	SEM 7850	LCN

MAGNETIC HOLD-OPENS TO BE WIRED TO FIRE ALARM SYSTEM BY ELECTRICAL SECTION

## HW SET: 2

DOOR NUMBER:

AA60B AA60C

EACH TO HAVE:

2	CONTINUOUS HINGES	224HD	IVE
1	MULLION	KR4954	VON
1	EXIT DEVICE	CD99DT	VON
1	EXIT DEVICE	CD99NL	VON
1	RIM CYLINDER	1E72	BES
3	MORTISE CYLINDERS	1E74 (FOR CD & KR)	BES
2	SURFACE CLOSERS	4111 SCUSH X MC	LCN
1	THRESHOLD	425	NGP
1	SET SEALS	5020B	NGP
2	DOOR SWEEPS	C627A	NGP
1	MULLION SEAL	5100	NGP

## HW SET: 3

DOOR NUMBER:

AA62

EACH TO HAVE:

3	HINGES	5BB1	IVE
1	STOREROOM LOCK	L9080T	SCH
1	SURFACE CLOSER	4011 X MC	LCN
1	WALL STOP	WS406CCV	IVE

## HW SET: 4

DOOR NUMBER:

AA64

EACH TO HAVE:

2	CONTINUOUS HINGES	224HD	IVE
1	MULLION	KR4954	VON
1	EXIT DEVICE	99L	VON
1	EXIT DEVICE	99EO	VON
2	RIM CYLINDERS	1E72	BES
1	MORTISE CYLINDER	1E74 (FOR KR)	BES
2	SURFACE CLOSERS	4111 SCUSH X MC	LCN

## HW SET: 5

DOOR NUMBER:

AA65 AA67 AA69

EACH TO HAVE:

3	HINGES	5BB1	IVE
1	PASSAGE LATCH	L9010T	SCH
1	SET SOUND SEALS	By Door Manufacturer	
1	ASTRAGAL SEAL	By Door Manufacturer	
2	DOOR BOTTOM	By Door Manufacturer	
1	THRESHOLD	By Door Manufacturer	

HW SET: 6

DOOR NUMBER:

AA66 AA68

EACH TO HAVE:

3	HINGES	5BB1 5	IVE
1	OFFICE LOCKSET	L9050	SCH
1	WALL STOP	WS406CCV	IVE

HW SET: 7

DOOR NUMBER:

AA70A

EACH TO HAVE:

2	CONTINUOUS HINGES	224HD	IVE
1	MULLION	KR4954	VON
1	EXIT DEVICE	99L	VON
1	EXIT DEVICE	99EO	VON
2	RIM CYLINDERS	1E72	BES
1	MORTISE CYLINDER	1E74 (FOR KR)	BES
2	SURFACE CLOSERS	4111 X MC	LCN
1	SET SOUND SEALS	By Door Manufacturer	
1	ASTRAGAL SEAL	By Door Manufacturer	
2	DOOR BOTTOM	By Door Manufacturer	
1	THRESHOLD	By Door Manufacturer	
2	WALL STOPS	WS406CCV	IVE

HW SET: 8

DOOR NUMBER:

AA70B

EACH TO HAVE:

2	CONTINUOUS HINGES	224HD	IVE
1	MULLION	KR4954	VON
2	EXIT DEVICES	CD99EO	VON
1	RIM CYLINDER	1E72	BES
3	MORTISE CYLINDERS	1E74 (FOR CD & KR)	BES
2	SURFACE CLOSERS	4111 SCUSH X MC	LCN
1	THRESHOLD	425	NGP
1	SET SEALS	5020B	NGP
2	DOOR SWEEPS	C627A	NGP
1	MULLION SEAL	5100	NGP

HW SET: 9

DOOR NUMBER:

AA72A AA72B

EACH TO HAVE:

3	HINGES	5BB1	IVE
1	CLASSROOM LOCKSET	L9070T	SCH
1	RIM CYLINDER	1E72	BES
1	SURFACE CLOSER	4111 X MC	LCN
1	WALL STOP	WS406CCV	IVE



## HW SET: 10

DOOR NUMBER:

AA71

EACH TO HAVE:

3	HINGES	5BB1	IVE
1	CLASSROOM LOCK	L9070T	SCH
1	SURFACE CLOSER	4011 X MC	LCN
1	OVERHEAD STOP	90xS	GLY

## HW SET: 11

DOOR NUMBER:

AA73 AA75

EACH TO HAVE:

3	HINGES	5BB1	IVE
1	STOREROOM LOCKSET	L9080T	SCH
1	RIM CYLINDER	1E72	BES
1	SURFACE CLOSER	4111 X MC	LCN
1	WALL STOP	WS306CCV	IVE

## HW SET: 12

DOOR NUMBER:

AA74

EACH TO HAVE:

3	HINGES	5BB1	IVE
1	CLASSROOM LOCK	L9070T	SCH
1	SURFACE CLOSER	4111 CUSH X MC	LCN

## HW SET 13

1 KEY CABINET

TCA-334S

TEL

1 KEY LOCK BOX

3200-RMK

KNX

END OF SECTION 08 7100



## SECTION 08 8000 - GLAZING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
  - 1. Windows.
  - 2. Doors.
  - 3. Interior borrowed lites.

## 1.3 DEFINITIONS

- A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.
- D. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

## 1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thickness by analyzing Project loads and in service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
  - a. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2- Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
  - b. Basic Wind Speed: Comply with local code.
  - c. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
  - d. Load Duration: 60 seconds or less.
  - e. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
    - 1). For monolithic-glass lites heat treated to resist wind loads.
    - 2). For insulating glass.
  - f. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
  - g. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
  1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
  2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
    - a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F.
    - b. Solar Heat Gain Coefficient: NFRC 200.
    - c. Solar Optical Properties: NFRC 300.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.

- B. Samples: For the following products, in the form of 12-inch- square samples for glass.
  - 1. Each color of tinted float glass.
  - 2. Insulating glass for each designation indicated.
- C. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.
- C. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.
  - 1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- D. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.
- E. Glazing for Fire-Rated Window Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.
- F. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
  - 1. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I

or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

- G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: GANA's "Glazing Manual."
  2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

#### 1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F.

#### 1.10 WARRANTY

- A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
1. Warranty Period: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Product: Subject to compliance with requirements, provide product specified.
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

## 2.2 GLASS PRODUCTS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
  - 1. For uncoated glass, comply with requirements for Condition A.
  - 2. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
  - 3. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is required by glazing code.
- C. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating Glass Units" Article.
  - 1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
  - 2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated.
  - 3. Overall Unit thickness and thickness of each lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glasslites at unit's edge.
  - 4. Sealing System: Dual seal, with primary and secondary sealants as follows:
    - a. Manufacturer's standard sealants.
  - 5. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
    - a. Spacer Material: Aluminum with clear mill or clear anodic finish.
    - b. Desiccant: Molecular sieve or silica gel, or blend of both.
    - c. Corner Construction: Manufacturer's standard corner construction.

## 2.3 FIRE RATED GLAZING PRODUCTS

- A. Monolithic Ceramic Glazing Material: Proprietary product in the form of clear flat sheets and as follows:
  - 1. Fire-Protection Rating: As indicated for the fire window in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 2. Material: FIRELITE Plus as manufactured by Hippon Electric Glass Company and as distributed by Technical Glass Products.
    - a. Pilkington Fire Protection Glass.
    - b. SaftiFirst division of O'Keefe's.
  - 3. Properties:

- a. Thickness: 5/16 inch overall.
- b. Weight: 4 lbs./sq. ft.
- c. Approximate Visible Transmission: 85 percent.
- d. Approximate Visible Reflection: 9 percent.
- e. Fire-rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications.
- f. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
- g. Surface Finish: Premium (polished).
- h. Postitive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes.

#### 2.4 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
  1. Neoprene, ASTM C 864.
  2. EPDM, ASTM C 864.
  3. Silicone, ASTM C 1115.
  4. Thermoplastic polyolefin rubber, ASTM C 1115.
  5. Any material indicated above.

#### 2.5 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

#### 2.6 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.



## 2.7 MONOLITHIC FLOAT-GLASS UNITS

- A. Uncoated Clear Float-Glass Units: Class 1 (clear); kind FT. (fully tempered) float glass.
  - 1. Thickness: 6.0 mm.
- B. Subject to compliance with requirements, products by the following are acceptable:
  - 1. AFG Industries, Inc.
  - 2. Pilkington Building Products North America.
  - 3. PPG Industries, Inc.

## 2.8 MONOLITHIC FLOAT-GLASS UNITS

- A. Uncoated Clear Float-Glass Units: Class 1 (clear), Kind FT (fully tempered) float glass.
  - 1. Thickness: 6.0 mm.
- B. Coated Tinted Float-Glass Units: Class 2 (tinted) Kind FT (fully tempered) float glass.
  - 1. Basis-of-Design Product: Eclipse Advantage Grey as manufactured by Pilkington Building Products North America or comparable product by the following:
    - a. AFG Industries, Inc.
    - b. PPG Industries, Inc.
  - 2. Thickness: 6.0 mm.
  - 3. Tint Color: To match existing.
  - 4. Reflective Coating: Pyrolytic.
    - a. Color: Silver.
    - b. Location: Second surface.
  - 5. Visible Light Transmittance: 32 percent minimum.
  - 6. Solar Heat Gain Coefficient: 0.41 maximum.
  - 7. Outdoor Visible Reflectance: 9 percent maximum.

## 2.9 INSULATING-GLASS UNITS

- A. Low-E Insulating-Glass Units:
  - 1. Basis-of-Design Product: Eclipse Advantage as manufactured by Pilkington Sales (North America) Ltd. or comparable product by the following:
    - a. AFG Industries, Inc.
    - b. PPG Industries, Inc.
  - 2. Overall unit thickness and thickness of each lite:
    - a. Windows: 13 and 3.0 mm.
    - b. Other locations: 25 and 6.0 mm.
  - 3. Interspace Content: Air.
  - 4. Outer Lite: 6 mm tinted glass.
    - a. Tint Color: To match existing.
    - b. Kind FT (fully tempered).
  - 5. Indoor Lite: 6 mm clear glass.

6. Visible Light Transmittance: 29 percent minimum.
7. Winter Nighttime U-Factor: 0.34 maximum.
8. Summer Daytime U-Factor: 0.35 maximum.
9. Solar Heat Gain Coefficient: 33 percent maximum.
10. Shading Coefficient: 0.39.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
  1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  2. Presence and functioning of weep system.
  3. Minimum required face or edge clearances.
  4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

#### 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

- F. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

### 3.4 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- C. Install gaskets so they protrude past face of glazing stops.

### 3.5 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection,

contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.6 SCHEDULE

A. Interior:

- 1. Hollow Metal Frames:
  - a. Rated: .....5/16" clear fire rated glass
  - b. Non-Rated .....1/4" clear tempered glass
- 2. Doors:
  - a. Rated: .....5/16" clear fire rated glass
  - b. Non-Rated:
    - 1). Non-STC rated:.....1/4" clear tempered glass
    - 2). STC rated: .....By Door Manufacturer

B. Exterior:

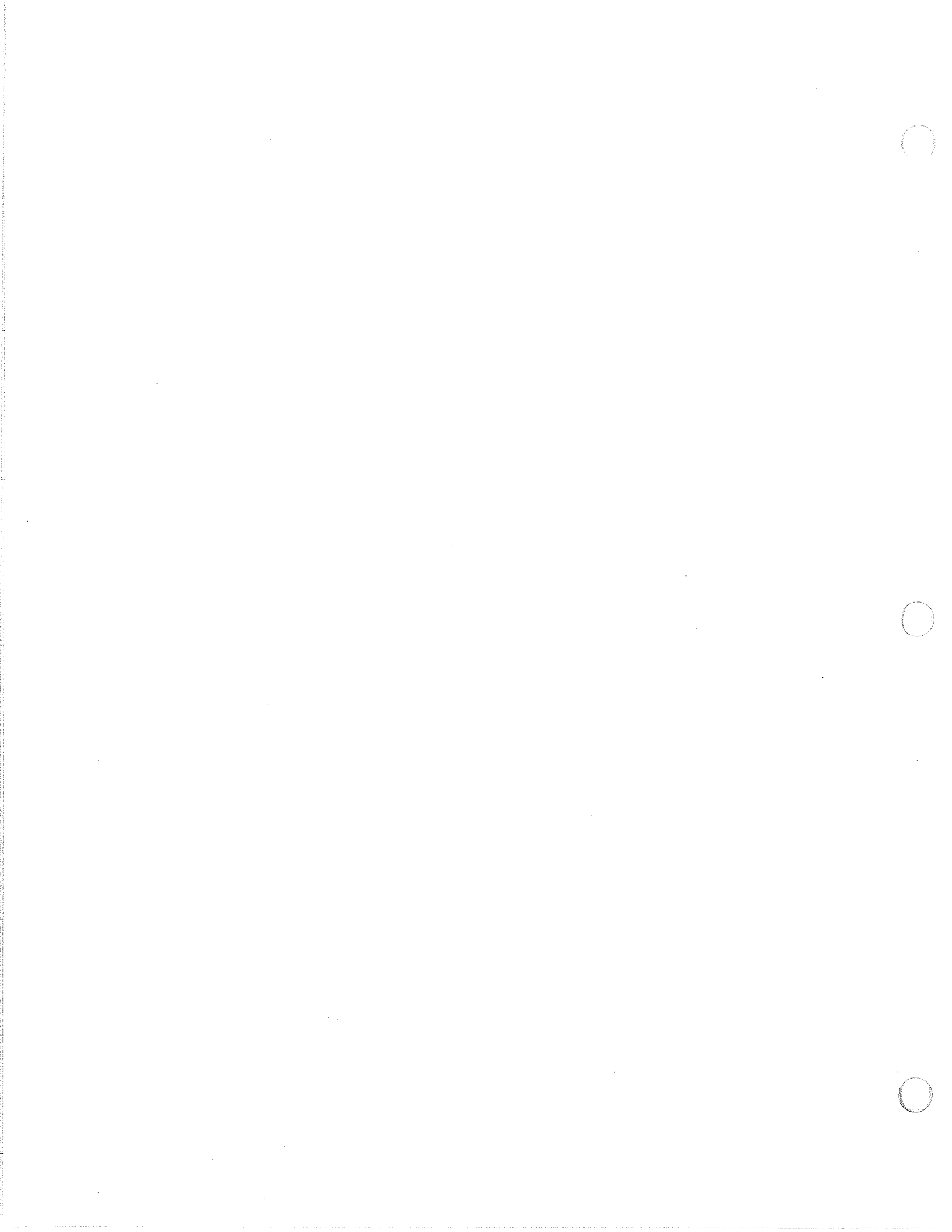
- 1. Windows (Factory Glazed) .....1" tinted insulated glass
- 2. Doors .....1/4" tinted tempered glass
- 3. Other Locations.....1" tinted insulated glass

END OF SECTION 08 8000

**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 9

FINISHES



## SECTION 09 2900 - GYPSUM BOARD

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Interior gypsum wallboard.
  - 2. Non-load-bearing steel framing.
- B. Related Sections include the following:
  - 1. Division 5 Section "Cold-Formed Metal Framing" for exterior metal framing.
  - 2. Division 6 Section "Rough Carpentry" for wood framing and furring.
  - 3. Division 6 Section "Sheathing" for exterior gypsum sheathing.

## 1.3 DEFINITIONS

- A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

## 1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

## 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Steel Framing and Furring:
    - a. Dale Industries, Inc. - Dale/Incor.
    - b. Dietrich Industries, Inc.
    - c. National Gypsum Company.
    - d. Unimast, Inc.
  - 2. Gypsum Board and Related Products:
    - a. BPB America Inc.
    - b. G-P Gypsum Corp.
    - c. National Gypsum Company.
    - d. United States Gypsum Co.

### 2.2 STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Components, General: Comply with ASTM C 754 for conditions indicated.
- B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch diameter wire, or double strand of 0.0475-inch diameter wire.
- C. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Armstrong World Industries, Inc.; Furring Systems/Drywall.
    - b. Chicago Metallic Corporation; Drywall Furring 640 System.
    - c. USG Interiors, Inc.; Drywall Suspension System.

### 2.3 STEEL PARTITION AND SOFFIT FRAMING

- A. Components, General: As follows:
  - 1. Comply with ASTM C 754 for conditions indicated.
  - 2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with manufacturer's standard corrosion-resistant zinc coating.
- B. Steel Studs and Runners: ASTM C 645.
  - 1. Minimum Base Metal Thickness: 0.0179 inch at interior, unless noted otherwise.
  - 2. Depth: As indicated.
  - 3. Deflection Tracks: Slotted track with minimum 2 inch high leg or double track installation with minimum 2 inch high leg runners.



- C. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power and other properties required to fasten steel members to substrates.

#### 2.4 INTERIOR GYPSUM WALLBOARD

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Gypsum Wallboard: ASTM C 36.
  - 1. Regular Type: With moisture- and mold- resistant core and surfaces.
    - a. Thickness: 5/8 inch.
    - b. Long Edges: Tapered.
    - c. Locations: As indicated.
  - 2. Type X:
    - a. Thickness: 5/8 inch.
    - b. Long Edges: Tapered.
    - c. Location: As indicated.

#### 2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
  - 1. Material: Galvanized steel sheet.
  - 2. Shapes:
    - a. Cornerbead: Use at outside corners.
    - b. LC-Bead: J-shaped; exposed long leg receives joint compound.
    - c. Expansion (Control) Joint.

#### 2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape:
  - 1. Interior Gypsum Wallboard: Paper.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
  - 3. Use setting-type compound for installing paper-faced metal trim accessories.
  - 4. Fill Coat: For second coat, use drying-type, all-purpose compound.
  - 5. Finish Coat: For third coat, use setting-type, sandable topping compound.
  - 6. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

## 2.7 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

## 2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Suspended Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

### 3.3 INSTALLING STEEL FRAMING, GENERAL

- A. Installation Standards: ASTM C 754, and ASTM C 840 requirements that apply to framing installation.
- B. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.
  - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.

- C. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

### 3.4 INSTALLING STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Suspend ceiling hangers from building structure as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
  - 3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
  - 4. Do not attach hangers to steel deck tabs.
  - 5. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  - 6. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet measured lengthwise on each member and transversely between parallel members.
- C. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.
  - 1. Hangers: 48 inches o.c.
  - 2. Carrying Channels (Main Runners): 48 inches o.c.
  - 3. Furring Channels (Furring Members): 16 inches o.c.
- D. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

### 3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

- A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.
  - 1. Where studs are installed directly against exterior walls, install foam-gasket isolation strip between studs and wall.
  - 2. Provide deflection track system at top of all framed partitions extending to structural framing.

- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
  - 1. Cut studs 1 inch short of full height to provide perimeter relief. Do not fasten studs to top track to allow independent movement of studs and track.
  - 2. For fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
- D. Install steel studs and furring at the following spacings:
  - 1. Single-Layer Construction: 16 inches o.c., unless otherwise indicated.
  - 2. Multilayer Construction: 16 inches o.c., unless otherwise indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.

### 3.6 APPLYING AND FINISHING PANELS, GENERAL

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Form control and expansion joints with space between edges of adjoining gypsum panels.
- I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch wide joints to install sealant.
- J. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- K. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

### 3.7 PANEL APPLICATION METHODS

- A. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - 3. Stagger abutting end joints not less than one framing member in alternate courses of board.
- B. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

### 3.8 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

### 3.9 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
  - 1. Level 2-Unexposed Location: All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
  - 2. Level 4-Exposed Locations, Unless noted otherwise: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges.

### 3.10 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
  - 1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
    - a. Installation of 80 percent of lighting fixtures, powered for operation.
    - b. Installation, insulation, and leak and pressure testing of water piping systems.
    - c. Installation of air-duct systems.
    - d. Installation of air devices.
    - e. Installation of ceiling support framing.
    - f. Removal of all temporary wiring, trash and debris.

END OF SECTION 09 2900

## SECTION 09 3000 - TILING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Ceramic mosaic tile.
  - 2. Glazed wall tile.
  - 3. Synthetic Stone thresholds installed as part of tile installations.
- B. Related Sections include the following:
  - 1. Division 3 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.

## 1.3 DEFINITIONS

- A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- B. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).
- C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

## 1.4 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  - 1. Level Surfaces: Minimum 0.6.
  - 2. Ramp Surfaces: Minimum 0.8.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

## 1.6 CLOSOUT SUBMITTALS

- A. Maintenance Data:
  - 1. Submit maintenance data for all products specified herein.

2. Include cleaning methods, cleaning solutions recommended, stain removal methods, and polish and waxes recommended.

#### 1.7 MATERIALS MAINTENACE SUBMITTALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated

#### 1.8 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type from one source or producer.
  1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
  1. Synthetic stone thresholds.
  2. Waterproofing.
  3. Joint sealants.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.

#### 1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.



### 1.11 WARRANTY

- A. Special Product Warranty: Submit a written warranty, executed by the contractor, installer and manufacturer, agreeing to repair or replace tiles that fail on materials or workmanship within the specified warranty period.
  - 1. Warranty Period: Two years after date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.
- C. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
  - 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

### 2.3 TILE PRODUCTS

- A. Manufacturers:
  - 1. American Marazzi Tile, Inc. Floor Gres-Progetto
  - 2. American Olean; Div. of Dal-Tile International Corp.
  - 3. Daltile; Div. of Dal-Tile International Inc.
  - 4. Florida Tile Industries, Inc. Metropolitan Ceramics
  - 5. Pantheon Flooring Solutions.
  - 6. Summitville Tile, Inc (Quarry Tile only).
- B. Colors: Colors to be selected from manufacturer's premium price range.

- C. Unglazed Ceramic Mosaic Tile: Factory-mounted flat tile as follows:
  - 1. Composition: Vitreous or impervious natural clay or porcelain.
  - 2. Surface: Smooth, without abrasive admixture.
  - 3. Module Size: 2 by 2 inches.
  - 4. Nominal Thickness: 1/4 inch.
  - 5. Face: Plain with cushion edges.
  
- D. Ceramic Mosaic Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:
  - 1. Base Cove: Cove, module size 4 by 4 inches.
  - 2. External corners: Surface bull nose, module size 2 x 2 inches.

## 2.4 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
  - 1. Bevel edges at 1:2 slopes, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.
  
- B. Synthetic Stone Thresholds: Made from homo-generous solid sheets of filled plastic resin complying with material and performance requirements in ANSI z124-3 for type 5 or 6, without pre-coated finish.
  - 1. Size: 1-1/2 x 1/2 inch size by full width of wall or frame opening.
  - 2. Finish: Honed.
  - 3. Manufacturers:
    - a. Dupont Polymers.
    - b. Formica Corporation.
    - c. Neumar; International Paper; Decorative Product Division.
    - d. Swan Corporation.
    - e. Wilsonart International.

## 2.5 SETTING AND GROUTING MATERIALS

- A. Manufacturers:
  - 1. Atlas Minerals & Chemicals, Inc.
  - 2. Boiardi Products Corporation.
  - 3. Bonsal, W. R., Company.
  - 4. Bostik.
  - 5. Custom Building Products.
  - 6. DAP, Inc.
  - 7. LATICRETE International Inc.
  - 8. MAPEI Corporation.
  - 9. Summitville Tiles, Inc.
  
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:

1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
  2. Basis-of-Design Product: Flexbond by Custom Building Products.
- C. Polymer-Modified Tile Grout - ANSOA1187, color to be selected.
1. Polymer Type: Either ethylene vinyl acetate, in dry, redispersible form, pre-packaged with other dry ingredients, or acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry grout mix.
  2. Manufacturers: Subject to compliance with requirements, products by the following are acceptable:
    - a. Bonsal American.
    - b. Bostic Findley, Inc.
    - c. PAP, Inc. Custom Building Products.
    - d. Laticrete International.
    - e. MAPEI Americas.
    - f. Summitville Tile, Inc.

## 2.6 MISCELLANEOUS MATERIALS

- A. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- B. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.
1. Products:
  2. Bonsal, W. R., Company; Grout Sealer.
  3. Bostik; CeramaSeal Grout Sealer.
  4. MAPEI Corporation; KER 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
  5. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
  6. TEC Specialty Products Inc.; TA-256 Penetrating Silicone Grout Sealer.

## 2.7 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
  - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
  - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

- D. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
  - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- E. Thresholds:
  - 1. Synthetic Stone Thresholds: Install stone thresholds at all door openings; set in same type of setting bed as abutting field tile, unless otherwise indicated.
    - a. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent non tile floor finish.

### 3.4 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Clean grout smears and hazes from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

### 3.5 INTERIOR TILE INSTALLATION SCHEDULE

- A. Multi-User Toilets: Slab-on-Grade: Interior floor installation on concrete; cement mortar bed (thickset); TCA F112, ANSI A108.C.
  - 1. Tile Type: Unglazed mosaic tile.
  - 2. Setting Bed: Portland cement mortar.
  - 3. Thin-Set Mortar: Latex-portland cement mortar.
  - 4. Grout Type: Polymer-modified tile grout.
  - 5. Thresholds: Synthetic Stone.
- B. Interior Surfaces: Interior wall installation over sound, dimensionally stable masonry; thin set mortar; TCA W202 and ANSI A108.5.
  - 1. Tile Type: Glazed ceramic tile.
  - 2. Thin-Set Mortar: Latex-portland cement mortar.
  - 3. Grout Type: Polymer-modification tile grout.

END OF SECTION 09 3000



## SECTION 09 5113 - ACOUSTICAL PANEL CEILINGS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes acoustical panels and exposed suspension systems for ceilings.

## 1.3 DEFINITIONS

- A. CAC: Ceiling Attenuation Class.
- B. LR: Light Reflectance coefficient.
- C. NRC: Noise Reduction Coefficient.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For components with factory-applied color finishes.

## 1.5 MATERIALS MAINTENANCE SUBMITTALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Panels: Full-size panels equal to one box or 2.0 percent, which ever is greater of quantity installed.
    - a. These extra materials shall not be opened or used by the Contractor. Place a label, protected by clear plastic, on each package with the following typewritten information.
      - 1). Manufacturer.
      - 2). Product name and number.
      - 3). Installation contractor.
      - 4). Date that the stock is put in the Owner's inventory.
      - 5). Room or area number where the product was used.
  - 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.

## 1.6 QUALITY ASSURANCE

- A. Source Limitations:
  - 1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
  - 2. Suspension System: Obtain each type through one source from a single manufacturer.
- B. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
  - 1. Provide seismic restraint as required by 2006 International Building Code. Refer to structural drawing for seismic design category. Component importance factor shall be equal to 1.0.
    - a. When the requirements of the Code exceed those specified herein, the requirement of the Code shall be provided at no additional costs.
    - b. When the requirements of the Documents exceed those specified in the Code, the requirement of the Documents shall govern.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

## 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

## 1.9 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.



## 1.10 MAINTENANCE

- A. Contractor shall promptly replace any tiles damaged by water and/or roof leaks for a period of one year from the date of substantial completion. Contractor shall further replace any tile damaged by roof leaks for a period of two years from the date of substantial completion.
- B. Replacement Tiles:
  - 1. Contractor shall furnish tile from same production run as original ceiling.
  - 2. If original tile is no longer available, tile shall match existing.
  - 3. If matching tile are unavailable, contractor shall replace tile in entire room at no additional cost to Owner.
  - 4. Owner's attic stick shall not be used for replacement tiles.

## PART 2 - PRODUCTS

### 2.1 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
  - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

### 2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING - APC1

- A. Basic-of-Design Product: United States Gypsum No. 560 fissured acoustical ceiling panel or comparable product by the following:
  - a. Armstrong World Industries, Inc.
  - b. BPB USA.
- B. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:
  - 1. Type and Form: Type III, Mineral base with painted finish; Form 2, water felted.
  - 2. Pattern: CD (perforated, small holes and fissured).
- C. Color: White.
- D. LR: Not less than 0.81.
- E. NRC: Not less than 0.55.
- F. CAC: Not less than 33.

- G. Edge/Joint Detail: Square.
- H. Thickness: 5/8 inch.
- I. Modular Size: 24 by 24 inches.

### 2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct hung metal suspension system of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Finishes and Color, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C6385, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- D. Wire Hangers, Braces, and Ties: Provide complying with the following requirements:
  - 1. Zinc-Coated, Carbon-Steel: ASTM A641/A 641M, Class 1 zinc coating, soft temper.
  - 2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106 inch diameter wire.

### 2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING - APC1

- A. Basis-of-Design Product: United States Gypsum No. DX Suspension System or comparable product by the following:
  - 1. Armstrong World Industries, Inc.;
  - 2. BPB USA;
  - 3. Chicago Metallic Corporation.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation, with prefinished 15/16-inch-wide metal caps on flanges.
  - 1. Structural Classification: Intermediate-duty system.
  - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
  - 3. Face Design: Flat, flush.
  - 4. Cap Material: Steel cold-rolled sheet.
  - 5. Cap Finish: Painted white.

## 2.5 METAL EDGE MOLDING AND TRIM

- A. Manufacturers: Subject to compliance with requirements, provide one of the following:
  - 1. Armstrong World Industries, Inc.;
  - 2. BPB USA;
  - 3. Chicago Metallic Corporation;
  - 4. USG Interiors, Inc.
  
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
  - 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
  
- B. NOTICE: No ceiling work shall be performed until all reviews by the county inspectors, the fire marshals, the engineers, the Architect and the Owner have been completed. All temporary wiring and other materials not part of the permanent installation shall be removed prior to cover-up.
  - 1. The Owner may, after the initial above ceiling review, allow the installation of the grid, cut-tile and borders.
  - 2. Full tiles shall not be installed until all parties listed hereinabove have completed their reviews, all punchlists from previous reviews have been resolved and all temporary wiring and lights have been removed.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

### 3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  - 6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  - 7. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  - 8. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
- D. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
  - 1. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. Arrange directionally patterned acoustical panels as follows:
  - a. Install panels with pattern running in one direction parallel to short axis of space.
2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.

#### 3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 5113



## SECTION 09 6500 - RESILIENT FLOOR TILE &amp; BASE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  1. Vinyl composition tile (VCT).
  2. Resilient wall base and accessories.
  3. Resilient molding accessory.

## 1.3 ACTION SUBMITTALS

- A. Samples for Initial Selection: For each type of product indicated.

## 1.4 MATERIALS MAINTENANCE SUBMITTALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.
  2. Resilient Wall Base and Accessories: Furnish not less than 10 linear feet for every 500 linear feet fraction thereof, of each type, color, pattern, and size of resilient product installed.
  3. Attic stock shall be from same dye lot as tile to be installed. Attic stock shall not be used by Contractor for repairs.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer. Store tiles on flat surfaces.

## 1.6 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F in spaces to receive floor tile during the following time periods:
  1. 48 hours before installation.
  2. During installation.
  3. 48 hours after installation.

- B. After post-installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install resilient products after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

### 2.2 COLORS AND PATTERNS

- A. Colors and Patterns: As selected by Architect from manufacturer's premium range.
- B. All resilient materials shall be from the same production run and dye lot.

### 2.3 VINYL COMPOSITION TILE

- A. Vinyl Composition Tile (VCT): ASTM F 1066.
  - 1. Basis-of-Design Product: Premium Excelon as manufactured by Armstrong.
    - a. Proposed Additional Manufacturers:
      - 1). Azrock.
      - 2). Tarkett.
- B. Dimensions:
  - 1. Thickness: 0.125 inch.
  - 2. Size: 12 by 12 inches.
- C. Types:
  - 1. Field Tile:
    - a. Class 2 - through pattern tile.
    - b. Wearing Surface: Smooth.
    - c. Fire-Test-Response Characteristics:
      - 1). Critical radiant flux classification: Class I, not less than 0.45 W/sq. cm. per ASTM.
  - 2. Accent Tile: Solid Vinyl Tile.
    - a. ASTM F1700.
    - b. Class: I, Monolithic Vinyl Tile.
    - c. Type: A, Smooth Surface.
    - d. Fire-Test-Response Characteristics:



- 1). Critical radiant flux classification: Class I, not less than 0.45 W/sq. cm. per ASTM.

#### 2.4 RESILIENT WALL BASE

- A. Wall Base: ASTM F 1861.
  1. Basis-of-Design Product: Pinnacle rubber base as manufactured by Roppe Rubber Company or comparable products by the following:
    - a. Burke Mercer Flooring Company.
    - b. Flexco Corporation.
- B. Type (Material Requirement): TS (rubber, vulcanized thermoset).
- C. Group (Manufacturing Method): I (solid, homogeneous).
- D. Style: Coved (base with toe).
- E. Minimum Thickness: 0.125 inch.
- F. Height: 4 inches unless noted otherwise.
- G. Lengths: Coils in manufacturer's standard length.
- H. Outside Corners: Job formed.
- I. Inside Corners: Job formed.
- J. Surface: Smooth.

#### 2.5 RESILIENT MOLDING ACCESSORY

- A. Basis-of-Design Manufacturer: Burke Mercer Product Company or comparable product by the following:
  1. Johnson Rubber Company.
  2. Roppe Rubber Company.
  3. Flexco Corporation.
- B. Description: Transition strips.
- C. Material: Vinyl.
- D. Profile:
  1. VCT to limited thickness flooring: No. 633.
  2. Carpet to limited thickness flooring: No. 700.

#### 2.6 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturer for applications indicated.

- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated. Use of asphalt "cut-back" adhesive is not acceptable.
- C. Floor Cleaner: Spartan's Shinline Emulsifier Plus Stripper.
- D. Floor Sealer: Spartan's Shinline Seal.
- E. Floor Polish: Spartan's Dura Gloss floor finish.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
  - 2. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 3. Telegraphing of tile will be sufficient grounds for removal of complete installation and re-installation at no additional cost to Owner.

#### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
    - a. The sub-floor shall be tested for alkalinity. Sub-floors with a Ph reading of 9 or greater shall be neutralized with either an acetic or muriatic acid solution followed by a thorough rinsing with water.
  - 3. Moisture Testing:
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
- C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
  - 1. Sub-floor surfaces shall not vary more than 1/8" in any ten foot dimension. Neither shall they vary at a rate greater than 1/16" per running foot. Grind or install leveling compounds until this tolerance is achieved.
  - 2. When the thickness of the leveling compound required to level floor exceeds 3/8", the Contractor shall install multiple layers. Installed layer shall be allowed to dry thoroughly prior to the installation of subsequent layers. Each layer shall not exceed 3/8" in thickness.
- E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
  - 1. Do not install resilient products until they are same temperature as space where they are to be installed.
- F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation until all materials that could telegraph through the new flooring are removed. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Telegraphing of tile will sufficient grounds for removal of complete installation and reinstallation at no additional cost to owner.

### 3.3 FLOOR TILE INSTALLATION

- A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  - 1. Lay tiles square with room axis.
- B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
  - 1. Lay VCT tiles with grain direction alternating in adjacent tiles (basket-weave pattern).
  - 2. Lay rubber tiles with grain direction same in adjacent tiles.
- C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
- D. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, non-staining marking device.

- F. Install tiles on covers for trench ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

### 3.4 RESILIENT WALL BASE INSTALLATION

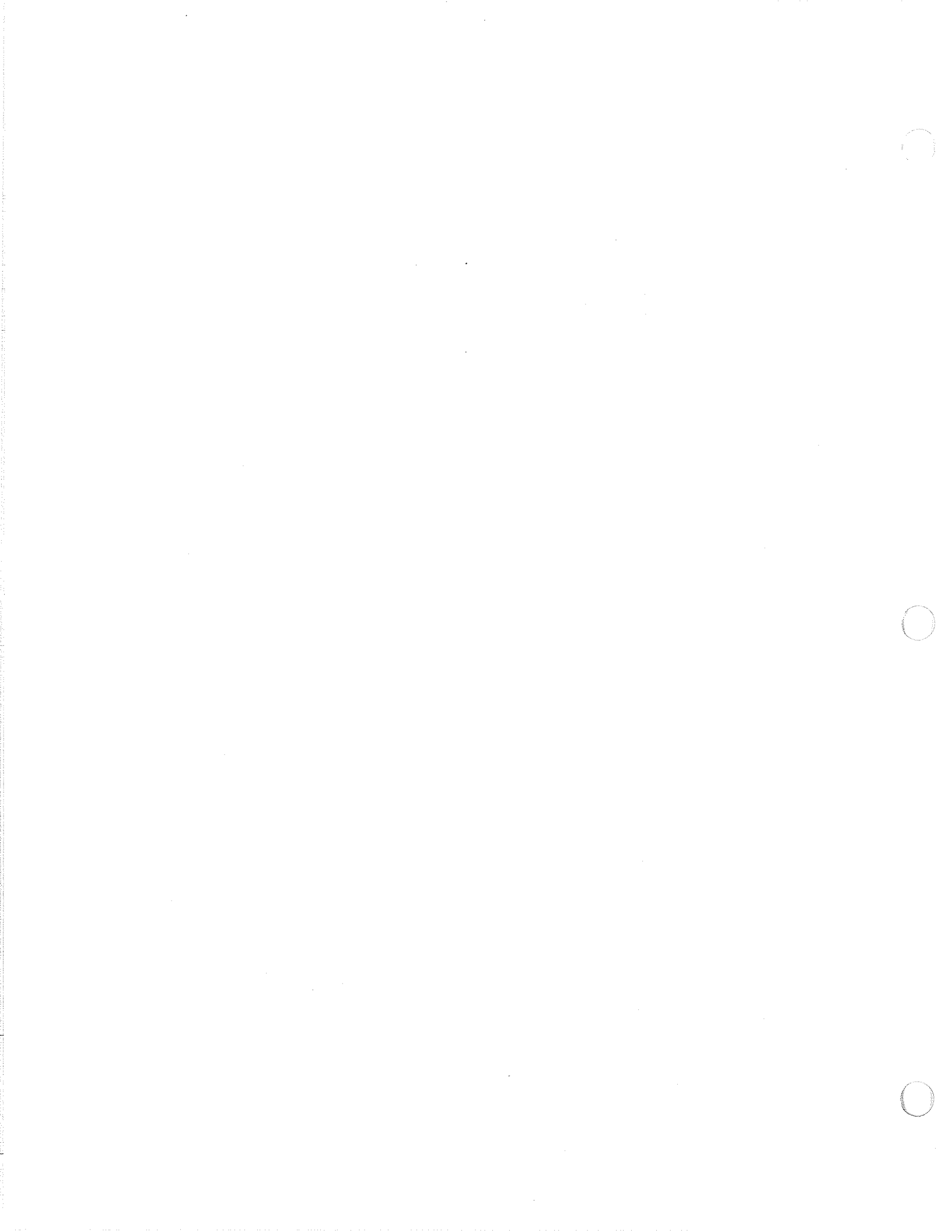
- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- D. Do not stretch wall base during installation.
- E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.
- F. Job-Formed Corners:
  - 1. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.
  - 2. Outside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in back of wall base at the point where corner is formed. Form without producing discoloration (whitening) at bends.

### 3.5 CLEANING AND PROTECTION

- A. General:
  - 1. Contractor shall coordinate the sequence for cleaning and waxing VCT floors with ECS Coordinator of Environmental Services and Coordinator of Warehouse. Schedule Cleaning and waxing VCT floors at Corridors and other stay areas after furniture is delivered.
  - 2. The contractor will enter into a contract with a Specialty Contractor, who will be engaged to clean, apply sealer and finish, and high-speed burnish all resilient flooring throughout the building.
  - 3.
- B. Perform the following operations immediately after completing resilient product installation:

1. Clean the floors of all dirt and debris that could interfere with proper floor finish application.
  2. Remove adhesive and other blemishes from exposed surfaces.
  3. Sweep and vacuum surfaces thoroughly.
  4. Damp-mop surfaces to remove marks and soil.
    - a. Do not wash, scrub or strip surfaces until after time period recommended by manufacturer or five days, whichever is later.
    - b. Bleeding of adhesive is not acceptable. Where bleeding occurs, remove tile and adhesive and replace with new.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
1. Scrub the new floor tile to remove the factory-applied sealer with a blue scrubbing pad and a water-mix solution of floor cleaner, diluted per the manufacturer's instructions. Thoroughly remove dirty solution with a wet/dry vacuum after scrubbing action is complete.
  2. Thoroughly rinse the floor with (2) rinses of clear water.
  3. Allow floor to dry completely.
  4. Apply two (2) coats of floor sealer in accordance with manufacturer's specifications. Allow adequate drying time between coats, as specified by the manufacturer. Force drying by fans or any other means is prohibited.
  5. Apply four (4) coats of floor polish.
  6. After the floor finish has cured in accordance with the manufacturer's specifications, burnish the floor finish with a high-speed burnisher to harden the floor finish surface and produce a "wet look" sheen.
  7. The Contractor shall notify Fulton County Board of Education during the cleaning, scrubbing, sealing and waxing stages of the floor finishing process for assistance and consultation as required to achieve the specified finish
  8. Upon completion of the contractor's Resilient Flooring work, the Design Professional and Fulton County Board of Education will conduct a "Punch List" documenting work to be finished, work not in compliance with the Contract Documents, work damaged, etc. Fulton County Board of Education will move furniture into the rooms. Upon completion of the moving of furniture and equipment, the Specialty Contractor will clean, scrub (lightly) and apply two (2) additional coats of floor polish on all corridors and high speed burnish to achieve a "wet-look" sheen.
  9. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
  10. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 09 6500



## SECTION 09 6813 -CARPETING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Tile carpeting.
- B. Related Sections include the following:
  - 1. Division 09 Section "Resilient Floor Tile & Base" for resilient wall base installed with carpet.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For the following, including installation recommendations for each type of substrate:
  - 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - 2. Catalog data of all proposed carpet adhesives and accessories.
- B. Shop Drawings: Show the following:
  - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
  - 2. Existing flooring materials to be removed.
  - 3. Existing flooring materials to remain.
  - 4. Carpet type, color, and dye lot.
  - 5. Locations where dye lot changes occur.
  - 6. Seam locations, types, and methods.
    - a. Layouts shall maximize use of 6' or 12' widths with minimal seaming.
    - b. Seams in wall openings shall be centered on the wall.
    - c. If the opening has a door, seams shall be centered beneath the door in closed position.
  - 7. Type of installation.
  - 8. Pile direction.
  - 9. Type, color, and location of edge, transition, and other accessory strips.
  - 10. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
  - 1. Carpet: 21 inch square Sample.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Certifications:
  - 1. Independent Testing Laboratory results from previously manufactured carpet materials (same as proposed for the project) illustrating compliance with specified project criteria.
  - 2. Carpet manufacturer's statement of acceptance of compatibility of concrete slab curing/sealing materials with carpet adhesive.
- B. Required Certificates: The carpet manufacturer shall submit a letter on company letterhead and signed by an officer of the company, outlining the following guarantees:
  - 1. The carpet manufacturer shall unconditionally guarantee that the carpet he proposes to furnish shall meet or exceed these specifications.
  - 2. Approval from the Department of Public Health and the State Fire Marshal. Acceptance of these agencies is a condition of sale.
  - 3. All carpeting shall meet or exceed the requirements of ASTM E-84 and flame and smoke requirements as specified.
- C. SUBMITTALS RECEIVED WITHOUT THESE CERTIFICATIONS SHALL BE RETURNED WITHOUT REVIEW.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet: Full-width rolls or tiles equal to 1 percent of amount installed in 36 inch minimum widths for each type indicated.

#### 1.6 QUALITY ASSURANCE

- A. GSA Certification: All carpet shall meet or exceed the General Services Administration requirements.
- B. Appearance Retention Rating: Carpet to be rated for severe wear by the Carpet & Rug Institute's Appearance Retention Rating system.
- C. Traffic Classification: Class III – Extra Heavy Commercial Traffic (more than 1000-foot traffic per day).
- D. Indoor Air Quality: Carpet shall meet or exceed CR1 & EPA guidelines (green label certified and labeled).
- E. Flammability:
  - 1. NBS Smoke Density: Less than 450 per test ASIM E 662; NFPA-258.
  - 2. Flame Resistant: Shall pass Methanarnine pill test ASTM E 662.
- F. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical



products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Flooring Radiant Panel: Class I.

- G. Recycling Program: Carpet shall be eligible to qualify for a close-loop recycling program (close-loop is a carpet that upon recycling is turned back into carpet and no part of the reclaimed carpet enters a landfill) either through the carpet manufacturer or fiber manufacturer.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104, Section 5, "Storage and Handling."

#### 1.8 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where other items are indicated for installation on top of carpet, install carpet before installing these items.

#### 1.9 WARRANTY

- A. Special Warranty for Static:
1. Manufacturer shall warrant that the carpet will neither cause static nor induce malfunction of electronic equipment when installed throughout the equipment operation area.
    - a. Remedy of claims under this warranty if found valid, shall include the engaging of the qualified installer to replace the carpeting in the static affected area with new materials having adequate static control properties, at no cost to the Owner for materials and labor, except that moving, replacing, disconnecting and reconnecting of equipment if not included herein.
    - b. Static is defined as the electric charge built up and later discharged from a person, cart or other objects as a result of movement of that person or object upon the floor covering.
      - 1). Static discharge shall not exceed of 3.5 KV when tested under the AATCC Test Method 134.
    - c. Malfunction is defined as any failure of the electronic equipment caused by carpet induced static electricity, provided the

equipment is operating within specifications in every other respect.

- d. Electronic Equipment is any computer, work processor, terminal, or other peripheral component, communications processor, typesetter or broadcast equipment sold by a recognized manufacturer (or its authorized distributor, agent, or representative) and installed and serviced by qualified personnel.
- 2. Warranty Period: Lifetime of installation.
- B. Special Warranty for Carpet:
  - 1. Manufacturer shall furnish the following written warranties:
    - a. Carpet Manufacturer's Standard Warranty for Wear - Twenty (20) year warranty.
    - b. Yarn Manufacturer's Color Fastness Warranty:
      - 1). Light - Ten (10) year warranty.
      - 2). Atmospheric -Five (5) year warranty.
    - c. Texture Retention Warranty: The manufacturer warrants that the carpet will substantially maintain its physical surface texture against crushing, matting and walking out - Ten (10) year warranty.
    - d. Run Resistant Strength: Not less than 25 lbs., in accordance with the Loop Pile Run Resistance test (TP 155-86), wet or dry - Twenty (20) year warranty.
    - e. Edge Ravel: Carpet will not have continuous pile yarn coming out at seams - Twenty (20) year warranty.
    - f. Zippering Warranty: Carpet will not zipper or develop continuous pile yarn runners in the body of the carpet - Twenty (20) year warranty.
    - g. Stain Warranty - Ten (10) year warranty.
  - 2. Warranty shall commence on the date of Substantial Completion.
- C. Adjustment: Contractor agrees to adjust carpeting as required by Owner for 1 year from date of Substantial Completion.

#### 1.10 MAINTENANCE

- A. Maintenance Schedule: The manufacturer and the Contractor shall accept the responsibility for establishing a proper schedule for maintenance. This schedule shall be prepared after thorough evaluation of all traffic and soil conditions and it shall include the materials, equipment and procedures necessary for every carpeted area of the building.

### PART 2 - PRODUCTS

#### 2.1 CARPETING

- A. Basis-of-Design Product: Subject to compliance with requirements, Carthage series as manufactured by Mannington Mills, Inc. or comparable product by the following:
  - 1. Interface.

## 2. Tandus/C&amp;A

## B. Construction:

1. Construction: Graphic-loop pile.
2. Yarn Type: 100% DuPont Type 6.6 CF Nylon with antimicrobial processing, permanent static control, and soil resistant technology.
  - a. BASF solution dyed. No after-manufacturer dye process is acceptable.
  - b. Yarn Size: 2/2470 or greater.
  - c. Gauge: 1/8 or 1/10 with stitches per inch not to exceed gauge.
3. Average Density: 7500.
4. Density Weight Factor: 150,000.
5. Turf Density: 100.
6. Tufted Yarn Weight - 20 oz. / sq. yd. Maximum.
7. Pile Height - 0.156 to 0.187 inches.
8. Primary Backing - 100% woven polypropylene.
9. Primary Pre-coat: 100% Vinyl non-aqueous closed cell polymer.
10. Width - 6 feet or pre-cut tiles.
11. Secondary Backing: Six Foot Reinforced Vinyl Composition Closed Cell Polymer with Recycled Content.
12. Underlayment - None; Glue Directly to Slab
13. Weight Density - Min. 18.5lbs/cu ft.
14. Total Thickness: 270.
15. Total Weight - 125 oz/sy.
16. Applied Soil-Resistance Treatment: Manufacturer's standard material.
17. Antimicrobial Treatment: Manufacturer's standard material required both top and bottom.
18. Stain and Soil Protection: BASF Zeftron 2000.
19. Fluorochemical Treatment: Minimum of 500 parts per million: per CRI-102; after two hot extractions (AATCC171), minimum 400 Parts Per Million per CR1 TM-102.
20. Color: As selected by Architect from CCSD's standard range.

## C. Performance Characteristics: As follows:

1. Moisture Impermeable: Carpet shall be unaffected by water and moisture.
2. Calcium Chloride: Carpets shall be able to be installed with 5 lbs. hydrostatic pressure or better (pounds) per 1000 square feet per 24 hours with a written documentation from manufacturer, per CRI-104.

## 2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- B. Adhesives: Premium grade water-proof, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
  1. Basis-of-Design Manufacturer: W.W. Henry's or compatible products furnished by carpet manufacturers listed herein.

2. Adhesive content shall be ASBESTOS FREE.
- C. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
  1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet manufacturer.
  2. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving carpet.
  3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Cleaning and Testing:
  1. The Contractor shall be responsible for the preparation of all sub-floors.
  2. All surfaces shall receive a thorough sweeping with a wire brush to remove all dusty, chalky, or flaky concrete. Follow sweeping with thorough vacuum cleaning. All subfloor surfaces shall be thoroughly cleaned of all foreign matter which could impair the adhesion of the flooring material.
  3. Alkalinity: The subfloor shall be tested for alkalinity. Subfloors with a Ph reading of 9 or greater shall be neutralized with either an acetic or muriatic acid solution followed by a thorough rinsing with water.
  4. Floor shall be completely dry prior to adhesive and carpet installation. Surface moisture shall not exceed adhesive manufacturer's recommendations. As a minimum, moisture shall not exceed 3 lbs. / 1000 s.f. / 24 hours as measure by means of a calcium chloride test in accordance with the recommendations of the National Rubber Tile Manufacturing Association.

- C. Leveling:
1. Sub-floor surfaces shall not vary more than 1/8" in any ten foot dimension. Neither shall they vary at a rate greater than 1/16" per running foot. Grind or install leveling compounds until this tolerance is achieved.
  2. Allow floor to dry thoroughly prior to installing leveling compounds. Surface moisture shall not exceed adhesive manufacturer's recommendations. Compounds shall be installed in accordance with compound manufacturer written instructions.
  3. When the thickness of the leveling compound required to level floor exceeds 3/8", the Contractor shall install multiple layers. Installed layer shall be allowed to dry thoroughly prior to the installation of subsequent layers. Each layer shall not exceed 3/8" in thickness.
- D. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- E. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- F. Broom and vacuum clean substrates to be covered immediately before installing carpet.

### 3.3 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Do not bridge building expansion joints with carpet.
- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.
- H. Edge Strips: Install strips at all locations where carpet abuts dissimilar flooring.
  - 1. Locations:
    - a. Centered under doors.
    - b. Centered on opening at cased or framed openings.

#### 3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

END OF SECTION 09680

## SECTION 09 8413 - ACOUSTICAL WALL PANELS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Mechanically-mounted acoustical wall panels.
- B. Related Sections include the following:
  - 1. Division 9 Section "Acoustical Panel Ceilings" for acoustical ceiling panels supported by exposed suspension system and tested for noise reduction.

## 1.3 DEFINITIONS

- A. NRC: Noise reduction coefficient.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of panel edge, core material, and mounting indicated.
- B. Shop Drawings: For acoustical wall panels. Include mounting devices and details; details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Include elevations showing panel sizes and direction of fabric weave and pattern matching. Indicate panel edge and core materials.
- C. Samples for Initial Selection: For each type of fabric facing material from acoustical wall panel manufacturer's full range.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of acoustical wall panel.
  - 1. Fire Test: Submit test data from an independent testing agency acceptable to authorities having jurisdiction, evidencing that panel assemblies comply with requirements indicated for fire performance characteristics.
  - 2. Acoustical Test: Submit complete test report from an independent testing agency certified to conduct acoustical tests according to ASTM standards, evidencing that the panel assemblies comply with requirements indicated for acoustical performance.

3. SUBMITTALS RECEIVED WITHOUT THIS INFORMATION WILL BE RETURNED WITHOUT REVIEW.

#### 1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain acoustical wall panels through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide acoustical wall panels with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  1. Flame-Spread Index: 25 or less.
  2. Smoke-Developed Index: 100 or less.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and acoustical wall panel manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and panels in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.
- C. Protect panel edges from crushing and impact.

#### 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical wall panels until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  1. Air-Quality Limitations: Protect acoustical wall panels from exposure to airborne odors, such as tobacco smoke, and install panels under conditions free from odor contamination of ambient air.
- B. Field Measurements: Verify locations of acoustical wall panels by field measurements before fabrication and indicate measurements on Shop Drawings.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.



## 2.2 WALL MOUNTED ABSORPTION PANELS - PANEL "A"

- A. Fabric Faced Back Mounted Impact Resistant Sound Absorbing Panels:
1. Manufacturer's standard panel construction consisting of an impact resistant, edge reinforced, glass fiber core with a fabric covering and complying with the following:
    - a. Core Materials: 1/8 inch thick, high density (20 lbs/ft<sup>3</sup>) glass fiber board lightly bonded to a medium density (6-7 lbs/ft<sup>3</sup>), dimensionally stable, glass fiber board. Core shall be face sanded for smoothness and dimensional tolerances shall not exceed 0.020 inch.
    - b. Covering Material: Woven 100% polyester fabric bonded or attached to the back of the panel frame. Guilford FR 701 or approved equal
    - c. Thickness: 2-1/8 inch minimum
    - d. Acoustical Performance: NRC 0.95 per ASTM C 423, Type A mounting.
    - e. Edge Detail: Square Edges.
    - f. Sizes: As indicated in the drawings.
    - g. Color/Pattern: Material, color, pattern and texture as selected by Architect from Manufacturer's standard.
  2. Basis-of-Design Product: H.I.R. #2 fabric-covered acoustical wall panel as manufactured by Decoustics or comparable product by the following:
    - a. Conwed
    - b. Kinetics Noise Control
    - c. Wenger Corporation

## 2.3 WALL MOUNTED SOUND DIFFUSER PANELS - PANEL "B"

- A. Back Mounted Sound Diffuser Panels: Manufacturer's standard panel construction consisting of thermo-molded plastic with a thickness of not less than 0.125", reinforcement applied to the rear surface of panels of greater than 24 ft<sup>2</sup>, corner brackets for acceptance of mounting hardware, and complying with the following:
1. Finish: Manufacturer's standard white "suede" or "lemon-peel" texture.
  2. Acoustical Performance: NRC 0.20 or less per ASTM C 423, Type A mounting.
  3. Sizes: As indicated in the drawings.
  4. Color/Pattern: Material, color, pattern and texture as selected by Architect from Manufacturer's standard.
- B. Basis-of-Design Product: Respond barrel type sound diffuser wall panel as manufactured by Conwed Designscape or comparable product by the following:
1. Conwed
  2. Kinetics Noise Control
  3. Wenger Corporation

## 2.4 MOUNTING ACCESSORIES

### A. Mounting Devices:

1. Back-Mounting Devices: Concealed on backside of panel, recommended to support weight of panel, with base-support bracket system where recommended by manufacturer for additional support of panels, and as follows:
  - a. Metal "Z" Clips: Two-part panel clips, with one part of each clip mechanically attached to back of panel and the other part to wall substrate, designed to allow for panel removal.
2. Face-Mounting Devices: Prefinished screws to match panels.

### B. Touch-Up Paint: For cementitious panels.

1. Color: To match panels.

## 2.5 FABRICATION

### A. Absorption Panels:

1. Face Attachment: Attach facing material to core material so there are no wrinkles, sags, or blisters.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- #### A. Examine fabric, substrates, blocking, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of acoustical wall panels.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- #### A. Install acoustical wall panels in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- #### B. Comply with acoustical wall panel manufacturer's written instructions for installation of panels using type of concealed mounting accessories indicated or, if not indicated, as recommended by manufacturer. Anchor panels securely to supporting substrate.
- #### C. Match and level fabric pattern and grain among adjacent panels.
- #### D. Installation Tolerances: As follows:
1. Variation from Level and Plumb: Plus or minus 1/16 inch.
  2. Variation of Panel Joints from Hairline: Not more than 1/32 inch wide.

### 3.3 CLEANING

- #### A. Clip loose threads; remove pills and extraneous materials.

- B. Clean panels with fabric facing, on completion of installation, to remove dust and other foreign materials according to manufacturer's written instructions.

#### 3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, to ensure that acoustical wall panels are without damage or deterioration at time of Substantial Completion.
- B. Replace acoustical wall panels that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 09 8413



SECTION 09 9100 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Concrete masonry units (CMU).
  - 2. Steel.
  - 3. Wood (Stained Finish).
  - 4. Gypsum board.
- B. Related Sections include the following:
  - 1. Division 5 Sections for shop priming of metal substrates with primers specified in this Section.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of topcoat product indicated.

1.4 MATERIALS MAINTENANCE SUBMITTALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
  - 1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.
  - 2. Containers shall only be opened by the paint manufacturer/supplier to formulate required color mixes. These extra materials shall not be opened or used by the Contractor without written permission from the Owner. Place a label, protected by clear plastic, on the lid of each container with the following typewritten information:
    - a. Paint Manufacturer.
    - b. Product name and number.
    - c. Mixing and color formulation.
    - d. Paint contractor.
    - e. Date that the paint is put in the Owner's inventory.
    - f. Room or area number where the paint applied was used.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.

## 1.6 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Duron Paints and Wallcoverings or comparable product by the following:
  - 1. ICI Paints.
  - 2. Porter Paints.
  - 3. PPG Architectural Finishes, Inc.
  - 4. The Sherwin-Williams Company.

### 2.2 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
  - 3. Colors: As selected by Architect from Manufacturer's full range.

### 2.3 BLOCK FILLERS

- A. Interior Block Filler: No. DU0008128 Block Kote Acrylic Latex Block Filler.

### 2.4 PRIMERS/SEALERS

- A. Interior Water Based Primer/Sealer: No. DU0004124 Interior Acrylic Latex Drywall Primer Sealer.

### 2.5 METAL PRIMERS

- A. Ferrous Metal Primer: No. DU0033010 Dura Clad 50 Alkyd White Metal Primer.

- B. Non-Ferrous Metal Primer: No. DU0033305 Dura Clad 62 Universal Acrylic Metal Primer.

## 2.6 LATEX PAINTS

- A. Interior Latex (Eggshell): No. DU0036 Series LifeMaster Ultra Deluxe Interior Acrylic Latex Eggshell Enamel.

## 2.7 ALKYD PAINTS

- A. Interior Enamel (Semi-Gloss): No. DU0035 Series Ultra Deluxe Interior Acrylic Latex Semi-Gloss Enamel.
- B. Exterior Enamel (Gloss): No. DU00953XX Series Dura Clad 300 "Direct-To-Metal" (DTM) Acrylic Gloss Enamel.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry (Clay and CMU): 12 percent.
  - 3. Wood: 15 percent.
  - 4. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
  - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
  1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
- I. Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.
- J. Testing for Passivators:
  1. Prepare a solution by dissolving 20 grams of copper sulfate in one liter of water.
  2. Solvent wash a small area per the procedure of SSPC-SPI.
  3. Sand a small washed area using emery cloth.
  4. Using a cotton swab saturated with the copper sulfate solution, apply a swipe to both sanded and un-sanded washed areas.
  5. If the sanded and un-sanded surfaces turn black at the same time and that time is less than 10 seconds, there is no passivation on the surface other than light oil, and a normal degreasing/cleaning operation is sufficient preparation prior to the coating application. If the un-sanded surface turns slower than the sanded surface, or not at all, a passivator of some type is present on the surface. If neither surface turns, the surface is probably an alloy of zinc or some other metal.
  6. This test shall be conducted in the presence of the Owner and Architect. Contractor shall provide 3 days notice to Architect when the test will be conducted.
  7. If passivators are detected methods to remove them include brush blasting, sanding, or chemical etching.

### 3.3 APPLICATION



- A. Apply paints according to manufacturer's written instructions.
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
    - a. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

#### 3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
  - 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove non-complying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

#### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 PAINTING SCHEDULE

#### A. General:

##### 1. Surfaces to be Painted:

- a. All exposed interior surfaces not specified to be completely finished at the factory shall be painted. Complete coverage of all exposed surfaces in finished areas is intended. Without restricting the extent of the work to be performed, the work shall include, but is not limited to, the following:
    - 1). Structural Steel: Touch-up after erection and finish painting of steel exposed in otherwise finished areas.
    - 2). Ferrous Metal: All exposed surfaces of all ferrous metal work, including galvanized, both interior which appears in otherwise finished areas and exterior.
    - 3). Gypsum Drywall: All exposed surfaces unless otherwise finished.
    - 4). Masonry: Painting of all exposed interior masonry except surfaces to receive other finishes, or those surfaces specifically noted unfinished.
    - 5). Mechanical and Electrical Equipment: Painting of all exposed Mechanical piping, conduit, equipment and insulation. Paint piping and equipment in mechanical room in color coded system as specified in Division 15.
    - 6). Wood: All exposed surfaces.
    - 7). Surfaces behind lockers, casework, markerboards, tackboards and other surface mounted items shall receive all specified coats.
  - b. Existing Surfaces: All previously painted, stained or glaze coated interior surfaces disturbed by the progress of the Work shall be cleaned and painted unless otherwise scheduled. The following list of surfaces to be cleaned and painted by the contractor is intended only as a guide and is not intended to limit the Scope of work:
    - 1). Ferrous and non-ferrous metals.
    - 2). Concrete Block.
    - 3). Drywall.
    - 4). Hollow Metal Doors and Frames.
    - 5). Surfaces behind tackboards, markerboards, heating units and other items removed under other sections of these specifications.
- ##### 2. Surfaces not to be painted: The following areas or items will not require painting under this section, unless otherwise noted.
- a. Duct shafts, concealed spaces, concealed pipes and ducts.
  - b. Stainless steel, unless otherwise noted.

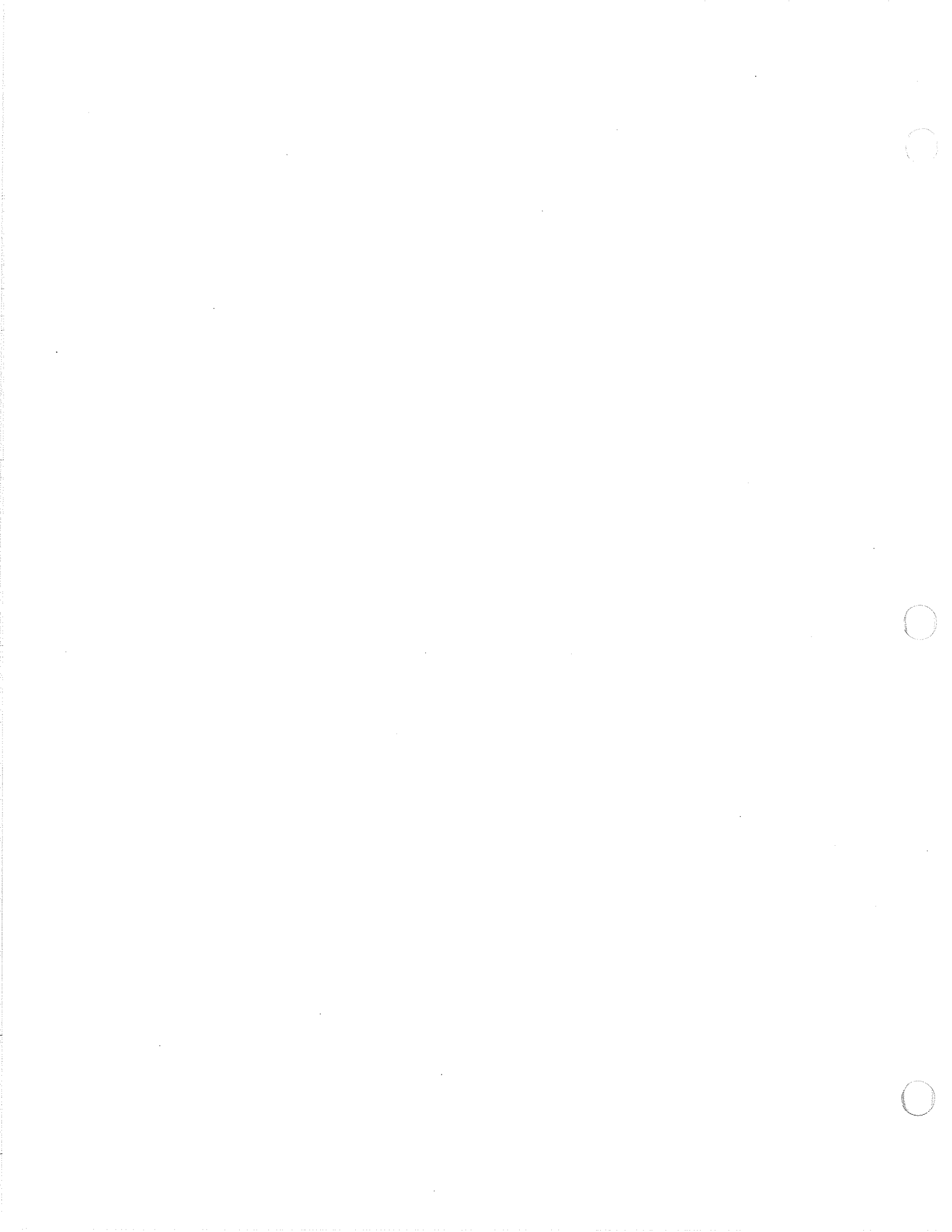
- c. Acoustical Tile and suspension system unless otherwise noted.
  - d. Manufactured items with acceptable factory finish, except as noted previously.
  - e. Concrete floors not scheduled.
  - f. Structural steel work concealed by interior building finish or appearing in otherwise unfinished areas.
  - g. Existing surfaces outside of construction area not specifically scheduled to be refinished.
- B. Specific:
- 1. CMU Substrates:
    - a. Filler: Block Filler. (Provide additional coats as required to completely fill pores).
    - b. Intermediate Coat: Acrylic Enamel (Gloss).
    - c. Top Coat: Acrylic Enamel (Gloss).
  - 2. Steel Substrates:
    - a. Interior:
      - 1). Prime Coat: Ferrous Metal Primer.
      - 2). Intermediate Coat: Enamel matching topcoat.
      - 3). Topcoat: Interior Alkyd Enamel (Semi-Gloss).
    - b. Exterior:
      - 1). Primer: Ferrous Metal Primer.
      - 2). Intermediate Coat: Exterior Enamel (Semi-Gloss).
      - 3). Top Coat: Exterior Enamel (Semi-Gloss).
  - 3. Galvanized Substrate:
    - a. Interior:
      - 1). Prime Coat: Non-Ferrous Metal Primer.
      - 2). Intermediate Coat: Enamel matching topcoat.
      - 3). Topcoat: Interior Alkyd Enamel (Semi-Gloss).
    - b. Exterior:
      - 1). Primer: Ferrous Metal Primer.
      - 2). Intermediate Coat: Exterior Enamel (Semi-Gloss).
      - 3). Top Coat: Exterior Enamel (Semi-Gloss).
  - 4. Gypsum Board Substrates:
    - a. Prime Coat: Interior Water Based Primer/Sealer.
    - b. Intermediate Coat: Latex matching topcoat.
    - c. Topcoat: Interior latex (eggshell).
- C. Existing Substrates:
- 1. First Coat: Touch up existing substrate with primer product specified for same substrate for new construction.
  - 2. Topcoat: Finish with product specified for same substrate for new construction.
- D. Graphics: The Architect reserves the right to select up to two colors per room. When multiple colors are selected, the contractor shall carefully layout, mask and cover said graphics to the tolerances established for finished walls.



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 10

SPECIALTIES



## SECTION 11 1100 - VISUAL DISPLAY SURFACES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Markerboards.
  - 2. Tackboards.

## 1.3 DEFINITIONS

- A. Tackboard: Framed or unframed tackable surface.
- B. Visual Display Boards: Chalkboards, markerboards, and tackboards.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show location of special-purpose graphics for visual display surfaces.
  - 2. Include sections of typical trim members.
- C. Samples for Initial Selection: For each type of visual display surface indicated and as follows:
  - 1. Actual sections of porcelain-enamel face sheet.
  - 2. Fabric swatches of vinyl-fabric-faced tack assemblies.
  - 3. Samples of accessories involving color selection.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of visual display surface through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of visual display surfaces and are based on the specific system indicated.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Fire-Test-Response Characteristics: Provide fabrics with the surface-burning characteristics indicated, as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Deliver factory-built visual display boards, including factory-applied trim where indicated, completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site.
  - B. Store visual display units vertically with packing materials between each unit.

1.7 WARRANTY

- A. Special Warranty for Proclean - Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porclean-enamel face sheets that fails in materials or workmanship with specified warranty period.
  1. Failure include, but are not limited to, the following:
    - a. Surface loses original writing and erasing qualities.
    - b. Surface becomes slick or sticky.
    - c. Surface Exhibits cracking, crazing or flaking.
  2. Warranty Period: Life or Building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturers: Claridge Products & Equipment, Inc. or comparable product by the following:
  1. Newline Products, Inc.
  2. Platinum Visual Systems; a division of ABC School Equipment, Inc.
  3. PolyVision Corporation.

2.2 MATERIALS, GENERAL

- A. Porcelain-Enamel Face Sheet: Manufacturer's standard steel sheet with porcelain-enamel coating fused to steel; uncoated thickness indicated.



1. Gloss Finish: Gloss as indicated; dry-erase markers wipe clean with dry cloth or standard eraser.

B. Hardboard: AHA A135.4, tempered.

C. Particleboard: ANSI A208.1, Grade 1-M-1.

D. Cork Sheet: MS MIL-C-15116-C, Type II.

E. Vinyl Fabric: FS CCC-W-408, Type II, burlap weave; weighing not less than 13 oz./sq. yd. with flame-spread index of 25 or less when tested according to ASTM E 84.

F. Extruded Aluminum: ASTM B 221, Alloy 6063.

### 2.3 MARKERBOARD ASSEMBLIES

A. Basis-of-Design Product: Claridge Series 1, Type A.

B. Porcelain-Enamel Markerboard Assembly: Balanced, high-pressure, factory-laminated markerboard assembly of 3-ply construction consisting of backing sheet, core material, and 0.0236 inch thick porcelain-enamel face sheet with high gloss finish.

1. Particleboard core: 3/8 inch thick with 0.015 inch thick, aluminum sheet.

2. Laminate Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.

### 2.4 TACKBOARD ASSEMBLIES

A. Basis-of-Design Product: Claridge Series 1, Type CO.

B. Vinyl-Fabric-Faced Tack Assembly 1/4 inch thick, vinyl-fabric-faced cork sheet factory laminated to 1/4-inch- thick hardboard backing.

1. Color: To be selected by Architect from manufacturer's full range.

### 2.5 MARKERBOARD AND TACKBOARD ACCESSORIES

A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch thick, extruded aluminum; of size and shape indicated.

1. Factory-Applied Trim: Manufacturer's standard.

B. Chalktray: Manufacturer's standard, continuous.

1. Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends at markerboards only.

C. Map Rail: Provide the following accessories:

1. Display Rail: Continuous and integral with map rail; fabricated from cork approximately 1 to 2 inches wide.
  - a. End Stops: Located at each end of map rail.
  - b. Map Hooks and Clips: Two map hooks with flexible metal clips for every 48 inches of map rail or fraction thereof.
2. Flag Holder: One for each room.

## 2.6 FABRICATION

- A. Boards to be fabricated as one piece in 4 feet height x length indicated on drawing.
- B. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.
- C. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to neat, hairline closure.
  1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.

## 2.7 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish designations prefixed by AA comply with the system established by the aluminum association for designating aluminum finishes.
- D. Class II, Clear Anodic Finish: AA-M12C22A31 complying with AAMA 611.

## 2.8 VISUAL DISPLAY SURFACE SCHEDULE

- A. Markerboard: Factory assembled.
  1. Color: As selected by Architect from full range of industry colors.
  2. Corners: Square.
  3. Width: As indicated on Drawings.
  4. Height: 48 inches.
  5. Mounting: Wall.
  6. Mounting Height: 36 inches above finished floor to top of chalktray unless noted otherwise.
  7. Factory-Applied Aluminum Trim: Manufacturer's standard with clear anodic finish.

8. Accessories:
  - a. Chalktray: Solid type.
  - b. Map rail with display rail, end stops, map hooks and clips and flag holder.
  
- B. Tackboard: Factory assembled.
  1. Color: As selected by Architect from full range of industry colors.
  2. Corners: Square.
  3. Width: As indicated on Drawings.
  4. Height: 48 inches.
  5. Mounting: Wall.
  6. Mounting Height: Align head with top of markerboard.
  7. Edges: Concealed by trim.
  8. Factory-Applied Aluminum Trim: Manufacturer's standard style, with clear anodic finish.

### PART 3 - EXECUTION

#### A. EXAMINATION

- B. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance.
  1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

### 3.2 PREPARATION

- A. Remove dirt, scaling paint, projections, and depressions that will affect smooth, finished surfaces of visual display boards.
- B. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, and substances that will impair bond between visual display boards and surfaces.
- C. Prepare recesses for sliding visual display units as required by type and size of unit.

### 3.3 INSTALLATION, GENERAL

- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
  1. Mounting height: 36 inches above finished floor to top of chalk tray.

3.4 CLEANING AND PROTECTION

- A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Cover and protect visual display surfaces after installation and cleaning.

END OF SECTION 10 1100

## SECTION 10 1200 - DISPLAY CASES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Illuminated display cases.
- B. Related Sections include the following.
  - 1. Division 10 Section "Visual Display Surfaces" for tackboards.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for display cases.
  - 1. Show location of tack assembly seams and joints.
  - 2. Include sections of typical trim members.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachment to other work.
  - 1. Show location of tack assembly seams and joints.
  - 2. Include sections of typical trim members.
- C. Sample of Verification: For each type of product indicated as follows:
  - 1. Tack Assembly: Not less than 8-1/2 by 11 inch mounted on substrate indicated for final work. Include one panel for each type, color, and texture required.
  - 2. Trim: 6-inch long sections of each trim profile included corner section.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain each type of product through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of display cases and are based on the specific system indicated.
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

- D. Fire-Test-Response Characteristics: Provide fabrics with the surface-burning characteristics indicated, as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

#### 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install display cases until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify recessed openings by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating products without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

#### 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of metal beyond normal weathering.
    - b. Delamination of tackable assemblies.
  - 2. Warranty Period: One year from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Hardboard: ANSI A135.4, tempered.
- B. Hardwood Plywood: HPVA HP-1.
- C. Cork Sheet: MS MIL-C-15116-C, Type II.
- D. Vinyl Fabric: FS CCC-W-408, Type II, burlap weave; weighing not less than 13 oz./sq. yd. with flame-spread index of 25 or less when tested according to ASTM E 84.
- E. Extruded-Aluminum Bars and Shapes: ASTM B 221, Alloy 6063.

- F. Clear Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3, with exposed edges seamed before tempering, and 6 mm thick, unless otherwise indicated.
- G. Fasteners: Provide screws, bolts, and other fastening devices made from same material as items being fastened, except provide hot-dip galvanized, stainless-steel, or aluminum fasteners for exterior applications. Provide types, sizes, and lengths to suit installation conditions. Use security fasteners where exposed to view.

## 2.2 TACK ASSEMBLIES

- A. Vinyl-Fabric-Faced Tack Assembly: 1/4-inch thick, vinyl-fabric-faced cork sheet factory laminated to 1/4-inch thick hardboard backing.

## 2.3 DISPLAY CASE

- A. Basis-of-Design Product: Subject to compliance with requirements, 390 series large door recessed display case as manufactured by Claridge Products and Equipment, Inc. or comparable product by the following:
  - 1. ADP Lemco, Inc.
  - 2. Ghent Manufacturing, Inc.
  - 3. Newline Products, Inc.
  - 4. Platinum Visual Systems; a division of ABC School Equipment, Inc.
  - 5. PolyVision Corporation; a Steelcase company.
- B. Recessed, Plywood-Framed Cabinet: Factory-fabricated cabinet, with top, bottom, and sides fabricated from hardwood veneer plywood; with tack assembly on back, side, top & bottom inside surface, glazed doors at front, and 3-by-3-inch extruded-aluminum angle trim on face to cover edge of recessed opening.
  - 1. Aluminum Finish: Clear anodic.
  - 2. Back Panel: Vinyl-Fabric-Faced Tack Assembly.
  - 3. Sides, Top and Bottom Panels: Vinyl-Laminated to match back panel.
- C. Glazed Sliding Doors: Tempered glass; unframed; with extruded-aluminum top and bottom track; supported on nylon or ball-bearing rollers; with plastic top guide and rubber bumpers. Equip each door with ground finger pull and adjustable cylinder lock with two keys.
  - 1. Thickness: Not less than 6 mm thick.
  - 2. Number of Doors:
    - a. Up to 96 Inch Width: Two.
- D. Shelves: 6-mm-thick tempered glass; supported on adjustable shelf standards and supports.
  - 1. Shelf Width: 12 inches.
  - 2. Number of Shelves: Four.

- E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112; recess mounted in rear surface. Provide standards full height of display case.
- F. Tack Surface: Vinyl-fabric-faced tack assembly.
  - 1. Color: As selected by Architect from full range of industry colors.
- G. Illumination System: Concealed top-lighting system consisting of fluorescent-strip fixtures. Include lamps and internal wiring with single concealed electrical connection to building system. Coordinate electrical characteristics with power supply provided.
  - 1. Ballasts: Low-temperature, high-power-factor, low-energy, fluorescent lamp ballasts that comply with CBMA standards and carry its label.
- H. Dimensions:
  - 1. Width: As indicated on Drawings.
  - 2. Height: As indicated on Drawings.
  - 3. Depth: 24 inches.

#### 2.4 FABRICATION

- A. Fabricate display cases to requirements indicated for dimensions, design, and thickness and finish of materials.
- B. Use metals and shapes of thickness and reinforcing to produce flat surfaces, free of oil canning, and to impart strength for size, design, and application indicated.
- C. Fabricate cabinets and door frames with reinforced corners, mitered to a hairline fit, with no exposed fasteners.
- D. Fabricate shelf standards plumb and at heights to align shelf brackets for level shelves.

#### 2.5 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled to minimize contrast.
- D. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.



- E. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine walls, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of work.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Examine walls and partitions for proper backing for display cases.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

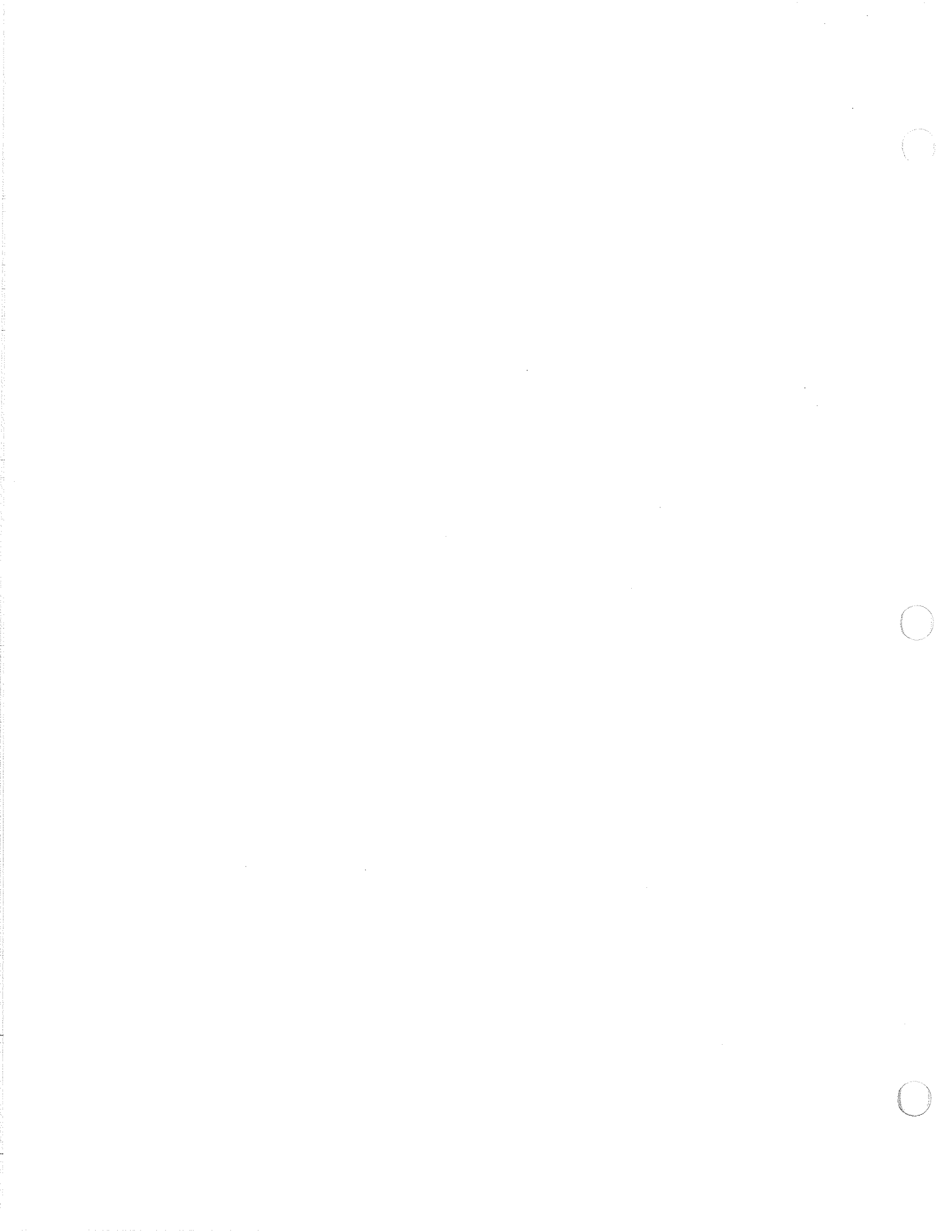
#### 3.2 INSTALLATION

- A. General: Install units in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
  - 1. Mounting Height: 88 inches above finished floor to top of cabinet.
- B. Recessed Display Cases: Attach units to wall framing with fasteners at not more than 16 inches o.c. Attach aluminum trim over edges of recessed display cases and conceal grounds and clips. Attach trim with fasteners at not more than 24 inches o.c.
  - 1. Comply with requirements in Division 26 for connecting illuminated display cases.
    - a. After installation is complete, install new fluorescent lamps.
  - 2. Install display case shelving level and straight.

#### 3.3 ADJUSTING AND CLEANING

- A. Adjust doors to operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION 10 1200



## SECTION 10 1400 - SIGNAGE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Panel signs.
  - 2. Cast-metal plaques.
  - 3. Signage accessories.
  - 4. Stenciling.
- B. Related Sections include the following:
  - 1. Division 23 "Mechanical" for labels, tags, and nameplates for mechanical equipment.
  - 2. Division 26 "Electrical" for labels, tags, and nameplates for electrical equipment.

#### 1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of sign.
- B. Shop Drawings: Include plans, elevations, and large-scale sections of typical members and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.
  - 1. Provide message list for each sign, including large-scale details of wording, lettering, artwork, and braille layout.
- C. Samples for Initial Selection: For each type of sign material indicated that involves color selection.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of signage manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain each sign type through one source from a single manufacturer.
- C. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.

## 1.5 PROJECT CONDITIONS

- A. Field Measurements: Where sizes of signs are determined by dimensions of surfaces on which they are installed, verify dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

## 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fails in materials or workmanship within specified warranty period.
  - 1. Failure includes, but are not limited to the following:
    - a. Deteriation of finishes beyond normal use.
    - b. Deteriation of embedded graphic images, colors and sign lamination.
  - 2. Warranty Period: Five years from date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

### 2.2 PANEL SIGNS

- A. General: Provide panel signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
  - 1. Produce smooth panel sign surfaces constructed to remain flat under installed conditions within tolerance of plus or minus 1/16 inch measured diagonally.
- B. Basis-of-Design Product: Subject to compliance with requirements, HC300 series as manufactured by Best Sign Systems or comparable product by the following:
  - 1. American Graphics, Inc.
  - 2. Andco Industries.
  - 3. ASI Sign Systems Inc.
  - 4. Henry Graphics.
  - 5. Mohawk Sign Systems.
  - 6. Multi-Graphics, Inc.
- C. Plastic Laminate: Provide high-pressure laminate engraving stock with face and core plies in contrasting colors as selected by Architect from manufacturer's full range.
  - 1. Corner Condition: Rounded to 1/2 inch radius.

- D. Graphic Content and Style: Provide sign copy that complies with requirements indicated in the Sign Schedule for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.
- E. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille. Produce precisely formed characters with square cut edges free from burrs and cut marks.
  - 1. Raised-Copy Thickness: Not less than 1/32 inch.
- F. Engraved Copy: Machine engrave letters, numbers, symbols, and other graphic devices into panel sign on face indicated to produce precisely formed copy, incised to uniform depth.
  - 1. Engraved Plastic Laminate: Engrave through exposed face ply of plastic-laminate sheet to expose contrasting core ply.

### 2.3 CAST-METAL PLAQUES

- A. General: Provide castings free from pits, scale, sand holes, and other defects. Comply with requirements specified for metal, border style, background texture, and finish and in required thickness, size, shape, and copy.
- B. Basis-of-Design Manufacturer: Subject to compliance with requirements, A. R. K. Ramos Architectural Signage System or comparable product by the following:
  - 1. Andco Industries
  - 2. American Graphics Inc.
  - 3. Henry Graphics.
  - 4. Leeds Aluminum Letters
  - 5. Metal Arts; Div. of L&H Mfg.
  - 6. Mills Manufacturing, Inc.
  - 7. Multi-Graphics, Inc.
- C. Bronze Castings: ASTM B 584, alloy UNS No. C83600 (No. 1 manganese bronze).
- D. Layout:
  - 1. Border Style:
    - a. Border shall be raised flat band.
    - b. School name shall be incised into 3" flush top border.
  - 2. Text shall include school name, date of completion, school superintendent, school board members, contractor and architect.
  - 3. Background Texture: Manufacturer's standard pebble texture.
  - 4. Mounting: Concealed studs for substrates encountered.
  - 5. Size: 18 inches x 24 inches.

### 2.4 PANEL SIGN TYPES

- A. Sign Type "A": 8 inch x 8 inch plastic molded sign with raised lettering, Grade II braille and graphic to meet ADA requirements.
  - 1. Toilets: Provide sign at all toilets and restrooms to read: MEN and WOMEN with pictogram.

- B. Sign Type "B": 4 inch x 8 inch plastic molded sign with raised lettering and Grade II braille to meet ADA requirements.
  - 1. Dedicated rooms shall have room number and name at all entrances that reflects its usage.
- C. Sign Type "C": 8 inch x 8 inch plastic molded sign and fixed raised numbering and Grade II braille to meet ADA requirements.
  - 1. Rooms shall have room number at all entrances.
- D. Sign Type "D": 8 inch x 8 inch plastic molded sign and fixed raised lettering.
  - 1. Corridors shall have number mounted over doors at all entrances.
- E. Sign Type "E": Miscellaneous Signage: Provide 12 inch x 18 inch minimum signs at all exterior entrances with the following message: "ALL VISITORS MUST REGISTER WITH OFFICE". Omit Braille text.

## 2.5 ACCESSORIES

- A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

## 2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

## 2.7 COPPER-ALLOY FINISHES

- A. Cast-Bronze Plaque Finishes: Exposed surfaces free from porosity, burrs, and rough spots; with returns finished with fine-grain air blast.
  - 1. Raised Areas: Hand-tool and buff borders and raised copy to produce manufacturer's standard satin finish.
  - 2. Background Finish: Dark oxidized.
- B. Clear Protective Coating: Coat exposed surfaces of copper alloys with manufacturer's standard clear organic coating specially designed for coating copper-alloy products.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that items, including anchor inserts, provided under other sections of Work are sized and located to accommodate signs.
- C. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.
  1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.
- B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using methods indicated below:
  1. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes except at glass. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
  2. Mount sign adjacent to the latch side of the door. Where there is no wall space to the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall.
    - a. Mounting height shall be 60 inches above the finish floor to the centerline of the sign.
    - b. Mounting location for such signage shall be so that a person may approach within three inches of signage without encountering protruding objects or standing within the swing of a door.
- C. Cast-Metal Plaques: Mount plaques using standard fastening methods recommended in writing by manufacturer for type of wall surface indicated.
  1. Concealed Mounting: Mount plaques by inserting threaded studs into tapped lugs on back of plaque. Set in predrilled holes filled with quick-setting cement.

#### 3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

3.4 STENCILING

- A. Stenciling of Fire- and Smoke- Rated Assemblies: Contractor shall permanently stencil portions of all rated assemblies located above finish ceilings and/or in concealed spaces with letters a minimum of 2 inches high on a contrasting background spaced a maximum of 12 feet on centers with a minimum of one per rated wall or barrier. The hourly rating shall be included on all rated barriers or walls. Wording shall be "XX Hour Fire Barrier - Protect all Openings" at rated assemblies and "XX Hour Fire and Smoke Barrier - Protect all Openings" at fire and smoke rated assemblies.

3.5 PANEL SIGNAGE SCHEDULE

- A. The following is the proposed signage schedule for panel type signs. Numbering shall be subject to modification by school officials.

MARK	NAME	SIGN TYPE	MESSAGE		QUAN	NOTES
			NO.	USAGE NAME		
AA60	CORRIDOR	D		AA	1	1
		E		See Part 2	2	2
AA61	MEN'S RESTROOM	A		MEN	1	3
AA62	IDF	B	AA62	IDF	1	
AA63	WOMEN'S RESTROOM	A		WOMEN	1	3
AA64	VESTIBULE	B	AA64	BAND	1	
AA65	PRACTICE ROOM	C	AA65		1	
AA66	OFFICE	B	AA66	OFFICE	1	
AA67	PRACTICE ROOM	C	AA67		1	
AA68	OFFICE	B	AA68	OFFICE	1	
AA69	PRACTICE ROOM	C	AA69		1	
AA70	BAND REHEARSAL				No Sign	
AA71	INSTRUMENT REPAIR	B	AA71	INSTRUMENT REPAIR	1	
AA72	INSTRUMENT STORAGE	B	AA72	INSTRUMENTS	2	
AA73	ELECTRICAL	B	AA73	ELECTRICAL	1	
AA74	UNIFORM STORAGE	B	AA74	UNIFORM STORAGE	1	
AA75	JANITOR CLOSET	B	AA75	CUSTODIAL	1	
Note 1: Locate above Door AA60A.						
Note 2: Locate near Doors AA60B and AA60C.						
Note 3: Location of sign to be confirmed in field by school officials.						

END OF SECTION 10 1400



## SECTION 10 2113 - TOILET COMPARTMENTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes solid-polymer units as follows:
  - 1. Toilet Enclosures: Overhead braced.
  - 2. Urinal Screens: Wall hung.
- B. Related Sections include the following:
  - 1. Division 10 "Toilet and Bath Accessories" for toilet tissue dispensers, grab bars, and similar accessories.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show locations of cutouts for compartment-mounted toilet accessories.
- C. Samples for Initial Selection: For each type of unit indicated.

## 1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating toilet compartments without field measurements. Coordinate wall, floor, ceilings, and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

## PART 2 - PRODUCTS

## 2.1 SOLID-POLYMER UNITS

- A. Basis-of-Design Product: Hiny-Hiders over-braced solid polymer units as manufactured by Santana Products division of Scranton Products or comparable product by the following:

1. Columbia Partitions
  2. Rockville Partitions
- B. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
1. Height:
    - a. Pilasters: 82 inches.
    - b. Others: 55 inches.
  2. Color and Pattern: Two colors and patterns as selected by Architect from manufacturer's full range of colors and patterns.
  3. Pilaster Shoes: Stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finish to match hardware.
- C. Brackets (Fittings):
1. Full-Height (Continuous) Type: Manufacturer's standard design; aluminum double ear wall bracket.
- D. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer components to prevent burning.

## 2.2 ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
1. Material: Stainless steel where available, aluminum with bright dipped anodized elsewhere.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

## 2.3 FABRICATION

- A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.
- B. Doors: Unless otherwise indicated, provide 24-inch- wide in-swinging doors for standard toilet compartments and 32-inch- wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments indicated to be accessible to people with disabilities.

1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
5. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

### PART 3 - EXECUTION

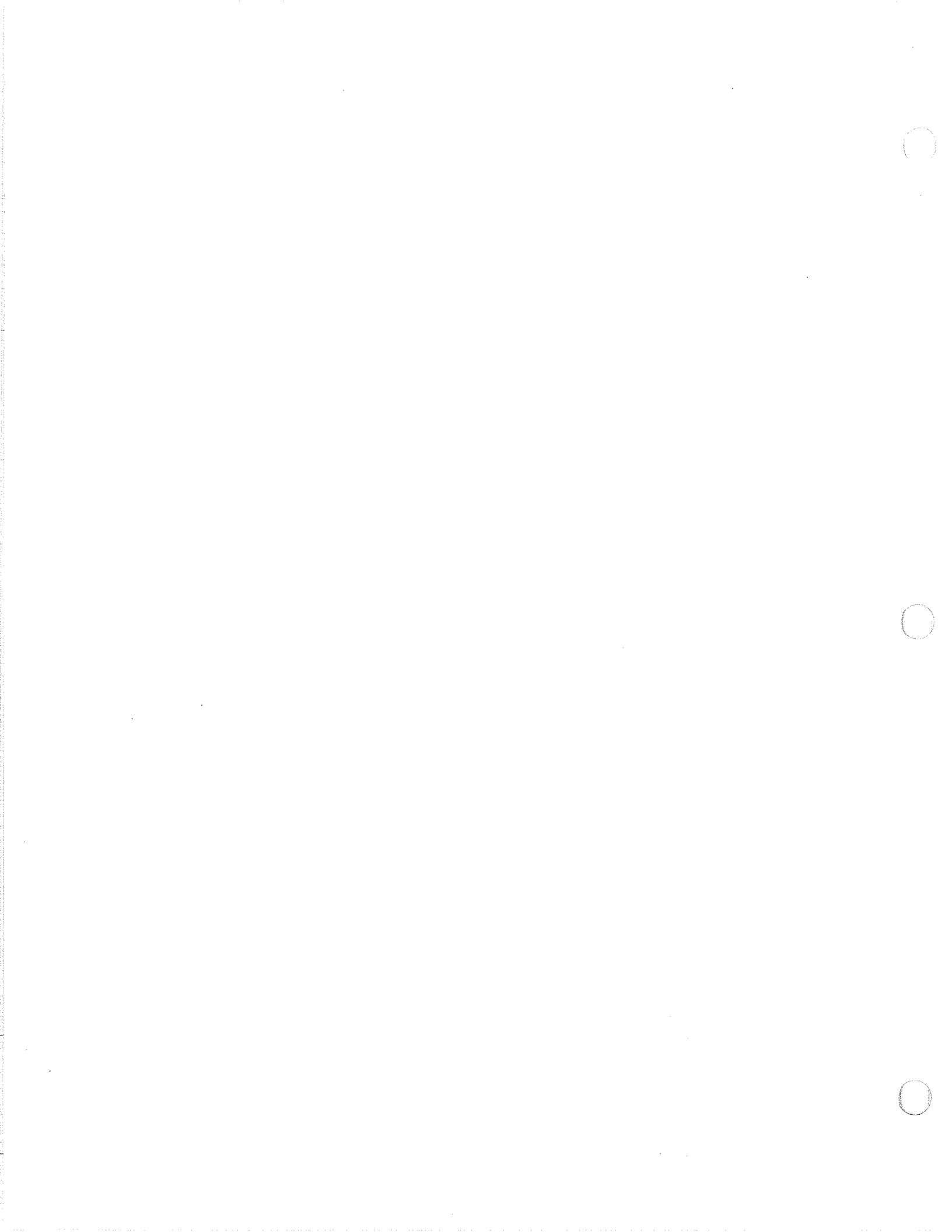
#### 3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  1. Maximum Clearances:
    - a. Pilasters and Panels: 1/2 inch.
    - b. Panels and Walls: 1 inch.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than two fasteners. Hang doors to align tops of doors with tops of panels and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Wall-Hung Urinal Screens: Attach with anchoring devices to suit supporting structure. Set urinal level and plumb and to resist lateral impact.

#### 3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10 2113



## SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  1. Public-use washroom accessories.
  2. Underlavatory guards.
  3. Custodial accessories.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
  1. Construction details and dimensions.
  2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
  3. Material and finish descriptions.
  4. Features that will be included for Project.
  5. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  1. Identify products using designations indicated on Drawings.

## 1.4 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

## 1.5 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
  1. Warranty Period: 15 years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated.

- B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch minimum nominal thickness.
- C. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- D. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- E. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- F. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- G. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- H. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

## 2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Basis-of-Design Products: The design for accessories is based on products indicated. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
  - 1. A & J Washroom Accessories, Inc.
  - 2. American Specialties, Inc.
  - 3. Bradley Corporation.
- B. Toilet Paper Holder:
  - 1. Basis-of-Design Product: Double roll Georgia Pacific Model No. 58250 with smoke plastic cover, 12" high x 20-1/2" wide x 5-3/4" deep with built-in lock and key.
    - a. No substitutions.
  - 2. Mounting Height:
    - a. Handicapped: As required by Georgia Accessibility Code.
    - b. Other: Manufacturer's recommendation.
- C. Paper Towel Dispenser:
  - 1. Bobrick model No. B-2620 dispenser 14" high x 7-1/2" wide x 4" deep.
  - 2. Mounting: Surface.
  - 3. Minimum Capacity: 400 C-fold or 525 multifold towels.
  - 4. Material and Finish: Satin finish stainless steel.
  - 5. Lockset: knob-latch.
  - 6. Mounting Height:
    - a. Handicapped: 54 inches to top of unit.
    - b. Other: 70 inches to top of unit.
- D. Liquid-Soap Dispenser:
  - 1. Basis-of-Design Product: Bobrick No B-2112.

2. Mounting: Horizontally oriented, surface mounted.
  3. Capacity: 40 fluid ounces.
  4. Materials:
    - a. Valve: Corrosion Resistant
    - b. Reservoir: 20 gauge stainless steel.
    - c. Refill Indicator: Window type.
  5. Mounting Height: 47-1/2 inches to top of unit.
- E. Grab Bar:
1. Basis-of-Design Product: No. 6806.99 grab bars as manufactured by Bobrick Washroom Equipment, Inc.
  2. Mounting: Flanges with concealed fasteners.
  3. Material: Stainless steel, 0.05 inch thick.
  4. Finish: Smooth, No. 4, satin finish.
  5. Outside Diameter: 1-1/2 inches.
  6. Configuration and Length: See schedule.
  7. Mounting Height:
    - a. Handicapped: 34 inches to centerline of unit.
- F. Sanitary-Napkin Disposal Unit:
1. Basis-of-Design Product: Bobrick model No. B-254.
  2. Material: No. 4 stainless steel.
  3. Size: 10-3/4" wide x 15-3/16" high x 4-1/16" deep.
  4. Mounting Height: 30 inches to top of unit.
- G. Mirror Unit:
1. Basis-of-Design Product: Model No. B-290 mirror as manufactured by Bobrick Washroom Equipment, Inc.
  2. Frame: Stainless-steel angle, 0.05 inch thick.
    - a. Corners: Welded and ground smooth.
  3. Mirror: Mirrors shall be clear mirrorized Lexan with stainless frame.
  4. Integral Shelf: None.
  5. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
    - a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
  6. Size: 24 inches wide by 60 inches high.
  7. Mounting Height: 84 inches to top of unit.

## 2.3 UNDERLAVATORY GUARDS

- A. Underlavatory Guard:
1. Basis-of-Design Product: LavGuard2 as manufactured by Truebro, Inc. or comparable product by the following:
    - a. Plumberex Specialty Products, Inc.
    - b. TCI Products.
  2. Description: Insulating pipe covering for supply and drain piping assemblies, that prevent direct contact with and burns from piping, and allow service access without removing coverings.
  3. Material and Finish: Antimicrobial, molded-plastic, white.

## 2.4 CUSTODIAL ACCESSORIES

- A. Basis-of-Design Product: Bobrick Mop Holder model No. B-224. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
1. American Specialties, Inc.
  2. Bobrick Washroom Equipment, Inc.
  3. Bradley Corporation.
- B. Mop and Broom Holder:
1. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
  2. Length: 36 inches.
  3. Hooks: Three.
  4. Mop/Broom Holders: Four spring-loaded, rubber hat, cam type.
  5. Material and Finish: Stainless steel, No. 4 finish (satin).
  6. Shelf: Not less than nominal 0.05-inch- thick stainless steel.
  7. Rod: Approximately 1/4-inch- diameter stainless steel.
  8. Mounting Height: 72 inches to top of unit.

## 2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

### 3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.



### 3.3 SCHEDULE

- A. The following is not a list of the entire scope of work. See drawings for location and quantity of other accessories not scheduled:
- (1) Toilet Paper Holder per water closet.
  - (1) Paper Towel Dispenser per lavatory or sink.
  - (1) Liquid Soap Dispenser per lavatory or sink in Restrooms.
  - (1) 36" Grab Bar per H.C. water closet.
  - (1) 42" Grab Bar per H.C. water closet.
  - (1) Sanitary-Napkin Disposal per water closet in Female Restroom.
  - (1) Mirror per Restroom.
  - (1) Set Underlavatory Guards per Lavatory or Sink with exposed drains and water lines.
  - (1) Mop Holder per Mop or Service Sink

END OF SECTION 10 2800



## SECTION 10 4400 - FIRE PROTECTION SPECIALTIES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Portable fire extinguishers.
  - 2. Fire-protection cabinets for the following:
    - a. Portable fire extinguishers.
  - 3. Mounting brackets for fire extinguishers.

## 1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection cabinets.
  - 1. Fire Extinguishers: Include rating and classification.
  - 2. Fire-Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

## 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer.
- B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
  - 1. Provide fire extinguishers approved, listed, and labeled by FMG.
- D. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements of ASTM E 814 for fire-resistance rating of walls where they are installed.

## 1.5 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

## 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10.
    - b. Faulty operation of valves or release levers.
- B. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, Larsen's Manufacturing Company or comparable product by the following:
  - 1. Ansul Company.
  - 2. JL Industries, Inc.
  - 3. Potter Roemer; Div. of Smith Industries, Inc.

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:
  - 1. Sheet: ASTM B 209
- C. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

### 2.3 PORTABLE FIRE EXTINGUISHERS

- A. Basis-of-Design Product:
  - 1. Other Locations: Model No. MP-10 series as manufactured by Larsen's Manufacturing Company.
- B. General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
  - 1. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
- C. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:80-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

## 2.4 FIRE-PROTECTION CABINET - FIRE EXTINGUISHER

- A. Basis-of-Design Product: Subject to compliance with requirements, Model No. 2409-6R Architectural Series as manufactured by Larsen's Manufacturing Company.
- B. Cabinet Type:
  - 1. Semi-Recessed, 27-1/2 inch by 13 inch outside trim dimension.
- C. Cabinet Construction:
  - 1. Rated to match partition when installed in rated assemblies.
- D. Cabinet Material: Enameled-steel sheet.
- E. Semirecessed Cabinet: Cabinet box partially recessed in walls of shallow depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
  - 1. Rolled-Edge Trim: 2-1/2 inch backbend depth.
- F. Cabinet Trim Material: Same material and finish as door.
- G. Door Material: Stainless steel sheet.
- H. Door Style: Vertical duo panel with frame.
  - 1. Door Glazing: Tempered float glass (clear).
  - 2. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
  - 3. Provide recessed door pull and friction latch.
  - 4. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.
- I. Accessories:
  - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  - 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
    - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
      - 1). Location: Applied to cabinet glazing.
    - b. 2) Application Process: Silk-screened.
    - c. 3) Lettering Color: Red.
    - d. 4) Orientation: Vertical.
- J. Finishes:
  - 1. Manufacturer's standard baked-enamel paint for the following:
    - a. Interior of cabinet.

2. Aluminum: Clear anodic.

## 2.5 MOUNTING BRACKETS

- A. Manufacturers: Same as extinguisher.
- B. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  1. Color: Red.

## 2.6 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  1. Weld joints and grind smooth. Mitered and riveted corners shall NOT be accepted.
  2. Construct fire-rated cabinets with double walls fabricated from 0.0428 inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch thick, fire-barrier material.
    - a. Provide factory-drilled mounting holes.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
  1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
  2. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth. Folded and riveted shall not be acceptable.

## 2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.8 STEEL FINISHES

- A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.
- B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

## 2.9 STAINLESS-STEEL FINISHES

- A. General: Remove tool and die marks and stretch lines or blend into finish.
  - 1. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- B. Bright, Directional Polish: No. 4 finish.
- C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged units.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

### 3.3 INSTALLATION

- A. General: Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights indicated below:
  - 1. Fire-Protection Cabinets: 54 inches above finished floor to top of cabinet.
  - 2. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.

- B. Fire-Protection Cabinets: Fasten fire-protection cabinets to structure, square and plumb.
  - 1. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

#### 3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection specialties are installed, unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet manufacturer.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

#### 3.5 SCHEDULE

- A. Provide extinguishers and cabinets in corridors and other areas indicated.
- B. Provide wall mounted extinguisher in electrical rooms and other locations indicated.

END OF SECTION 10 4400



## SECTION 10 7300 - PROTECTIVE COVERS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following items fabricated from extruded aluminum:
  - 1. Pre-engineered, pre-finished extruded aluminum canopies of the following types:
    - a. Wall-mounted suspended aluminum canopies.
- B. Related Sections
  - 1. Division 4 - Unit Masonry Assemblies.

## 1.3 REFERENCES

- A. References in these specifications to standards, test methods, codes etc., are implied to mean the latest edition of each such standard adopted.
  - 1. Specifications for Aluminum Structures, Sixth Edition.
  - 2. ASCE 7-95, Minimum Design Loads for Buildings and Other Structures.
  - 3. American Architectural Manufacturers Association (AAMA).
  - 4. American Society for Testing and Materials (ASTM).

## 1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
  - 1. All construction shall be in accordance with all applicable codes and ordinances.
  - 2. Aluminum deck and support shall resist all superimposed loads required by the International Building Code and other applicable ordinances.
  - 3. Complete assembly shall support a minimum 20 psf distributed load and/or a 300 pound concentrated load at any location without permanent deformation.

## 1.5 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer=s literature for all items specified herein. Indicate material type, finish and sizes.
- B. Shop Drawings: Submit shop drawings indicating all materials to be provided under this section. Shop drawings shall include a plan layout showing all bent and drainage locations elevations, column setting plans, all foundation and

connections details, and related items necessary for coordination with the trades involved.

#### 1.6 INFORMATIONAL SUBMITTALS

##### A. Certification:

1. Submit shop drawings stamped and signed by a Registered Professional Structural Engineer licensed in the State of Georgia. Design calculations shall state that the protective cover system and foundation design complies with the design loads, wind requirements, the stability criteria of applicable building code and of ASCE 7-95, and all other governing criteria.
2. SUBMITTALS RECEIVED WITHOUT STAMPED SHOP DRAWINGS SHALL BE RETURNED WITHOUT COMMENT.

##### B. Qualification Data: for manufacturer / installer.

#### 1.7 QUALITY ASSURANCE

- A. Protective Covers shall be wholly produced by a recognized manufacturer with at least five years experience in the design and fabrication of extruded aluminum walkway cover systems.
  1. All canopies shall be furnished and installed by a single manufacturer.
- B. Components shall be assembled in shop to greatest extent possible to minimize field assembly.
- C. Protective cover shall be installed by manufacturer. Third party installation is not acceptable.

#### 1.8 WARRANTY

- A. Protective cover system, including material and workmanship, shall be warranted from defects for a period of one year from substantial completion of installation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS:

- A. Basis-of-Design Product: Suspended canopies as manufactured by Perfection Architectural Systems, Inc. or comparable product by the following:
  1. Dittmar Architectural Aluminum.
  2. Mitchell Metals.
  3. Peachtree Protective Covers, Inc.
  4. PolyVision Corporation.

#### 2.2 COMPONENTS

- A. General:

1. Protective cover shall be all welded extruded aluminum system complete with internal drainage. Non-welded systems are not acceptable.
  - a. Roll formed deck is not acceptable.
2. Material thicknesses specified are minimum requirements. Heavier component required by code or design to meet Contract Design Requirements shall be furnished at no additional costs.
3. Expansion joints shall be included to accommodate temperature changes of 120°F. Expansion joints shall have no metal to metal contact.

B. Materials:

1. All sections shall be extruded aluminum 6063 alloy heat treated to T-6 temper for maximum strength. Color to be AA-M-10 C-22 A-31 (AAMA 607.1) clear anodized.
2. Fasteners: Fasteners shall be aluminum, 18-8 stainless steel or 300 series stainless steel.
3. Gaskets: Gaskets shall be dry seal santoprene pressure type.

C. Components:

1. Deck: Deck shall be extruded self-flashing sections interlocking into a composite unit. Closures at deck ends shall be welded plates.
2. Fascia: Fascia shall be manufacturer's standard shape. Size as indicated on drawings.
3. Flashing: Flashing shall be .040 aluminum (min.).
4. Hanger Rods: 3/4- inch minimum diameter galvanized steel pipe with powder-coated finish to match aluminum finish.

## 2.3 FABRICATION

- A. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at 8" O.C. creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Deck shall be assembled with sufficient camber to offset dead load deflection.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Preparation: Erection shall be scheduled by the manufacturer or his authorized agent after all masonry, and cleaning work in the vicinity is complete and cleaned.
- B. Erection: Canopies shall be erected true to line, level and plumb.
- C. Flashing: Contractor shall provide flashing at adjoining structures to insure a watertight application.

3.2 CLEANING

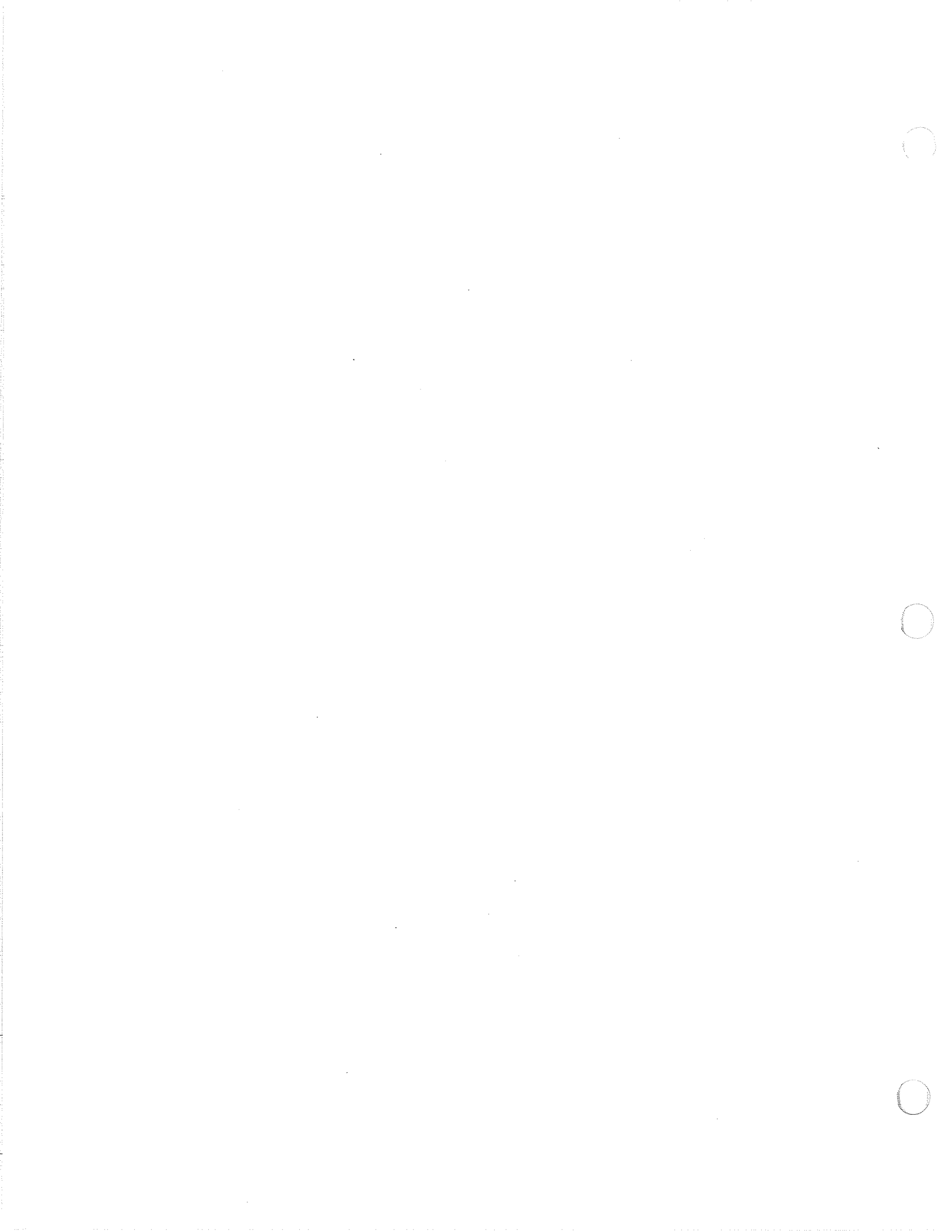
- A. Clean-up: All components of canopy to be cleaned on completion and work area left in neat condition.

End of Section 10 7300

**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 11

EQUIPMENT



## SECTION 11 5200 - AUDIO-VISUAL EQUIPMENT

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Ceiling mounted adjustable projector mount.
  - 2. Wall-mounted television mounts.
- B. Allowances: Refer to Division 1 Section "Allowances" for provisions for projectors.
- C. Related Sections include the following:
  - 1. Division 9 Section "Acoustical Panel Ceilings" for lay-in suspension system.
  - 2. Division 26 "Electrical" for power and data systems.

## 1.3 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for projector mount.

## 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

## 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of projection mounts that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: One year from date of substantial completion.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, products manufactured by Peerless Industries, Inc. or compatible products by the following:
  - 1. Bretford Manufacturing Company.
  - 2. Chief Manufacturing Co.

## 2.2 CEILING MOUNTED PROJECTOR MOUNTS

- A. Projector Ceiling Plate: Suspended plate should be Peerless CMJ 455, White in color, Max. Load 50 lbs with five point attachment.
- B. Multi directional universal projector mounts: Provide Peerless PJC, color black (fused epoxy), Roll (30 degrees, with keyed locking), pitch (30 degrees), Yaw (360 degrees), 1-1/2" x 11.5 NPT, Max Load 50 lb.
  - 1. Mount to include quick-release.
- C. Projector Mount Accessories: Provide Peerless ADJ series, color black (fused epoxy), 1-1/2 inch x 11.5 NPT extension column with ACC800 cord management adapter and stability kit in each direction.
  - 1. Length: Custom 72 inch.
  - 2. Provide secondary support extending above from ceiling plate to anchor projector mount directly to structure.

## 2.3 WALL-MOUNTED TELEVISION BRACKETS

- A. Basis-of-Design Product: Peerless Model No. PP740.
  - 1. Maximum Load Capacity: 80 pounds.
  - 2. Extends 8.13 inch maximum, retracts to 2.93 inches from wall.
  - 3. Tilt: continuous one touch with +15, -5 degrees range.
  - 4. Roll: +/- 7 degrees of roll to level screen horizontally.
  - 5. Accessories:
    - a. Integrated cable management system.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions for compliance with requirements for installation tolerance and other conditions affecting performance of work, including proper orientation of projector mount.

### 3.2 INSTALLATION, GENERAL

- A. Assembly and installation shall be done according to instructions provided by the manufacturer.

### 3.3 CLEANING

- A. Clean all products installed under this section prior to substantial completion.

END OF SECTION 11520



## SECTION 11 5213 - PROJECTION SCREENS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Front-projection screens.
- B. Related Sections include the following:
  - 1. Division 6 Section "Rough Carpentry" for wood backing for recessed screen installation.
  - 2. Division 26 Sections for electrical service and connections including metal device boxes for switches.

## 1.3 DEFINITIONS

- A. Gain of Front-Projection Screens: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.
- B. Half-Gain Angle: The angle, measured from the axis of the screen surface, to the most central position on a perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of screen indicated.
- B. Shop Drawings: Show layouts and types of projection screens. Include the following:
  - 1. Location of screen centerline relative to ends of screen case.
  - 2. Location of wiring connections.
  - 3. Drop length.
  - 4. Connections to supporting structure for pendant- and recess-mounted screens.
  - 5. Anchorage details.
  - 6. Details of juncture of exposed surfaces with adjacent finishes.
  - 7. Accessories.
  - 8. Wiring Diagrams: For electrically operated units.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain projection screens through one source from a single manufacturer. Obtain each screen as a complete unit, including necessary mounting hardware and accessories.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver projection screens until building is enclosed and other construction within spaces where screens will be installed is substantially complete and ready for screen installation.

## 1.7 COORDINATION

- A. Coordinate layout and installation of projection screens with adjacent construction, including ceiling framing, light fixtures, HVAC equipment, fire-suppression system, and partitions.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Cosmopolitan Electrol as manufactured by DA-Lite Screen Company, Inc. or comparable model by the following:
  - 1. Draper, Inc.
  - 2. Stewart Filmscreen Corporation.

### 2.2 FRONT-PROJECTION SCREENS

- A. Electrically Operated Screens, General: Manufacturer's standard units consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation. Provide units that are listed and labeled as an assembly by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Line Voltage Control: Remote, key-operated, 3-position control switch installed in recessed metal device box with flush cover plate matching other electrical device cover plates in room where switch is installed.
  - 2. Motor in Roller: Instant-reversing motor of size and capacity recommended by screen manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.
  - 3. Screen Mounting: Top edge securely anchored to rigid metal roller and bottom edge formed into a pocket holding a 3/8-inch diameter metal rod with ends of rod protected by plastic caps.

- a. Roller for motor in roller supported by vibration- and noise-absorbing supports.
- B. Wall Mounted, Electrically Operated Screens: Motor in roller units designed and fabricated for suspended mounting.
  1. Screen Case: Made from metal.
    - a. Color: White.
- C. Screen Material and Viewing Surface:
  1. Glass-Beaded Viewing Surface: Peak gain of 2.0 to 2.8, and half-gain angle of at least 15 degrees.
- D. Mildew Resistance: Rating of 0 or 1 when tested according to ASTM G 21.
- E. Seamless Construction: Provide screens without seams.
- F. Edge Treatment: With black masking borders.
- G. Provide extra drop length of dimension indicated to comply with the following requirements for fabric color and location of drop length:
  1. Color: Black.
  2. Location: At top of screen.
- H. Size of Viewing Surface: 6'-0"H x 8'-0"W plus 3' deep drop.

### PART 3 - EXECUTION

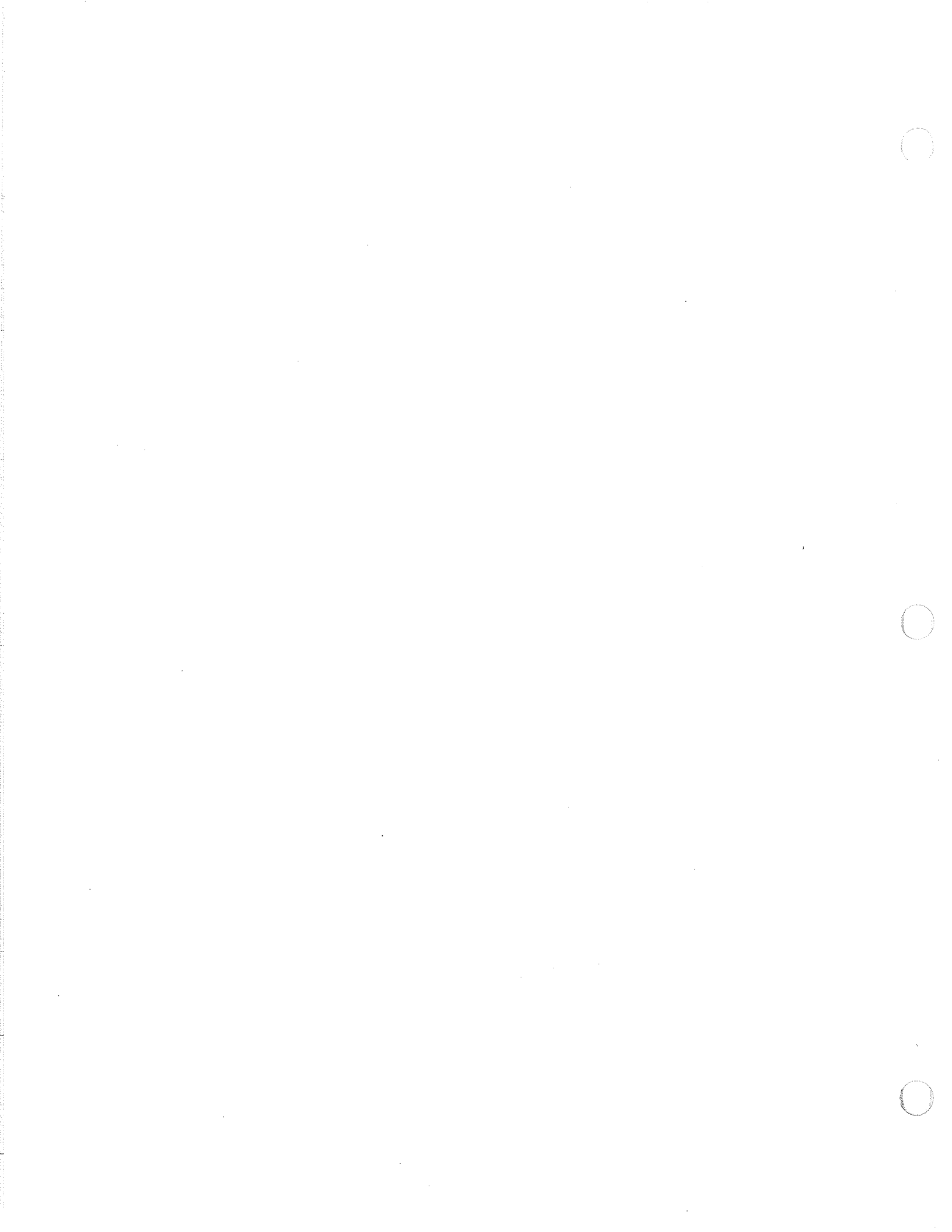
#### 3.1 INSTALLATION

- A. General: Install projection screens at locations indicated to comply with screen manufacturer's written instructions.
- B. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.
  1. Test electrically operated units to verify that screen controls, limit switches, closure, and other operating components are in optimum functioning condition.
  2. Test manually operated units to verify that screen operating components are in optimum functioning condition.

#### 3.2 PROTECTING AND CLEANING

- A. After installation, protect projection screens from damage during construction. If damage occurs despite such protection, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

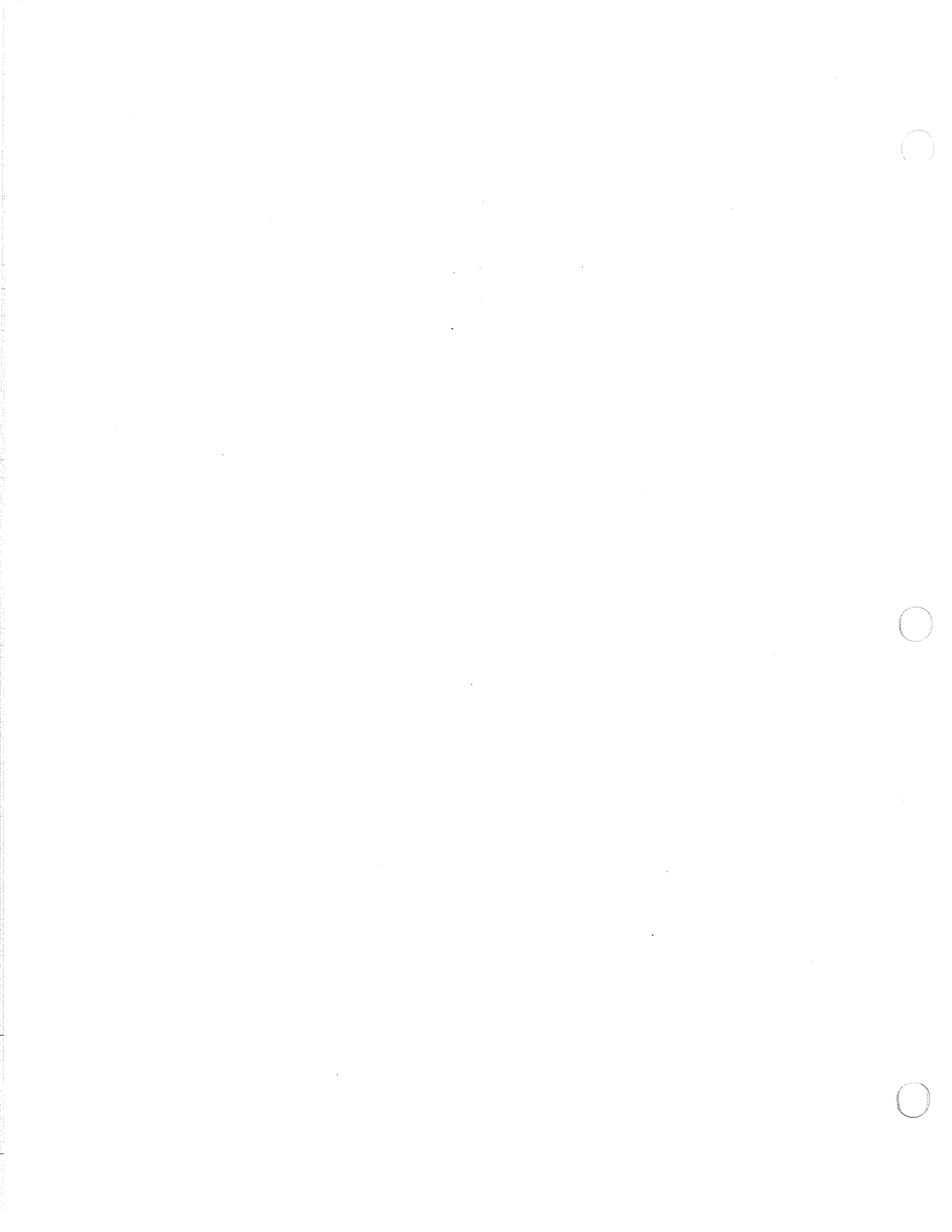
END OF SECTION 11 5213



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 12

FURNISHINGS



## SECTION 12 2113 - HORIZONTAL LOUVER BLINDS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Horizontal louver blinds with aluminum slats.
  - 2. Motorized operators.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type and color of horizontal louver blind indicated.
  - 1. Include similar samples of accessories involving color selection.

## 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain horizontal louver blinds through one source from a single manufacturer.
- B. Product Standard: Provide horizontal louver blinds complying with WCSC A 100.1.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver horizontal louver blinds in factory packages, marked with manufacturer and product name, and location of installation using same designations indicated on Drawings and in a window treatment schedule.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet and dirty finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware

throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

## 1.7 WARRANTY

- A. Blinds: Lifetime of installation.
- B. Motor Operators:
  - 1. Workmanship of Motors and Hardware: Five years.
  - 2. Electronic Components: One year.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Riviera Mini Blinds as manufactured by Levolor Contract Shading Systems or comparable product by the following:
  - 1. Bali Contact Division of Spring Window Fashions
  - 2. Hunter-Douglas.

### 2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

- A. Headrail: Formed steel; long edges rolled; fully enclosing operating mechanisms on three sides and end plugs in accordance with the following:
  - 1. Headrail shall be of 0.25" thick steel, "U"-shaped 1 inch x 1 inch wide with flanged edges at top, and coated with baked-on finish. All hardware shall be concealed in the headrail.
  - 2. Capacity: One blind per headrail.
  - 3. Integrated Headrail/Valance: Curved face.
  - 4. Light-blocking lower back lip.
  - 5. Tilt limiter with preselected degree settings.
- B. Clutch Tilter: Mechanism shall be of 0.626" thick plastic housing, automatically disengaging worm and gear mechanism to provide maximum closure, eliminate over drive, and prevent strain or damage to blind.
- C. Tilt Rod: Tilt rod shall be hexagonal, with a circular radius of approximately 0.125 designed to achieve minimum torsion deflection.
- D. Tilt Wand shall be transparent with a hexagonal cross section 1/4 inch across.
- E. Cord lock shall be .055" thick steel and shall be securely attached to headrail. It shall be a crash-proof type with sufficient sensitivity to lock slats at desired height upon release cords.
- F. Drum and Cradle shall be provided for each ladder.
  - 1. Drums shall be .027 steel to position both ladder ends.
  - 2. Cradles shall be of .082" thick plastic having two holes to guide cords through bottom of head rail without abrasion. They shall provide bearing support for the tilt rod, thus preventing the weight of the blind



from being transferred to the tilter. Cradles shall center drums over ladder openings.

- G. Mounting: Wall mounting, permitting easy removal and replacement without damaging blind or adjacent surfaces and finishes; with spacers and shims required for blind placement and alignment indicated.
1. Mounting Brackets shall be of at least .048" thick steel with baked-on finish to match headrail. The brackets shall incorporate a rivet-hinged safety locking front cover to permit removal of the headrail without lateral movement. Mounting holes shall be located to accommodate overhead, side or face mounting.
  2. Provide intermediate support brackets if end support spacing exceeds spacing recommended by manufacturer for weight and size of blind. Brackets shall be of .050" thick steel and shall be installed with blinds over 60" wide and under 80" long, or over 55" wide and over 80" long.
- H. Ladders: Slat support shall be braided polyester yarn dyed to match blind color. The two vertical components shall be not less than 0.45 inch nor greater than 0.066 inch designed for maximum flexibility combined with minimum stretch and tensile strength of not less than 50 lbs. per cable. Horizontal components shall consist of not less than two crossed cables interbraided with the vertical components. Ladder shall support the slats without visible distortion. Distance between slats shall not exceed 19.6 mm (normally 15.7 slats per vertical foot). Distance between ladders shall not exceed 23" for blinds up to 80" long; distance between ladders shall not be greater than 22". Distance between end ladder and end of slat shall not exceed 7". For blinds over 80" long, distance between ladders shall not be greater than 22". Distance between end ladder and end of slat not to exceed 7".
- I. Slats: Slats shall be aluminum alloy, which includes recycled aluminum materials. Aluminum alloy shall be tempered to optimize tensile and yield strength for superior salt strength, resiliency and corrosion resistance.
1. Width: 1 inch.
    - a. Spacing: Not less than 15.7 slats per foot.
  2. Thickness: 0.006 inch thick prior to coating; after coating the thickness shall be 0.007 inch.
  3. Slats shall have a baked-on coating thickness of 0.8 mil to 1.5 mil.
  4. Testing: Un-perforated slats shall perform up to 500 hours of 100% relative humidity testing, 300 hours of 5% salt spray solution at 95 degree F testing, and 250 hours of accelerated weathering testing without blistering, fading, corroding, or adhesive failure. Slat thickness and ladder support distances shall prevent visible sag or distortion after continued use indoor.
  5. Finish: One color.
    - a. Ionized Coating: Antistatic, dust-repellent, baked polyester finish.
- J. Bottom Rail: Shall be of 0.023" thick steel formed coating and shall be provided with clear molded plastic ladder and end caps having integral protrusions designed to prevent bottom bar from marring windowsills and/or mullions.

- K. Lift Cords: Lift cord shall be braided of high strength, 1.4 mm diameter polyester fiber with a high tenacity polyester core, 34 picks per inch, 16 carrier smooth braids, and shall be flexible, have minimum stretch, maximum abrasion characteristics, and a minimum breaking strength of 130 lbs. Cord shall be of sufficient length equalized to properly control raising and lowering of blind and spaced not over 46" between cords.
- L. End Brace shall be of .035" thick steel with reinforcing ribs and field adjustable tabs. End braces shall incorporate a field adjustable tab to ensure secure installation, center blind in window, and prevent lateral movement.
- M. Colors, Textures, Patterns, and Gloss: As selected by Architect from manufacturer's full range.

### 2.3 HORIZONTAL LOUVER BLIND FABRICATION

- A. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
  - 1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.
- B. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F.
  - 1. Blind Units Installed between (inside) Jambs: Width equal to 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch, less than jamb-to-jamb dimension of opening in which each blind is installed. Length equal to 1/4 inch , plus or minus 1/8 inch, less than head-to-sill dimension of opening in which each blind is installed.
- C. Installation Brackets: Designed for easy removal and reinstallation of blind, for supporting headrail and operating hardware, and for hardware position and blind mounting method indicated.
- D. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.
- E. Color-Coated Finish:
  - 1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

### 2.4 MOTORIZED OPERATORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide MLS-40 motorized lift & tilt/lift system as manufactured by BTX Window Automation Inc or comparable product by one of the following:
  - 1. Am-Source International.
  - 2. SM Automatic, Inc.

- B. General: Provide factory-assembled blind-operator systems of size and capacity and with features, characteristics, and accessories suitable for conditions indicated and recommended by motorized operator and blind manufacturers for use with blinds indicated, complete with electric motors and factory-prewired motor controls, power disconnect switches, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
  - 1. Headrail: As specified for blind(s) operated by motorized operator.
  - 2. Function: Lift and tilt.
  - 3. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Control Equipment: Comply with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6.
- D. Electric Motors: Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Division 11 Section "Common Motor Requirements for Equipment."
  - 1. Electrical Characteristics: Single phase, 110 V, 60 Hz.
- E. Remote Controls: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following for remote-control activation of blinds:
  - 1. Keyed Control Stations: Keyed, momentary-contact, three-position, switch-operated control station with open, close, and off functions. Provide two keys per station.
  - 2. Group Control Stations: Momentary-contact, three-position, rocker-style, wall-switch-operated control station with open, close, and center off functions for single-switch group control.
  - 3. Color: Ivory.
- F. Limit Switches: Adjustable switches, interlocked with motor controls and set to stop blind automatically at fully raised and fully lowered positions.
- G. Operating Features:
  - 1. Group switching with integrated switch control; single faceplate for multiple switch cutouts.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 2. Measurements will be made to assure maximum aesthetic coverage of the window area without interference to surrounding structures.

3. All operating devices will be placed for convenience of users with special attention to child safety and to prevent destruction of blinds by school children.

### 3.2 INSTALLATION

- A. Install horizontal louver blinds level and plumb and aligned with adjacent units according to manufacturer's written instructions, and located so exterior slat edges in any position are not closer than 1 inch to interior face of glass. Install intermediate support as required to prevent deflection in headrail. Allow clearances between adjacent blinds and for operating glazed opening's operation hardware if any.
- B. Flush Mounted: Install horizontal louver blinds with slat edges flush with finish face of opening if slats are tilted open.
- C. Each mounting bracket or hold-down bracket is to be mounted using not less than two screws of sufficient length to assure permanent installation. Special brackets as required in custom installations will be provided at no additional cost to the Owner.

### 3.3 ADJUSTING

- A. Adjust horizontal louver blinds to operate smoothly, easily, safely, and free of binding or malfunction throughout entire operational range.

### 3.4 CLEANING AND PROTECTION

- A. Clean horizontal louver blind surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged horizontal louver blinds that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

### 3.5 SCHEDULE

- A. Furnish and install aluminum blinds on all exterior windows except at windows and doors located in corridors.
  1. Provide motor-operators all all openings where sill height exceeds 72 inches.
- B. Furnish and install aluminum blinds on interior windows.
- C. Blinds shall not be furnished in existing building unless otherwise indicated.

END OF SECTION 12 2113

## SECTION 12 3216 - MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. General Requirements: Refer to the General Conditions, the Supplementary General Conditions and Division 1, all provisions of which apply to work under this section as if written in full herein.

## 1.2 SUMMARY

- A. Section Includes: Fabricate and install all new items of casework and cabinetry including all accessories, cabinet hardware, trim and filler panels that are integral with casework.
  - 1.
- B. Related Items:
  - 1. Division 12 - Plastic-Laminate-Clad Music Casework for modular casework indicated for instrument, folios and uniform storage.
  - 2. Rough blocking and furring shall be furnished in accordance with the requirements of Division 6.
  - 3.

## 1.3 DEFINITIONS

- A. Identification of casework components and related products by surface visibility.
  - 1. Open Interiors: Any open storage unit without solid door fronts.
  - 2. Closed Interiors: Any closed storage unit behind solid door or drawer fronts.
  - 3. Exposed Ends: Any storage unit exterior side surface that is visible after installation.
  - 4. Other Exposed Surfaces: Faces of doors and drawers when closed, and tops of cabinets less than 72 inches above furnished floor.
  - 5. Semi-Exposed Surfaces: Interior surfaces which are visible, bottoms of wall cabinets and tops of cabinets 72 inches or more above finished floor.
  - 6. Concealed Surfaces: Any surface not visible after installation.

## 1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
  - 1. Design system of cabinets which will be chip and abrasion resistant under normal usage and will protect instruments and cases from damage under normal use.
  - 2. Design shelving to withstand continuous use without surface or front edge breakdown.

### 1.5 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's literature and catalog cuts on all products specified herein where available.
- B. Shop Drawings:
  - 1. Submit shop drawings showing complete details of fabrication and installation.
  - 2. Shop drawings shall show layout and dimensions, product reference numbers, construction details where necessary and relationship of this work to other work.
- C. Samples: Plastic laminate shall be furnished for selection by Architect.

### 1.6 INFORMATIONAL SUBMITTALS

- A. Certifications:
  - 1. Letter from manufacturer confirming that the installer is an acceptable contractor authorized to install the specified system.
  - 2. Letter from manufacturer and installer documenting required experience in the manufacturing and installation of the products specified. Include contact persons with owner, architect and/or contractors.
  - 3. SUBMITTALS RECEIVED WITHOUT THESE CERTIFICATIONS SHALL NOT BE REVIEWED.

### 1.7 QUALITY ASSURANCE

- A. Qualifications of Manufacturer:
  - 1. Minimum of five (5) years experience in the manufacture of casework and furnishing as specified herein.
  - 2. Minimum of five (5) completed installations of equal size and educational requirements which can be inspected prior to the award of the Contract.
- B. All products covered by this Specification shall be manufactured or furnished by one casework manufacturing company.

### 1.8 PRODUCT HANDLING AND STORAGE

- A. Protection: Use all means necessary to protect the materials of the Section before, during and after installation, and to protect the work and materials of all other trades.
- B. Deliver casework only after wet operations in building are completed. Store casework in a ventilated place, protected from the weather, with relative humidity therein of 50% or less and with temperature of 70° F or greater.
- C. Protect finished surfaces from soiling and damage during handling and installation.

- D. Replacement: In the event of damage prior to acceptance, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

## 1.9 PROJECT CONDITIONS

- A. Air circulation control system shall be functioning and maintaining relatively constant temperature and humidity conditions closely approximately those to be maintained by the owner for at least one week prior to the installation of casework.
  - 1. Manufacturer/Supplier shall advise Contractor of temperature and humidity requirements for architectural casework installation areas.
  - 2. After installation, control temperature and humidity to maintain relative humidity between 25 percent and 55 percent.

## 1.10 WARRANTY

- A. Casework manufacturer shall guarantee to replace or repair, at no expense to the owner, all materials of this contract found to be defective within five years of date of substantial completion, due to defective materials and/or workmanship.
- B. Shelving shall be guaranteed for a period of ten years from the date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, products manufactured by TMI Systems Design Corporation or comparable products by the following:
  - 1. Case Systems, Inc.
  - 2. LSI Corporation.
  - 3. Stevens Industries, Inc.
  - 4. The Wenger Corporation.

### 2.2 MATERIALS

- A. Core Materials:
  - 1. Particleboard up to 7/8 inch thick: Industrial Grade (cabinet), minimum average 47-pound density particleboard, ANSI A 208.1-2009, M-2 requirements with thermoset polyester laminate.
  - 2. Particleboard 1 inch thick and thicker: Industrial Grade average 45-pound density particle-board, ANSI A 208.1-2009, M-2 requirements.
  - 3. Medium Density Fiberboard 1/4 inch thick: Average 54-pound density grade, ANSI A208.2-2009 requirements.
  - 4. Tempered Hardboard: Oil-tempered hardboard shall conform to CS 251 and shall be a wood fiber/resinous combination formed with heat and pressure into sheets providing a hard, smooth surface. Untempered or non-oil tempered hardboard is not permitted.

5. MR Moisture Resistant Particleboard: Average 47-pound density particleboard, ANSI A208.1 1-2009, M-2 requirements.
- B. Decorative Laminates:
1. High-pressure decorative laminate HGS, NEMA Test LD 3-2005.
  2. High-pressure decorative laminate HGP, NEMA Test LD 3-2005.
  3. High-pressure cabinet liner CLS, NEMA Test LD 3-2005.
  4. High-pressure backer BKH, NEMA Test LD3-2005.
  5. Thermally fused melamine laminate, NEMA Test LD 3-2005.
  6. Laminate Adhesive: Water based low Volatile Organic Compound (VOC), non-toxic, PVA adhesive.
  7. Colors: To be selected from manufacturer's full range of colors and textures.
- C. Edging: 0.118 inch beveled PVC edge-banding, color - to match laminate.

### 2.3 CABINET HARDWARE

- A. Hinges:
1. Five knuckle, epoxy powder coated, institutional grade, 2-3/4 inch overlay type with hospital tip. 0.095 inch thick. ANSI-BHMA standard A156.9, Grade 1.
    - a. Doors 48 inches and over in height have 3 hinges per door.
    - b. Magnetic door catch with maximum 5 pound pull provided, attached with screws and slotted for adjustment.
    - c. Anchor hinges with engineered screws. Wood screws are not allowed.
- B. Pulls:
1. Door and drawer front pulls are rectangular, semi-recessed, injection molded plastic, screw fastened.
  2. Pull design shall comply with the Americans with Disability Act (ADA).
  3. Provide 2 pulls for drawers more than 24 inches wide.
- C. Door Catches: Zinc-plated, nylon-roller spring catch. Provide 2 catches on doors more than 48 inches high.
- D. Drawer Slides: BHMA A156.9, Type B05091.
1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-overtravel-extension type; zinc-plated, steel ball-bearing slides.
    - a. Box Drawer Slides: Grade 1HD-100, for drawers not more than 6 inches high and 24 inches wide.
    - b. File Drawer Slides: Grade 1HD-200, for drawers more than 6 inches high or 24 inches wide.
- E. Adjustable Shelf Supports:
1. Injection molded transparent polycarbonate friction fit into cabinet end panels and vertical dividers, adjustable on 32mm centers.
    - a. Each shelf support has 2 integral support pins, 5mm diameter, to interface pre-drilled holes, and to prevent accidental rotation of support.



- b. The support shall automatically adapt to 3/4 inch or 1 inch thick shelving and provides non-tip feature for shelving.
  - c. Supports may be field fixed if desired.
  - d. Structural load to 1200 pounds (300 pounds per support) without failure.
- F. Drawer and Hinged Door Locks: Half-mortise type with only cylinder exposed, 5-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.
- 1. Provide a minimum of two keys per lock and six master keys.
  - 2. Provide locks where indicated.
  - 3. Provide spring bolt with chain at top with elbow catch at bottom at inactive leaf of pairs.
- A. Grommets for Cable Passage through Countertops: 2-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.
- G. Coat Rods: 1 inch diameter, 14-gauge chrome plated steel installed in captive mounting hardware.
- H. Mirrors: 1/8 inch thick mirrored acrylic, break and impact resistant.

#### 2.4 FABRICATION

- A. Fabricate casework to dimensions and profiles shown.
- B. Casework shall be full-overlay type.
- C. All casework panel components must go through a supplemental sizing process after cutting, producing a panel precisely finished in size and squareness to within 0.010 inches, ensuring strict dimensional quality and structural integrity in the final fabricated product.
- D. Cabinet Body Construction:
- 1. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.
  - 2. Tops and bottoms shall be glued and doweled to cabinet sides and internal cabinet components such as fixed horizontals and vertical dividers. Exposed assembly hardware and through-bolt assembly construction methods will not be accepted.
    - a. Minimum of 6 dowels each joint for 24 inch deep cabinets.
    - b. Minimum of 4 dowels each joint for 12 inch deep cabinets.
    - c. Tops, bottoms and sides of all cabinets shall be particleboard core.
  - 3. Cabinet backs: 1/4 inch thick oil-tempered hardboard panel fully captured by the cabinet top, bottom and side panels. Finish to match cabinet interior.
    - a. 3/4 inch x 4 inch particleboard rails will be placed behind the back panel at the top and bottom, and doweled to the sides utilizing 10mm hardwood fluted dowels.

- b. A third intermediate rail shall be included on all cabinets taller than 56 inches.
      - c. Utilize hot melt glue to further secure back and increase overall strength.
4. Cabinet sub-base shall be a separate and continuous ladder-type platform design, leveled and floor mounted prior to cabinet body placement. Materials shall be exterior grade plywood. No cabinet sides shall be allowed to extend to the floor.
  - a. Base shall be finished with rubber base as specified in Division 9 - Resilient Flooring.
5. Tops:
  - a. Base units, except sink base units: Full sub-top.
  - b. Sink base: Open top and a stretcher at the front, attached to the sides. Back to be split removable access panel.
6. Side panels and vertical dividers shall receive adjustable shelf hardware at 32mm line boring centers. Mount door hinges, drawer slides and pull-out shelves in the line boring for consistent alignment.
  - a. Exposed and semi exposed edges.
    - 1). 3mm PVC banding, machine applied.
7. Adjustable Shelves in Cabinets:
  - a. Core: Particleboard.
  - b. Core Thickness: 3/4 inch up to 27 inches wide, 1 inch over 27 inches wide.
  - c. Edge: 3mm PVC on front edge only.
8. Interior finish, units with open Interiors:
  - a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with high-pressure decorative laminate, type VGS.
9. Interior finish, units with closed Interiors:
  - a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with Thermally Fused Melamine laminate.
10. Exposed ends:
  - a. Faced with high-pressure decorative HGS laminate.
11. Wall unit bottom:
  - a. Faced with thermally fused melamine laminate.
12. Drawers:
  - a. Sides, back and sub front: Minimum 1/2 inch thick particleboard, laminated with thermally fused melamine doweled and glued into sides. Top edge banded with 1mm PVC.
  - b. Drawer bottom: Minimum 1/2 inch thick particleboard laminated with thermally fused melamine, screwed directly to the bottom edges of drawer box.
  - c. Paper storage drawers: Minimum 3/4 inch thick particleboard sides, back, and sub front laminated with thermally fused melamine. Minimum 1/2 inch thick particleboard drawer bottoms screwed directly to the bottom edges of the drawer box. Provide PVC angle retaining bar at the rear of the drawer.
13. Door/Drawer Fronts:
  - a. Core: 3/4 inch thick particleboard.

- b. High-pressure decorative HGS laminate exterior, balanced with high-pressure cabinet liner CLS.
- c. Edges: 3mm PVC, machine applied, external edges and outside corners machine profiled to 1/8 inch radius.
- d. Provide double doors in opening in excess of 24 inches wide.

## 2.5 COUNTERTOPS

- A. Core:
  - 1. All countertops except at sink elevations: 1-1/2 inch thick ANSI A208.1-1993 M-2 particleboard.
  - 2. Countertops at sink elevations: 1-1/2 inch thick comprised of calibrated plywood.
- B. Adhesives:
  - 1. All countertops except at sink elevations: water-resistive.
  - 2. Countertops at sink elevations: non-soluble glue.
- C. Surface: High-pressure decorative HGS laminate with balanced backer sheeting.
  - 1. Edges, including applied backsplash and sidesplashes: High-pressure decorative HGS laminate with balanced backer sheeting.
  - 2. All countertops joints must be dry fit at the factory to check for consistency in color from one panel to the other and overall finished panel thickness, resulting in a high quality product easy to install.

## 2.6 MISCELLANEOUS

- A. Required Options: Furnish and install the following options:
  - 1. Vertical Closure Kit: Provide visual closure between wall and cabinet constructed of 3/4 inch thick laminate-clad to match cabinet.
  - 2. Top Back Filler Kit: Provide visual closure between back wall and top panel of cabinet constructed of 0.750 inch thick thermoset composite wood.

## PART 3 - EXECUTION

### 3.1 ACCEPTABLE INSTALLERS

- A. Installer shall be acceptable to the manufacturer.
- B. Installer shall be skilled in the craft of the Section and have been regularly engaged in this business for the last five (5) years.

### 3.2 EXAMINATION

- A. Site Verification of Conditions:
  - 1. Field measurements shall be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a manner to permit it to be moved through properly into place.
  - 2. Prior to commencing installation, verify that surface and environmental conditions are proper for installation of this material.

3. Do any necessary remedial work to correct surfaces and/or utilities to receive this work.

### 3.3 INSTALLATION

#### A. Description:

1. Install casework in accordance with approved shop drawings and manufacturer's recommendations.
2. All components shall be fully assembled, installed and securely fastened in place, plumb, level, and true to line, in complete working order. Scribe work to adjacent finishes. Use scribe mold as needed. Final mechanical and electrical connections shall be made as outlined in other divisions of these specifications.

#### B. Final:

1. Upon completion, check all parts, hardware, doors, etc. and see that all units are complete and that everything operate smoothly and properly. In particular, check that all doors fit right, are neatly in position and are not warped. Doors and drawer fronts shall align. Make all necessary corrections. Clean all cabinets, wash all other items built-in to casework.

End of Section 12 3217

## SECTION 12 3217 MANUFACTURED PLASTIC-LAMINATE-CLAD MUSIC CASEWORK

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. General Requirements: Refer to the General Conditions, the Supplementary General Conditions and Division 1, all provisions of which apply to work under this section as if written in full herein.

## 1.2 SUMMARY

- A. Section Includes: Fabricate and install all new items of musical instrument, uniform/robe storage casework and cabinetry including all accessories, cabinet hardware, trim and filler panels that are integral with casework.
- B. Related Items:
  - 1. Modular casework in other areas indicated shall be furnished in accordance with the requirements of Division 12 - Manufactured Plastic-Laminate-Clad Casework.
  - 2. Rough blocking and furring shall be furnished in accordance with the requirements of Division 6.

## 1.3 DEFINITIONS

- A. Identification of casework components and related products by surface visibility.
  - 1. Open Interiors: Any open storage unit without solid door fronts, and units with wire grille doors.
  - 2. Exposed Ends: Any storage unit exterior side surface that is visible after installation.
  - 3. Concealed Surfaces: Any surface not visible after installation.

## 1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
  - 1. Design system of storage cabinets for musical instruments which will be chip and abrasion resistant under normal usage and will protect instruments and cases from damage under normal use.
  - 2. Design shelving to withstand continuous use without surface or front edge breakdown.

## 1.5 SUBMITTALS

- A. Certifications:
  - 1. Letter from manufacturer confirming that the installer is an acceptable contractor authorized to install the specified system.
  - 2. Letter from manufacturer and installer documenting required experience in the manufacturing and installation of the products

specified. Include contact persons with owner, architect and/or contractors.

3. Submittals received without these certifications shall not be reviewed.

B. Product Data: Submit manufacturer's literature and catalog cuts on all products specified herein where available.

C. Shop Drawings:

1. Submit shop drawings showing complete details of fabrication and installation.

2. Shop drawings shall show layout and dimensions, product reference numbers, construction details where necessary and relationship of this work to other work.

D. Samples: Plastic laminate shall be furnished for selection by Architect.

#### 1.6 QUALITY ASSURANCE

A. Qualifications of Manufacturer:

1. Minimum of five (5) years experience in the manufacture of casework and furnishing as specified herein.

2. Minimum of five (5) completed installations of equal size and educational requirements which can be inspected prior to the award of the Contract.

B. All products covered by this Specification shall be manufactured or furnished by one casework manufacturing company.

#### 1.7 PRODUCT HANDLING AND STORAGE

A. Protection: Use all means necessary to protect the materials of the Section before, during and after installation, and to protect the work and materials of all other trades.

B. Deliver casework only after wet operations in building are completed. Store casework in a ventilated place, protected from the weather, with relative humidity therein of 50% or less and with temperature of 70° F or greater.

C. Protect finished surfaces from soiling and damage during handling and installation.

D. Replacement: In the event of damage prior to acceptance, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

#### 1.8 PROJECT CONDITIONS

A. Air circulation control system shall be functioning and maintaining relatively constant temperature and humidity conditions closely approximately those to be maintained by the owner for at least one week prior to the installation of casework.

1. Manufacturer/Supplier shall advise Contractor of temperature and humidity requirements for architectural casework installation areas.
2. After installation, control temperature and humidity to maintain relative humidity between 25 percent and 55 percent.

#### 1.9 WARRANTY

- A. Casework manufacturer shall guarantee to replace or repair, at no expense to the owner, all materials of this contract found to be defective within five years of date of substantial completion, due to defective materials and/or workmanship.
- B. Shelving shall be guaranteed for a period of ten years from the date of substantial completion.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Products manufactured by TMI Systems Design Corporation complying with this specifications or comparable products by the following:
  1. Case Systems, Inc.
  2. LSI Corporation.
  3. Stevens Industries, Inc.
  4. The Wenger Corporation.

#### 2.2 MATERIALS

- A. Core Materials:
  1. Particleboard up to 7/8 inch thick: Industrial Grade (cabinet), minimum average 47-pound density particleboard, ANSI A 208.1-2009, M-2 requirements with thermoset polyester laminate.
  2. Particleboard 1 inch thick and thicker: Industrial Grade average 45-pound density particle-board, ANSI A 208.1-2009, M-2 requirements.
- B. Decorative Laminates:
  1. High-pressure decorative laminate VGS (.028), NEMA Test LD 3-2005.
  2. High-pressure cabinet liner CLS (.020), NEMA Test LD 3-2005.
  3. Thermally fused melamine laminate, NEMA Test LD 3-2005, color matched with White.
  4. Laminate Adhesive: Water based low Volatile Organic Compound (VOC), non-toxic, PVA adhesive.
  5. Colors: To be selected from manufacturer's full range of colors and textures.
- C. Edging: 0.118 inch beveled PVC edge-banding, color - to match laminate.

## 2.3 CABINET HARDWARE

- A. Hinges:
1. Five knuckle, epoxy powder coated, institutional grade, 2-3/4 inch overlay type with hospital tip. 0.095 inch thick. ANSI-BHMA standard A156.9, Grade 1.
    - a. Doors 48 inches and over in height have 3 hinges per door.
  2. Padlocks: Not Included
- B. Coat Rods: 1 inch diameter, 14-gauge chrome plated steel installed in captive mounting hardware.

## 2.4 FABRICATION

- A. Fabricate casework to dimensions and profiles shown.
- B. All casework panel components must go through a supplemental sizing process after cutting, producing a panel precisely finished in size and squareness to within 0.010 inches, ensuring strict dimensional quality and structural integrity in the final fabricated product.
- C. All music instrument storage casework shall be assembled and finished at the factory utilizing a case clamp to ensure tight joints and a square box. Field assembled casework will not be accepted.
1. Any units too large to fit through a standard 36 inch wide doorway may be shipped knocked down and assembled in the field.
- D. Cabinet Body Construction:
1. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.
  2. Tops and bottoms are glued and doweled to cabinet sides and internal cabinet components such as fixed horizontals and vertical dividers. Exposed assembly hardware and through-bolt assembly construction methods will not be accepted.
    - a. Minimum of 6 dowels each joint for 29 inch deep cabinets.
    - b. Minimum of 8 dowels each joint for 39 inch deep cabinets.
    - c. Tops, bottoms and sides of all cabinets are particleboard core.
  3. Cabinet backs:
    - a. 1/2 inch thick particleboard core.
    - b. Finished with thermally fused melamine laminate.
  4. All units have an individual factory-applied base, constructed of 3/4 inch thick plywood. Base to be 4 inch high.
    - a. Base shall be finished with rubber base as specified in Division 9 - Resilient Flooring.
  5. Exposed and semi exposed edges.
    - a. Heavy duty 3mm PVC banding, machine applied and machine profiled to 1/8 inch radius.
  6. Instrument Shelf and Cabinet Bottom panels:
    - a. Core: 1 inch thick particleboard.



- b. Front Edge: Heavy duty 3mm PVC banding, machine applied and machine profiled to 1/8 inch radius. Black color.
  - c. Top Surface: Molded flat stock heavy-duty polyethylene with textured abrasion-resistant finish permanently bonded to shelf. Black color.
  - d. Bottom Surface: Thermally fused melamine laminate.
  - e. All shelves to be permanently doweled to cabinet sides and vertical dividers. Removable or adjustable shelves and shelves attached with mechanical fasteners will not be accepted.
7. Interior finish, units with Open Interiors:
- a. Top, bottom, sides and vertical members finished with thermally fused melamine laminate.
8. Exposed ends:
- a. Faced with VGS high-pressure decorative laminate.
  - b. Balanced with high-pressure liner CLS interior surface.
- E. Wire Grille Doors:
1. Door Frame: 5/16 inch diameter heavy gauge metal rod welded to 3/16 inch diameter verticals with beveled end to produce a clean, finished look. Epoxy powder coated.
  2. Hinges: 2-3/4 inch five knuckle hinges non-binding, 180 degrees welded to door, made of 0.095 inch thick steel with hospital safety tip. Epoxy powder coated.
  3. Provide 2 hinges for each door up to 39 inches in height and 3 hinges for each door over 39 inches in height.
  4. Padlock eyelets and label holder included and welded to door. Epoxy powder coated.

## 2.5 MISCELLANEOUS

### A. General:

1. Fabricate and package all components in the factory and ship fully assembled or ready to assemble.
2. Required Options: Furnish and install the following options:
  - a. Vertical Closure Kit: Provide visual closure between wall and cabinet constructed of 3/4 inch thick laminate-clad particleboard to match cabinet.
  - b. Top Back Filler Kit: Provide visual closure between back wall and top panel of cabinet constructed of 0.750 inch thick thermoset composite wood.

## PART 3 - EXECUTION

### 3.1 ACCEPTABLE INSTALLERS

- A. Installer shall be acceptable to the manufacturer.
- B. Installer shall be skilled in the craft of the Section and have been regularly engaged in this business for the last five (5) years.

### 3.2 EXAMINATION

#### A. Site Verification of Conditions:

1. Field measurements shall be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a manner to permit it to be moved through properly into place.
2. Prior to commencing installation, verify that surface and environmental conditions are proper for installation of this material.
3. Do any necessary remedial work to correct surfaces and/or utilities to receive this work.

### 3.3 INSTALLATION

#### A. Description:

1. Install casework in accordance with approved shop drawings and manufacturer's recommendations.
2. All components shall be fully assembled, installed and securely fastened in place, plumb, level, and true to line, in complete working order. Scribe work to adjacent finishes. Use scribe mold as needed. Final mechanical and electrical connections shall be made as outlined in other divisions of these specifications.

#### B. Final:

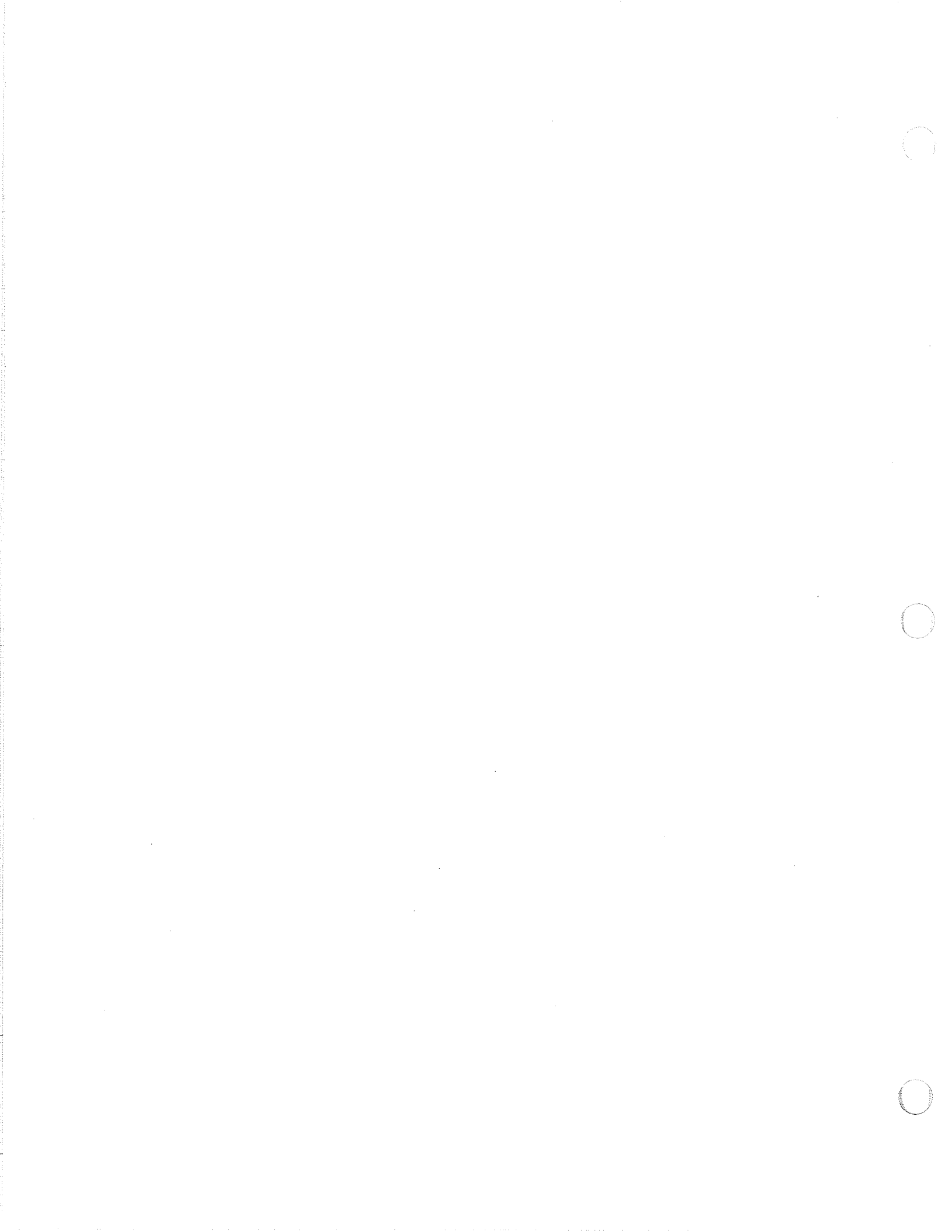
1. Upon completion, check all parts, hardware, doors, etc. and see that all units are complete and that everything operate smoothly and properly. In particular, check that all doors fit right, are neatly in position and are not warped. Doors and drawer fronts shall align. Make all necessary corrections. Clean all cabinets, wash all other items built-in to casework.

End of Section 12 3217

**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 21

FIRE SUPPRESSION



**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, apply to all work herein.

**1.2 SYSTEM DESCRIPTION**

- A. Modify the existing automatic fire sprinkler system as shown on the drawings and as specified herein.
- B. The existing system is a wet-pipe type.
- C. Provide sprinkler branches and new sprinkler heads in all spaces where indicated in accordance with codes, space available, specifications, and ceiling finish. Sprinklers shall be relocated in all spaces included in this project except where noted otherwise.
- D. Plans are diagrammatic and show generally the location of heads and are not to be scaled for construction measurements. All dimensions shall be verified at the building site.

**1.3 CODES AND STANDARDS**

- A. All work shall comply with the specifications and noted codes and standards. Where the requirements of these specifications exceed specified codes and ordinances, conform to these specifications.
- B. The latest edition of the following standards, and as published by the National Fire Protection Association (NFPA), govern work in this Section.
  - 1. NFPA 13: Sprinkler Systems.
  - 2. NFPA 101: Life Safety Code.
  - 3. State and Local Codes.
  - 4. IRI: Industrial Risk Insurers.
- C. All products and components installed in the system shall be listed by Underwriters Laboratories (UL) and approved by Factory Mutual Engineering (FM).

**1.4 GUARANTEE**

- A. In addition to other warranties or guarantees required by the contract documents, guarantee all piping, devices and related materials and workmanship for a period of one year from date of the Owner's final acceptance of the project. All defects shall be promptly corrected at no cost to the Owner.
- B. Be responsible for providing a sprinkler system that has been coordinated with the contract documents and approved by all agencies listed in this section.

- C. Correct all deficiencies pointed out by field inspectors representing these agencies, at no cost to the Owner.

## 1.5 CONTRACTOR QUALIFICATIONS

- A. The Contractor shall possess a certificate of competency and have at least 4 years of current experience in the installation of fire protection and detection systems similar in size and design for this particular project. A written record of this qualification shall be submitted to the Owner.

## 1.6 GENERAL REQUIREMENTS

- A. Become familiar with all details of the work, verify all dimensions in the field, and advise the Owner of any discrepancy before performing the work.
- B. All piping, fittings and sprinkler system components shall be rated for system pressure.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Materials and equipment shall conform to NFPA 13 and other requirements specified herein.
- B. Unless noted otherwise, all materials shall be new and free from defects.
- C. Materials and equipment used for similar application shall be the products of one manufacturer unless noted otherwise.
- D. All pipe shall be stamped on each length with its ASTM, ANSI, or AWWA number. Bundles of steel pipes shall have a metal tag attached showing the ASTM number and pipe schedule.

### 2.2 SPRINKLERS

- A. Sprinklers below finished ceilings shall be pendant 1/2-inch orifice, UL listed types having a chrome finish. Temperature rating shall be 165 deg F. K value shall be approximately 5.6. Provide chrome plated recessed escutcheons where recessed light fixtures are furnished. Provide standard escutcheons where surface mounted light fixtures are provided. Star, Viking, Central, or approved equal.
- B. Sprinklers in areas having no finished ceilings shall be standard upright, 1/2-inch UL listed 165 deg F temperature rated types having brass finish, except near heaters or duct outlets where sprinklers having an intermediate temperature rating shall be used. K value shall be approximately 5.6. Star, Viking, Central, or approved equal.
- C. Release element of each head shall be of the ordinary temperature rating 160-165 deg F or higher as suitable for the individual location where the head is

installed. Sprinkler heads subject to high temperature caused by unit heaters, hot pipes, radiant ceilings, or other heat sources shall be of high temperature rating or higher.

### 2.3 PIPE

- A. Sprinkler pipe and fittings shall be per NFPA 13, except as modified herein.
- B. Pipe shall be ASTM A 795 steel pipe and shall be Schedule 40 for sizes less than 2 inches and Schedule 10 ASTM A 135 steel pipe or ASTM A 795 Schedule 40 steel pipe for sizes 2 inches and larger.
- C. Rubber gasketed grooved-end pipe and fittings with mechanical couplings shall only be permitted in pipe sizes 2 inches or larger.
- D. Steel piping with wall thickness less than Schedule 30 shall not be welded, cut grooved or threaded. Threadable thinwall piping will be accepted if UL listed and FM approved.
- E. The following are acceptable options:
  - 1. Black steel, Schedule 40, to meet ASTM A 795.
  - 2. Black steel thinwall, Schedule 10 wall thickness, 0.134 min. wall thickness, 300 psi max. operating pressure to meet ASTM A 135 Standard.
  - 3. Galvanized steel, Schedule 40, to meet ASTM A 795.
  - 4. Galvanized steel thinwall, Schedule 10, 300 psi max. operating pressure to meet ASTM A 135 Standard.

### 2.4 PIPE FITTINGS

- A. Fittings into which sprinkler heads, sprinkler head riser nipples or drop nipples are threaded, shall be threaded or grooved-end type. Black malleable iron threaded fittings shall be Class 150. Fittings shall be manufactured per ANSI B16.3 standards.
- B. Use of plain-end fittings with mechanical couplings which utilize steel gripping devices to bite into the pipe when pressure is applied, will not be permitted.
- C. Fittings shall be UL listed and/or FM approved for use in wet-pipe sprinkler systems. Fittings, mechanical couplings and rubber gaskets shall be supplied by the same manufacturer.
- D. Grooved couplings with minimum pressure rating for expected working pressure.
  - 1. Acceptable manufacturers: For use with Schedule 40 pipe with cut grooves. Gustin-Bacon 100, 500 PSI max. working pressure, or equal by Pipeco or Victaulic.
  - 2. Acceptable manufacturers: For use with light wall pipe with rolled grooves conforming to NFPA 13. Gustin-Bacon 100, 300 PSI max. working pressure, or equal by Pipeco or Victaulic.
  - 3. Acceptable manufacturers: For use with light wall pipe with rolled

grooves conforming to NFPA 13. Victaulic 75, 500 PSI max. working pressure, or equal by Pipeco or Victaulic. Grooved fittings for connection to cut or rolled grooved pipe with minimum pressure rating to exceed expected working pressure. Couplings joining fittings and pipe shall be of the same manufacturer as fittings.

## 2.5 RETURN BENDS

- A. Return bends shall be provided on all drops to pendant sprinkler heads. Sprinkler branch lines supplying pendant sprinkler heads shall be connected to the top of the supply main.

## 2.6 PIPE HANGERS

- A. Pipe hangers, braces and supports shall be provided in accordance with NFPA 13.
- B. Hanger rings shall be band type. Acceptable manufacturers: Elcen 89, ITT Grinnell 97, Michigan 100, Fee and Mason 400, PHD Manufacturing 141 and 151, Globe 304.
- C. Clevis hangers. Acceptable manufacturers: Elcen 12, Michigan 400, Fee and Mason 239, ITT Grinnell 260, PHD Manufacturing 450, Globe 400 and 400N.
- D. Upper hanger attachments shall be C-clamp with set screw and lock nut. Acceptable manufacturers: Elcen 29A, UL listed, Elcen 231 UL listed; Michigan 300L; ITT Grinnell 86 UL listed, FM approved, Fee and Mason 250L, 255L Globe 250, 254, 259, 354, 103N, 107N and 203; PHD 250, 270, 340, 350, 360, 370; Tolco 67 and 68.
- E. Top beam clamp with set screw and locknut. Acceptable manufacturers: Michigan 300L and 310; Fee and Mason 269 and 270; ITT Grinnell 227 UL listed; FM approved.
- F. Provide pipe sleeves where piping passes entirely through walls. Secure sleeves in position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls. Provide one inch minimum clearance between exterior of piping and interior of sleeve or core-drilled hole. Firmly pack space with mineral wool insulation. Seal space at both ends of the sleeve or core-drilled hole with plastic waterproof cement which will dry to a firm but pliable mass, or provide a mechanically adjustable segmented elastomeric seal. In fire walls, seal both ends of pipe sleeves or core-drilled holes with UL listed fill, void, or cavity material.
- G. Sleeves in masonry and concrete walls shall be hot-dip galvanized steel, ductile-iron, or cast-iron sleeves. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled hole are completely grouted smooth.
- H. Provide split hinge metal escutcheon plates for piping entering walls and ceilings in exposed spaces. Provide polished stainless steel plates or chromium-



plated finish on copper alloy plates in finished spaces. Provide paint finish on metal plates in unfinished spaces.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Installation, workmanship, fabrication, assembly, erection, examination, inspection and testing shall be in accordance with NFPA 13, except as modified herein. Install piping straight and true to bear evenly on hangers and supports. Do not hang piping from plaster ceilings. Keep the interior and ends of new piping and existing piping affected by Contractor's operations thoroughly cleaned of water and foreign matter.
- B. Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign matter. Inspect piping before placing into position. Provide piping compound or Teflon tape applied to male threads only.

#### 3.2 COORDINATION AND SYSTEMS LAYOUT

- A. Sprinkler systems shall be compatible with the building layout and shall avoid interference with structural, electrical, mechanical and plumbing work in the building. Final layout in special finish areas shall be approved by the Owner.
- B. Install systems to keep all piping concealed in all areas with ceilings. All piping and equipment shall be located as out-of-the-way as possible, holding all piping and equipment close in corners and to walls.
- C. Sprinkler heads shall be symmetrically located as required to provide proper coverage and to avoid interference with lights, diffusers, grilles or other ceiling mounted equipment. Where sprinkler heads are located in a ceiling, use symmetrical head pattern in proper relationship with the general ceiling pattern, including ceiling tile where applicable and lights throughout each area. Center sprinkler head in all ceiling tiles.
- D. Provide sprinkler coverage for all areas of the project unless specifically noted otherwise on drawings.

#### 3.3 HANGERS AND SUPPORTS

- A. The installation of all hangers and supports shall comply with NFPA 13.
- B. All sprinkler piping shall be independently supported from other piping and duct systems. All piping shall be rigidly supported.
- C. Where grooved couplings and/or other systems of mechanical fittings and couplings are utilized for fastening, sufficient number of hangers shall be provided to prevent any sagging or misalignment of piping.

### 3.4 ADJUST AND CLEAN

- A. Prior to connecting sprinkler piping for flushing, flush water feed mains, lead-in connections and control portions of sprinkler piping. After fire sprinkler piping installation has been completed and before piping is placed in service, flush entire sprinkler system as required to remove foreign substances.
- B. Continue flushing until water is clear, and check to ensure that debris has not clogged sprinklers. Provide test connections on sprinkler mains, crossmains and large branch piping to permit flushing.

### 3.5 TESTS AND INSPECTIONS

- A. Furnish all labor and equipment required to conduct all specified tests.
- B. All tests and inspections of the system and its components shall be witnessed by representatives of the Owner, the Contractor, the local fire department (at their discretion) and the Insurance and Regulatory Agencies at a time coordinated between all parties. A minimum of 5 working days notice shall be given that the system is ready for tests.

### 3.6 CERTIFICATE OF APPROVAL

- A. On completion of installation, obtain and deliver to the Owner certificates of final inspection and approval. Test certificates shall be signed by a Certificate of Competency holder.

END OF SECTION 21 0000

**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 22

PLUMBING



## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

## 1.2 DESCRIPTION

- A. Include all necessary apparatus, excavating, controls, valves and fittings required for a complete sanitary plumbing system.

## 1.3 UTILITIES AND SERVICES

- A. Sanitary: Provide sanitary drainage, connecting to existing sewer. Make arrangements for and pay all fees in connection with this installation.
- B. Water: Provide domestic (City) water, connecting to existing water system. Pay all fees associated with new water service.
- C. Natural Gas: Provide natural gas service, connecting to existing gas system. Arrange with local gas company for installation of gas service including meter for the increase gas load. Pay all fees associated with revised gas service.

## PART 2 - PRODUCTS

## 2.1 PIPING

- A. Domestic hot and cold water piping:
  - 1. Above grade: Hard drawn type "L" copper tubing.
  - 2. Below grade:
    - a. 1 inch and smaller: Soft temper type "K" copper tubing.
    - b. 1-1/4 inch to 3 inch: Hard drawn type "K" copper tubing.
    - c. 4 inch and larger: Ductile iron conforming to ANSI/AWWA C151/A21.5 Class 52.
  - 3. Protect all uninsulated copper piping below grade with a Bitumen coating.
- B. Building soil, drain, waste, vent and storm piping:
  - 1. Interior above grade: Service weight cast iron soil pipe, no-hub pattern. Only piping products made in the USA will be acceptable.
  - 2. Below grade and exterior: Service weight cast iron soil pipe, hub and spigot pattern, tar coated. Only piping products made in the USA will be acceptable.
- C. Gas piping:
  - 1. Schedule 40 black steel, screw type for piping 2 inch and smaller per ASTM A-120, weld type for piping 2-1/2 inch and larger per ASTM A-53.
  - 2. Buried steel pipe in contact with the earth shall be metallic arc welded and coated with high density "X-Tru-Coat" polyethylene and with

- polyethylene tape coat joints.
3. Buried plastic gas distribution piping shall be polyethylene piping manufactured for gas distribution. Resin shall be PE 2306, PE 3406, or PE 3408.

## 2.2 PIPE FITTINGS

- A. Domestic hot and cold water piping:
  1. For above grade piping, sweat type, wrought copper fittings. Provide reducing fittings to reduce pipe size. Bushings will not be acceptable.
  2. For below grade piping, 4 inch and larger, gray ductile fittings conforming to ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11, mechanical joint pattern.
- B. Cast iron piping fittings shall be cast iron corresponding to the pipe (hub and spigot or no-hub). Below grade fittings shall be tar coated. Only pipe fittings made in the USA will be acceptable.
- C. Gas piping:
  1. High pressure gas piping fittings shall be standard weight butt weld manufactured per ASTM A-234 standards.
  2. Low pressure gas piping fittings shall be threaded black malleable iron, Class 150 per ANSI B16.3 standards.

## 2.3 PIPE JOINTS

- A. Solder joints (2-1/2" and smaller) in Type L copper tubing and on all copper waste piping: Wire solder, 95/5 lead free, in accordance with manufacturer's recommendations.
- B. Brazed joints (3" and larger) in Type L copper tubing and all Type K copper tubing: Lead free brazing alloy having a melting point at or above 1,000 deg. F. During brazing procedure, purge all oxygen from the piping with nitrogen to prevent oxidation from occurring inside the piping.
- C. Joints in cast iron piping:
  1. Joints for hub and spigot piping shall be one piece elastomeric compression-type gaskets made of neoprene. Gaskets shall be marked with ASTM C564 and the "CI" symbol of the Cast Iron Soil Pipe Institute. Gaskets shall completely fill the hub.
  2. Joints for no-hub soil piping shall be heavy duty no-hub couplings constructed of 304 stainless steel with a minimum shield thickness of 0.015 inches. Couplings shall be manufactured by Husky (SD 4000 type) or similar by Clamp-All, Tyler, Charlotte, Alpha, or Mission.
- D. Joints in gas piping:
  1. High pressure gas piping joints shall be metallic arc weld or gas weld with oxygen and acetylene. Welders shall be qualified per ASA B31-1 code for pressure piping.
  2. Low pressure gas piping joints shall be threaded. All burrs shall be removed, pipe ends shall be reamed or filed out to size of bore, and all

chips shall be removed. Pipe joint compound shall be used only on male threads.

- E. Ductile iron: Mechanical joint glands except couplings may be Tyton joint.

#### 2.4 GRADES

- A. Horizontal drainage piping less than 3 inch diameter shall be installed with fall of not less than 1/4 inch per ft. Drainage piping 3 inch diameter and larger shall be installed with fall of not less than 1/8 inch per foot unless otherwise shown on the drawings.

#### 2.5 VALVES AND SPECIALTY ITEMS

- A. Gate valves: 200 psi WOG, non-rising stem, solid wedge, solder ends and screw-in bonnet on sizes 2 inch and smaller. Flanged ends and bolted bonnet on sizes 2-1/2 inch and larger.

2 inch and smaller	2-1/2 inch and larger
Nibco S-113	Nibco F-691
Crane 1320	Crane 461
Hammond IB647	Hammond IR1138
Stockham B-104	Stockham G-612

- B. Globe valves: 200 psi WOG, screw-in bonnet, integral seal, renewable discs and solder ends on sizes 2 inch and smaller. Bolted bonnet, renewable seat and discs and flanged ends on sizes 2-1/2 inch and larger.

2 inch and smaller	2-1/2 inch and larger
Nibco S-211-Y	Nibco F-718-B
Crane 1320	Crane 351
Hammond 424	Hammond IR116
Stockham B-14-T	Stockham G-512

- C. Check valves: 200 psi WOG, horizontal swing, regrinding type, renewable discs, Y-pattern and solder ends on sizes 2 inch and smaller. Bolted bonnet, renewable seat and discs and flanged ends on sizes 2-1/2 inch and larger.

2 inch and smaller	2-1/2 inch and larger
Nibco S-413-B	Nibco F-918-B
Crane 1342	Crane 373
Hammond 18912	Hammond 1R1124
Stockham B-319	Stockham G-931

- D. Ball valves: 400 psi WOG, full port, 3-pc. construction, blow-out proof stem, solder ends, 2 inch and smaller only.

Nibco 595  
Apollo 82  
Pittsburgh SP-B

Watts B6800

- E. Gas cocks: Lubricated plug valve, 150 pound, threaded ends on sizes 2 inch and smaller. Flanged ends on sizes 2-1/2 inch and larger. Powell 1558, 1559 or approved equal.
- G. Thermometers: 7 inch scale, separable socket, adjustable angle, 3-1/2 inch stem with a scale from 30 to 240 degrees F in 2 degree increments. Duro 7 inch EZ, or equal by Weksler or Weiss.

## 2.6 HANGERS AND SUPPORTS:

### A. Upper attachments:

1. Hangers shall be attached to wood structure by means of 3/8 inch lag bolts or 2 inch No. 18 wood screws.
2. In poured-in-place concrete, install either concrete inserts or drill concrete anchors. Do not drill in precast pans.
  - a. Inserts shall be: B-Line Fig. B 3014 or equal by Elcen or Grinnell.
  - b. Anchors shall be expansion "drop-in" type. Install anchors in drilled holes per manufacturer's recommendations. Hilti Series 5490000 or equal by Red Head or Rawl.
3. Steel: Malleable "C" clamp with locknut manufactured by B-Line B-3036L or equal by Elcen, Grinnell, or Michigan Hanger.
4. Channel iron: When piping runs parallel to bar joists and cannot be hung directly from joists, provide angle iron to span two bar joists and use angle iron as upper attachment.

### B. Pipe attachments:

1. Cast iron pipe clevis hangers shall be manufactured by B-Line B-3100 or equal by Grinnell or Michigan Hanger.
2. Copper tubing hangers shall be manufactured by B-Line B-3172CT or equal by Grinnell or Michigan Hanger.
3. Wrought iron and steel pipe clevis hangers shall be manufactured by B-Line B-3100 or equal by Grinnell or Michigan Hanger.
4. Pipe shields shall be manufactured by B-Line B3380 series.
5. Provide insulated piping larger than 2-1/2 inch with calcium silicate inserts at all supports and hangers.

### C. Hanger rods:

Pipe size	Rod diameter
2 inch and smaller	3/8 inch rod
2-1/2 inch to 4 inch	1/2 inch rod
5 inch to 6 inch	5/8 inch rod
8 inch and larger	3/4 inch rod

- D. Vertical supports shall be offset pipe clamp manufactured by B-Line B-3148 or equal by Elcen or Michigan Hanger.
- E. Riser clamp shall be manufactured by B-Line B-3373 or equal by Grinnell or Michigan Hanger.



## 2.7 PIPING INSULATION

- A. Refer to Section 23 0700, Thermal Insulation for Mechanical Systems, for requirements.

## 2.8 FLOOR AND ROOF DRAINS

- A. Drains shall be manufactured by Josam Manufacturing Company or similar by Zurn Industries, Inc., Wade Manufacturing Company or Smith. All drains shall be of the same manufacturer.
- B. Roof drains shall be Josam Series 21000 arranged for inside caulking with outlets the same size as the downspouts to which they are connected and shall have deck clamps. Roof drains shall have cast iron strainers.
- C. Floor drains shall be Josam Series 30000-A coated cast iron floor drain, two-piece body with double drainage flange, flashing collar, weepholes, bottom outlet, inside caulk connection, adjustable satin nikaloy strainer and cast iron P-trap. Strainer top shall be two sizes larger than the drain size.
- D. Floor sinks shall be Josam Series 49040AS square cast iron, 3/8" deep, acid resistant interior finish, bottom outlet with aluminum internal dome strainer, weepholes, inside caulk connection, nikaloy anti-tilting grate and cast iron P-trap. Coordinate with the kitchen equipment supplier for providing partial grates for indirect wastes.

## 2.9 TRAP PRIMERS

- A. Provide trap primers on all floor drains. Connect trap primer to domestic cold water piping at least 12" above the traps to ensure proper flow. Trap primers shall be accessible. Basis of design J.R. Smith 2698.
- B. Trap primers shall be manufactured by J.R. Smith, Josam, Precision Plumbing Products, Mifab, Wade, Watts or Zurn.

## 2.10 CLEANOUTS

- A. Cleanouts shall consist of cast iron ferrule and heavy brass cleanout plug with square head.
- B. Cleanouts in floors shall be Josam Series 58000 or similar by Zurn, Wade or J.R. Smith. Floor cleanouts shall have inside caulk outlet, coated cast iron internal cleanout with lead seal, brass rim, and Nikaloy cover plate for light traffic, secured to plug by countersunk screw for installation flush with finished floor. Cleanouts in walls shall be Josam Series 58710 or similar by Zurn, Wade or J.R. Smith.
- C. Where piping is concealed in walls install cleanouts with counter-sunk plugs and chrome plated or stainless steel covers on the surface of the wall. For cleanouts in floors with vinyl composition tile (VCT) provide cover plate with

depression for inset in the VCT. Provide carpet marker in carpeted areas

#### 2.11 WATER HAMMER ARRESTORS

- A. Field fabricated air chambers will not be acceptable.
- B. Select and size water hammer arrestors in accordance with Standard PDI - WH201.
- C. Arrestors shall be manufactured by Josam 75000 or similar by Zurn, Smith, Wade or Precision Plumbing Products.

#### 2.12 HOSE BIBBS

- A. Interior hose bibbs (non-freeze areas): Woodford Model 24P-1/2, chrome plated, all brass construction with adjustable packing nut, teflon impregnated packing and standard "O" size washer, tee handle, and vacuum breaker by Chicago Mfg. or T&S Brass Co.
- B. Exterior hose bibbs (freeze-proof wall box): Woodford Model B65, non freeze, automatic draining type with vacuum breaker, all brass construction enclosed in flush mounted, chrome plated, brass wall box. Equal by Chicago Mfg. or T&S Brass Co.

#### 2.13 VACUUM BREAKERS

- A. Provide vacuum breakers on connections to all hose bibbs, hose outlets, wall hydrants, below the rim water supplies of all types, plugged or capped outlets and at all other locations shown on the drawings.
- B. Vacuum breakers shall be manufactured by Watts Regulator Company Model No. 288A or similar by Sloan with bronze body, chrome-plated in finished areas.

#### 2.14 PLUMBING FIXTURES:

- A. Provide plumbing fixtures complete with trim. All fixtures, trimmings and stops shall be Grade "A" and shall be of one manufacturer. Trim shall be chrome plated brass. Plastic trim will not be acceptable. Refer to the plumbing fixture schedule on the drawings.
- B. Plumbing fixtures for use by handicapped persons shall be in accordance with the Americans with Disabilities Act (ADA) and/or local accessibility codes.
- C. Plumbing fixtures shall be low water consumption type with a maximum of 1.28 gal/flush for water closets, 0.125 gal/flush for urinals, 0.5 gpm for lavatories and 2 gpm for showers unless specified otherwise.
- D. Manufacturers:
  - 1. Fixtures: Zurn, American Standard or Kohler.
  - 2. Lavatory/sink faucets: Delta, Symmons, Zurn, American Standard or Kohler.

3. Trim: Jameco, Brasscraft or McGuire.
4. Flush valves: Sloan, Delaney or Zurn.
5. Toilet seats: Bemis, Beneke, Church, Centoco or Olsenite.
6. Drinking fountains: Oasis, Elkay, Acorn Aqua or Halsey Taylor.
7. Stainless steel sinks: American Standard, Just or Elkay.
8. Service sinks: Fiat, Stern-Williams, Zurn
9. ADA insulation: Truebro # 103.

## 2.15 WATER HEATER

- A. Water heater shall be fully automatic, electric, UL listed, complete with insulation in accordance with the Georgia State Energy Code for Buildings, glass-lined tank, coated steel jacket, adjustable thermostat, magnesium anode and overheat control.
- B. Water heater shall be guaranteed by the manufacturer for a period of not less than 3 years after start-up. Furnish to the Owner the manufacturer's guarantee.
- C. Water heater shall have a combination temperature and pressure relief valve having the capacity to relieve the full capacity of the heating element input rating for both temperature and pressure relief. Valve shall be Watts and shall be ASME rated.
- D. Water heater manufactured by Bradford White, Lochinvar, Smith or State will be acceptable.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Make connections to all fixtures, traps and similar items. Place into operation all equipment.
- B. Refer to the architectural drawings for the exact location of fixtures and drains. Determine roughing dimensions from the manufacturer of the equipment furnished.

### 3.2 INSTALLATION

- A. Remove stems and washers from solder end valves and other item subject to damage by heat during installation and reassemble valve after soldering.
- B. Provide dielectric union connectors at all connections between non-ferrous and ferrous metal piping materials.
- C. Pipe openings shall be closed with caps or plugs during installation. Tightly cover fixtures and equipment and protect against dirt, water, chemicals and mechanical injury. Upon completion of the work, thoroughly clean, adjust and operate the fixtures, materials and equipment.
- D. Cut pipe accurately and work into place without springing or forcing. Run

above ground piping parallel with the lines of the building unless otherwise indicated. Do not bury water pipe in or under floors unless specifically indicated on the drawings. Make changes in pipe sizes with reducing fittings. Use of bushings will not be acceptable, make changes in direction with fittings.

- E. Securely anchor water piping to urinal and water closet flush valves within the wall structure during the plumbing rough-in phase to prevent movement. Use only non-ferrous materials for anchor straps or pipe clamps.

### 3.3 DRAINS

- A. Set floor drains with tops flush with the finished floor. Route water line from trap primer connection to floor drain concealed inside walls, partitions and the floor system.
- B. Install roof drains with lead flashing extending at least 8" from the clamping ring in all directions.
- C. In special roofing systems, flash in accordance with roofing manufacturers recommendations.

### 3.4 CLEANOUTS

- A. Provide cleanouts where indicated and where required by the applicable plumbing code.
- B. Cleanouts shall be the same size as the pipe in line sizes 4 inches and smaller. Pipe lines larger than 4 inches shall have 4 inch cleanouts.
- C. Cleanouts installed outside buildings shall be the same as in floors, shall be flush with the grade and shall have minimum 6 inch thick, 12 inch by 12 inch concrete pad poured around the cover. Make cover flush with top of concrete.

### 3.5 PLUMBING FIXTURES

- A. Grout between plumbing fixtures and walls and/or floors.
- B. For connection of floor outlet water closets, use brass floor flanges. Make the joints between closet trap and flange tight with gaskets.
- C. Make the connection of fixture traps from lavatories, drinking fountains, service sinks, etc. to cast iron with D.W.V. type copper.
- D. Seal, using sealant meeting the requirements of Federal Specification TT-S-230, for the joint between urinals and wall and between water closets and floor.

### 3.6 WATER HEATER

- A. Provide a drain pan under the water heater. Pipe relief valve discharge to the drain pan. Pipe drain pan drain to floor drain, or to the nearest utility or janitor's sink. Do not make direct connection to drain.

- B. The water heater piping detail on the drawings is diagrammatic only. Install water heater and accessories in strict accordance with the manufacturer's recommendations.
- C. Do not place under-fired, tank type water heater directly on the floor. Provide a concrete block, metal, or pressure treated lumber stand to raise the heater above the floor a minimum of 8 inches. Raise gas water heater to height required by local code.

### 3.7 TESTS

- A. Test the plumbing system as required by the applicable plumbing code.
- B. Test domestic hot and cold water piping for a continuous period of not less than four hours at a hydrostatic pressure of not less than 125 psig and make free from leaks. Completely remake leaky joints with piping dry. Retest system after leaks are corrected.
- C. Plug all necessary openings in the drainage and vent piping systems and fill the entire system with water to the level of the highest vent stack above the roof. Hold this water for 30 minutes without showing a drop in water level greater than 4 inches. Subject to approval of the Architect, the drainage system may be tested in sections.
- D. Test natural gas piping at 50 psig minimum using compressed air or inert gas for a minimum of 6 hours without a discernible loss of pressure when adjusted for temperature changes. Subject all joints to a soap suds test during testing.

### 3.8 STERILIZATION

- A. Disinfect the potable water system in accordance with the applicable plumbing code. After disinfection, send water samples to the local Health Department for testing. Obtain approval of the local Health Department before the system is placed into service.
- B. Unless the local Health Department requires otherwise, disinfect potable water piping upon completion of installation by a mixture containing not less than 0.6 pounds of high test calcium hypochlorite, or 2 pounds of chlorinated lime to each 1000 gallons of water to provide not less than 50 ppm of available chlorine. Inject the mixture into the system and retain for not less than 24 hours, at which time the chlorine level shall be at 10 ppm or greater. Then drain the system and flush with potable water until only a normal chlorine residual remains (0.2 ppm).

END OF SECTION 22 0000



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 23

HEATING, VENTILATING & AIR CONDITIONING (HVAC)





## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. This division and the accompanying drawings cover furnishing of all labor, equipment, appliances and materials and performing all operations in connection with the installation of complete air conditioning, ventilating, heating, plumbing and fire protection systems as specified herein and as shown on the drawings.
- B. The general provisions of the Contract including the conditions of the Contract (General, Supplementary and other Conditions) and other divisions as appropriate, apply to all work specified in this division.

## 1.2 CODES AND REGULATIONS

- A. Comply with the following codes and standards as applicable, including all Georgia amendments, for all heating, ventilating and air conditioning materials and workmanship:
  - 1. The International Energy Conservation Code, 2006 Edition, with Georgia Amendments.
  - 2. The International Mechanical Code, 2006 Edition.
  - 3. The National Electrical Code, 2005 Edition.
- B. Comply with the following codes and standards as applicable, including all Georgia amendments, for all plumbing materials and workmanship:
  - 1. The International Plumbing Code, 2006 Edition.
  - 2. The National Electrical Code, 2005 Edition.
- C. Comply with the following codes and standards as applicable, including all Georgia amendments, for all fire protection material and workmanship:
  - 1. The International Fire Code, 2006 Edition.
  - 2. The National Electrical Code, 2005 Edition.
- D. The publications listed below form a part of this specification to the extent referenced and are referred to in the text by the basic designation only.
  - 1. Air-Conditioning and Refrigeration Institute Standards (ARI).
  - 2. American National Standards Institute, Inc. Standards (ANSI).
  - 3. American Society for Testing and Materials Publications (ASTM).
  - 4. American Society of Mechanical Engineers Code (ASME).
  - 5. Factory Mutual Underwriters (FM).
  - 6. National Fire Protection Association Standards (NFPA).
  - 7. Sheet Metal and Air-Conditioning Contractors' National Association, Inc. (SMACNA).
  - 8. Underwriters Laboratories, Inc. (UL).
- E. Comply with all state and local codes having jurisdiction. Make all modifications required by these codes without additional charges. Immediately bring to the attention of the Architect any conflict between these documents and the governing codes. Follow the drawings and specifications where code

requirements are less stringent than those shown on the drawings or in the specifications.

- F. Obtain all permits, inspections and approvals as required by all authorities having jurisdiction and deliver certificates of approval to the Architect. Assume and pay all fees and costs of any nature whatsoever incidental to these permits.

## PART 2 - PRODUCTS

### 2.1 COORDINATION

- A. The products of particular manufacturers have been used as the basis of design in preparation of these documents. Coordinate with all other trades any modifications to the mechanical systems and their components, the electrical systems, the building structure and architecture or any other portion of the building that result from the use of any other than the basis of design equipment.
- B. Such coordination shall occur before delivery of products from the manufacturer and shall be clearly indicated on the shop drawings. Perform all related modifications without any additional cost to the Contract.

### 2.2 DESCRIPTION

- A. All products shall be new and shall bear the Underwriter's Laboratories, Inc. (UL) label unless specifically indicated otherwise.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. The mechanical/plumbing/fire protection drawings do not give exact elevations or location of lines, nor do they show all the offsets, control lines or installation details. Carefully lay out the work at the site to conform to the structural conditions, to provide proper grading of lines, to avoid all obstructions, to conform to details of the installation supplied by the manufacturers of the equipment to be installed, and to thereby provide an integrated and coordinated installation operating at optimum performance.
- B. If equipment, piping and ductwork requires space conditions other than those shown, or if the equipment is rearranged, assume full responsibility for the rearrangement of the space and have the Architect review the change before proceeding with the work. Perform all related costs incurred without any additional cost to the Contract.
- C. Properly locate and size of all slots and openings in the building structure pertaining to the work and correctly locate sleeves, inserts and cores.
- D. Coordinate the work of several various trades so that it may be installed in the most direct and workmanlike manner without hindering or handicapping the

other trades. Handle piping interferences by giving precedence to pipe lines which require a stated grade for proper operation. For example, sewer lines and condensate piping shall take precedence over water lines in determination of elevations.

- E. Install all piping and ductwork in finished areas in chases, furred spaces or above ceilings. Install pipes and ducts as high as possible. Group runs of piping whenever it is feasible to do so.
- F. Do not install piping, equipment or ductwork in electrical rooms or electronic data rooms except as serving only those rooms. Do not run piping or ductwork or locate equipment with respect to switchboards, panelboards, power panels, motor control centers or dry type transformers:
  - 1. Within 42" in front (and rear if free standing) of equipment.
  - 2. Within 36" of sides of equipment.
  - 3. Clearances apply vertically from floor to structure.
- G. Provide access to equipment and apparatus requiring operation, service or maintenance within the life of the system. Devices include but are not limited to motors, valves, filters, dampers and shock absorbers. Equipment located above lay-in type ceilings is considered accessible.

### 3.2 EXCAVATION, TRENCHING AND BACKFILLING

- A. Perform all excavation, trenching and backfilling for work under Division 22.
- B. Lay pipe on firm soil, laid in straight lines and on uniform grades. Provide bell holes so that barrels of pipe rest evenly on bottom of trench along entire length of pipe.
- C. Inspect and test pipe prior to backfilling. Use no roots, rocks or foreign materials of any description in backfilling the trenches. Hand fill trenches to a minimum of 12" above the top of the pipe with clean earth and tamp to 95% compaction after first layer using the modified Proctor test method of compaction.

### 3.3 ELECTRICAL WORK

- A. Comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 26 all electrical equipment provided under this Division.
- B. All components shall be in conformance with the requirements of the National Electrical Code and Division 26. Furnish motor starters for all equipment under Section 23 0513, Starters and Disconnect Switches, unless specifically indicated to be furnished under Division 26.
- C. Provide all power wiring and final power connections to the systems under Division 26.

- D. Provide control wiring (120 volt and less) under Division 23 and extend from the 120 volt power circuits indicated on the electrical drawings. All wiring for voltages higher than 30 volts shall be done by a licensed electrician.
- E. Take all electrical characteristics from the electrical drawings and coordinate with the electrical drawings before equipment is ordered or shop drawings submitted.
- F. Electrical power wiring to HVAC control panels may not be indicated on the drawings. Determine final control panel locations and quantity prior to bidding and include 115 volt power circuits to each control panel location.

### 3.4 MOTORS

- A. Unless specifically noted otherwise in other sections of these specifications, all motors and motor controllers shall meet the requirements specified in this Section. All motors shall be built in accordance with the current applicable IEEE and NEMA standards and shall have voltage, phase, frequency and service as scheduled.
- B. Each motor to be installed outdoors shall be of the totally enclosed fan-cooled type or housed in a weatherproof housing.
- C. Unless otherwise indicated, motors smaller than 1/2 horsepower shall be capacitor start or split phase type designed for 120 volt, single phase, 60 cycle alternating current. Shaded pole motors will not be acceptable except 35 watts and smaller. Motors 1/2 horsepower and larger shall be squirrel cage induction type, 3 phase, 60 cycle alternating current.
- D. If motors are furnished varying in horsepower and/or characteristics from those specified, first inform the Architect of the change by clearly identifying it on the shop drawings or submittal, and then coordinate the change with all associated parties. Bear all additional charges in connection with the change.

### 3.5 PROTECTION OF EQUIPMENT

- A. Store all equipment, including pipe and valves, off the ground and under cover. For storage outdoors, securely fit minimum 4 mil thick plastic to withstand splattering, ground water, precipitation and wind.
- B. Plug ends of pipe when work is stopped and close ends of ducts with 4 mil thick plastic taped in place until work resumes. Duct tape is not an acceptable substitute.
- C. Repair or replace damaged equipment at the option of the Architect.

### 3.6 PAINTING

- A. Repaint factory painted equipment that has been scratched or marred to match original factory color.

- B. Clean and paint all uninsulated black ferrous metal items exposed to sight inside the building such as loop water piping, exposed sprinkler piping, equipment hangers and supports with one coat of zinc chromate primer. In addition, paint such items in finished spaces with two coats of finish paint in a color to match adjacent surfaces or as otherwise directed by the Architect.
- C. Clean and paint black ferrous metal items exposed outside the building such as uninsulated pipe and pipe supports with one coat of rust inhibiting primer and two coats of an asphaltic base aluminum paint. Clean and paint all piping installed outside the building that is to be insulated with one coat of rust inhibiting primer before installing insulation.
- D. Do not paint nameplates on equipment and afford suitable protection to the plates to prevent their being rendered illegible during the painting operation.
- E. Re-coat galvanizing broken during construction with cold galvanizing compound.
- F. Paint all ductwork, piping, insulation, conduit or other appurtenances visible through grilles and diffusers flat black.

### 3.7 PROTECTION OF EXISTING UTILITIES

- A. Use extreme caution during excavation operations not to damage or otherwise interrupt the operations of existing utilities. Be responsible for the continuous operation of these lines and provide bypasses or install such shoring, bracing or underpinning as may be required for proper protection.
- B. Schedule work so existing systems will not be interrupted when they are required for normal usage. Inform the Owner's representative and Architect and obtain approval from the utility authority involved at least seven days prior to any utility interruption or connection.
- C. Coordinate all activities around existing utility lines with the appropriate utility company.

### 3.8 CUTTING AND PATCHING

- A. Assume all cost of, and be responsible for, all cutting and patching required to complete the installation of the work. All cutting shall be carefully and neatly done so as not to damage or cut away more than is necessary of any portions of the structure.
- B. Reinstate all surfaces to the condition of the adjacent surfaces.
- C. Make suitable provisions for adequately water-proofing at the penetrations of exterior walls and roofs.

### 3.9 SLEEVES AND FRAMES

- A. Install in concrete, carpentry or masonry construction, all necessary sleeves, frames, hangers, expansion bolts, inserts and other fixtures and appurtenances

necessary for the support of all pipe, duct, equipment and devices furnished under this Division.

- B. Cut openings and install sleeves or frames through walls and surfaces in a neat workmanlike manner. Cut openings only as large as required for the installation. Install sleeves and/or frames flush with finished surfaces and grout in place unless otherwise indicated. Leave surfaces around openings smooth and finish to match surrounding surface.
- C. Where pipes pass through walls, sleeves shall be standard weight black steel pipe or 20-gauge galvanized sheet metal with ends flush with both surfaces.
- D. Provide each pipe or duct passing through walls or partitions with sleeves having an internal diameter 1 inch larger than the outside dimensions of the insulated pipe or duct.
- E. Build all pipe sleeves through masonry walls in place as the affected walls are built.
- F. Pack all penetrations through rated walls with mineral wool and cap off with a silicon caulk. As an alternate use an approved, fire rated sealant as manufactured by Hilti, 3M or Dow. Materials shall meet or exceed UL 1479 or ASTM E814 requirements.
- G. Sleeves through exterior walls shall be cast iron pipe or Schedule 40 PVC flush with both wall surfaces, and with the space between the pipe and the sleeve caulked watertight in an approved manner.

### 3.10 ESCUTCHEONS

- A. Install escutcheons on all pipes where they pass through ceilings, walls or partitions in finished areas.
- B. Escutcheons shall be split, hinged, stamped brass type designed to fit the pipe and to cover the terminating pipe sleeve. Escutcheons shall be chrome plated finish unless otherwise specified with a securing device to hold them tight to the pipe.
- C. Allow sufficient spacing between parallel pipe runs to ensure installation of escutcheons without modification. Do not alter the escutcheons in any manner to allow for installation.

### 3.11 CLEANING

- A. Remove all stickers, rust, stains, labels and temporary covers before final acceptance.
- B. Clean the exterior surfaces of all mechanical equipment, plumbing fixtures, piping and ducts of all grease, oil, paint, dust and other construction debris.

- C. Clean the interior of all ducts, plenums and casings of all debris and blow free all particles of rubbish and dust before installing outlet faces.
- D. Lubricate bearings that require lubrication in accordance with the manufacturer's recommendations. Provide two copies of certification of lubrication.
- E. Provide temporary filters for any fans operated during construction. Change temporary filters regularly to prevent contamination of the equipment and duct systems. Install new and unused permanent filters one week prior to final inspection.
- F. Cover ends of open ducts and pipes during construction except when working on such end prohibits covering. Cover with minimum 4 mil thick polyethylene taped, tied or wired in place.
- G. Sterilize the domestic water supply and distribution system in accordance with Section 22 0000, Plumbing, and the local codes having jurisdiction. Furnish three copies of a certificate of performance of complete sterilization to the Architect before final inspection of the work. All work shall be certified by a state approved testing laboratory.

### 3.12 EQUIPMENT, MATERIALS AND BID BASIS

- A. It is the intent of these Specifications to indicate a standard of quality for all materials incorporated into the work. Manufacturer's names are used to designate the item of equipment or material as a means of establishing grade and quality.
- B. Substituted manufacturers of similar quality products will be considered unless these specifications state otherwise. Such manufacturer's products may be considered as substitutions but shall not be used as a basis for bidding. In the event substitutions are submitted to the Architect for review prior to bid, furnish descriptive catalog material, test data and samples, as well as any other pertinent data necessary to demonstrate that the proposed substitutions are acceptable equals to the specified product. No substitutions shall be made without the written consent of the Architect.
- C. The use of one named manufacturer in the schedules on the drawings is for guide purposes. The provisions of the previous paragraph shall govern in the selection of products to be used.

### 3.13 WARRANTY

- A. Provide warranty as indicated in applicable Division 0 or Division 1 sections, or as indicated in the Owner Contractor General Agreement. The warranty shall cover all materials and workmanship. During this warranty period correct all defects in materials and workmanship by repair or replacement without incurring any additional cost to the Contract.

- B. Warrant all air conditioning compressors for an additional four years beyond the initial one year warranty. This additional warranty shall include parts only.

### 3.14 RECORDS AND INSTRUCTIONS FOR OWNER

- A. Accumulate during the job's progress the following data in triplicate prepared in neat brochures or packet folders and turn over to the Architect for check and subsequent delivery to the Owner per Division 1 section requirements:
  - 1. All warranties, guarantees and manufacturer's directions on equipment and materials.
  - 2. Approved fixture brochures, wiring diagrams and control diagrams.
  - 3. Copies of approved shop drawings.
  - 4. Operating instructions for the HVAC and other mechanical systems. Include recommended periodic maintenance and seasonal changeover procedures, and suggested procedures in operation of all systems to promote energy conservation.
  - 5. Repair parts lists of all major items of equipment including name, address and telephone number of the local supplier or agent.
- B. Submit all of the above data to the Architect for approval at such time as the last inspection is requested prior to the final inspection, but in no case less than two weeks before final inspection.
- C. Give not less than two days of operating instruction, during the adjustment and testing period, to the Owner's operating personnel in order to familiarize them with the proper care and operation of the equipment. Use the written operating instructions referred to above as the basis for this instruction.
- D. A competent technician employed by the Building Automation System subcontractor shall be required to instruct the Owner in proper operating procedures and shall explain the significance of the controls literature filed in the maintenance manual over a period of two days while the system is in continuous operation.

### 3.15 RECORD DRAWINGS

- A. As-built (record) working drawings:
  - 1. On a daily basis review and record as-built conditions on a set of drawings maintained at the job site. Work that has been completed and subject to progress payments will not be considered for such payments unless as-built conditions are shown on these site drawings.
  - 2. Record Document submittal procedures: Refer to other applicable Division 1 specification section(s).
- B. Record dimensions shall clearly and accurately delineate the work as installed. Locations shall be suitably identified by at least two dimensions to a permanent structure.
- C. Mark all "Record Drawings" on the front lower right hand corner with a rubber stamp impression that states the following: "RECORD DRAWINGS. To be used for recording field deviations and dimensional data only"



### 3.16 INSTALLATION

- A. Install all equipment in strict conformance with the manufacturer's recommendations, as specified herein and as shown. If any conflict arises between these instructions notify the Architect immediately for guidance.

### 3.17 EQUIPMENT LABELS

- A. Permanently label each item of equipment with a nameplate of sufficient size to clearly indicate the identification designation (i.e. mark number) appearing in the Contract documents.
- B. Nameplates shall be 1/16" thick bakelite laminate engraved with white letters through black, or aluminum with black enameled surface and engraved letters. Handwritten marker identifications will not be acceptable.

### 3.18 ACCESS DOORS

- A. Furnish and install access doors at each point required to provide access to concealed valves, cleanouts, fire dampers and other devices requiring operation, adjustment or maintenance. Access doors shall be 16 gauge steel, prime coat finish with mounting straps, concealed hinges and screwdriver locks, designed for the door to open 180 degrees.
- B. Access doors installed in fire rated walls or partitions shall be UL labeled to maintain the fire rating of the wall or partition.
- C. Coordinate access panels in ceilings with the architectural reflected ceiling plans. Obtain approval from the Architect before installing any ceiling access panels.

### 3.19 FLAME SPREAD AND SMOKE DEVELOPED RATINGS OF MATERIALS

- A. Materials and adhesives used throughout the mechanical systems for insulation, jackets or coverings of any kind, or for piping or conduit systems or components, shall have a flame spread rating not over 25 without evidence of continued combustion, and with a smoke developed rating not to exceed 50. If such materials are to be applied with adhesives, test them as applied with such adhesives, or the adhesives used shall have a flame spread rating not over 25 and a smoke developed rating not to exceed 50.
- B. Determine flame spread rating and smoke developed rating by the Method of Testing of Surface Burning Characteristics of Building Materials, NFPA 255, ASTM E84, and Underwriters' Laboratories, Inc. standards. Such materials are listed in the Underwriters' Laboratories, Inc., Building Materials List, under the heading Hazard Classification (Fire).

### 3.20 HAZARDOUS MATERIALS

- A. Use no products that contain any known hazardous or carcinogenic materials. Do not use products with asbestos or radioactive content.
- B. Handling of any hazardous material is beyond the scope of these specifications. Any requirements for such shall be handled outside this Contract by persons contracted to do so.

END OF SECTION 230000

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

## 1.2 SCOPE OF WORK

- A. Furnish and install all motor starters and disconnect switches required by this section. Where starters and/or disconnect switches are furnished by equipment manufacturers, comply with all requirements of this section. Refer to Division 26 for disconnect switches provided therein.
- B. All items required for a complete installation shall be provided.

## 1.3 QUALITY ASSURANCE

- A. Furnish all starters and disconnect switches to be installed under this section of these specifications to be the product of one manufacturer.
- B. Starters and disconnect switches manufactured by Allen-Bradley, Eaton, General Electric, Siemens, or Square-D, will be acceptable.

## PART 2 - PRODUCTS

## 2.1 STARTERS AND CONTACTORS

- A. Furnish starters for all motors unless indicated to be equipment furnished with mechanical equipment, or as a part of Division 26 motor control centers.
- B. Each starter shall incorporate a solid state overload protection device with an adjustable trip point and single phase protection to protect motors.
- C. Coordinate starter holding coils with Section 23 0923, Building Automation System. Holding coils shall be 120 volt or less.
- D. Provide 480V/120V control transformer with each 480 volt magnetic starter or control panel.
- E. Provide one set of spare auxiliary contacts (1 normally open set and 1 normally closed set) in each starter for the future, in addition to sealed contact.
- F. Starters for 3 phase motors shall be solid state type and unless otherwise indicated shall be as follows:
  - 1. NEMA 1 enclosure, combination line starter with disconnect (not fused) and solid state type overload protection on all 3 phases. Trip current rating will be established by selection of overload relay and shall be adjustable (3 to 1 current range). The overload shall be self-powered, provide phase loss and phase unbalance protection, have a permanent

- tamper guard, be ambient insensitive and have a mechanical test function. Provide Trip Class 20.
2. 24V coil or 120V coil (to agree with control circuit - not to exceed 120V) and control transformer built-in, with fuses in primary leads and in hot secondary lead, other secondary grounded.
  3. Furnish HAND-OFF-AUTO control for all automatically controlled starters and remotely controlled starters. Furnish ON-OFF selector switch where there is no automatic, remote or interlock control.
- G. Starters for single phase motors shall be manual type motor rated switches with thermal overload device (except omit overload device from switches for motors with built-in overload protection) and NEMA type 1 enclosure except for installation in toilets or public spaces or when noted for flush mounting. In such locations, provide jumbo stainless steel flush plate and pull box. Provide pilot lights in starters when noted.

## 2.2 DISCONNECT SWITCHES

- A. Furnish and install a disconnect switch for all equipment requiring electrical power, unless provided under Division 26.
- B. When equipment manufacturer recommends overcurrent protection by HARC circuit breaker or fuses, the disconnect switch for that piece of equipment shall be fused at the maximum recommended fuse size. Otherwise, the disconnect shall be non-fused.
- C. All disconnect switches and switch installation shall meet the requirements of NFPA 70.
- D. Coordinate switch size and configuration with the equipment manufacturer's recommended maximum fuse size or other applicable data.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install equipment complete with all components connecting services and adjustments for its safe operation and in compliance with requirements of the Contract.

END OF SECTION 23 0513

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

## PART 2 - PRODUCTS

## 2.1 PIPE MARKINGS

- A. Pipe markings shall be manufactured, pre-printed markers in accordance with the following:
1. No taped or self-adhering markers will be acceptable.
  2. Markers shall be strapped in place using nylon fasteners.
  3. Markers shall be non-corrosive, non-conducting, mildew resistant and impervious to moisture.
  4. Direction of flow arrows shall be placed adjacent to color bands. Band, letter sizes and colors shall be as indicated below.
  5. Snap-On pipe markers manufactured by W.H.Brady Co., Seton or approved equal will be acceptable.

## 2.2 PIPE BAND AND LETTER SIZE:

- A. Pipe band and letter sizes shall conform to ASHRAE standards and the following table:

<u>O.D. of Pipe or Pipe Covering</u>	<u>Width of Color Band</u>	<u>Size of Letters and Numbers</u>
1-1/4" and smaller	8"	1/2"
1-1/2" to 2"	8"	3/4"
2-1/2" and larger	12"	1-1/4"

## 2.3 IDENTIFICATION

- A. Band legend and letter color shall conform to the following table:

<u>Piping Band</u>	<u>Legend</u>	<u>Letters</u>	<u>Band Color</u>
Domestic Cold Water	CW	White	Green
Domestic Hot Water	HW	Black	Yellow
Domestic Hot Water Circulation	HWC	Black	Yellow

## PART 3 - EXECUTION

## 3.1 GENERAL

- A. Locate piping identification at the following areas:
1. At each riser.
  2. At each valve.
  3. Where pipes pass through walls and floors (one each side).
  4. At or near each change in direction or height.

## IDENTIFICATION OF PIPING SYSTEMS

BRPH Architects - Engineers, Inc.

School Code: 0392

5. Every 40 feet along continuous runs.
  6. Within 4 feet of the entrance or exit to a vessel, tank or piece of equipment.
- B. Indicate flow direction with arrows of matching style and color and placed so that the arrow points away from the legend.
- C. A copy of the pipe identification legend shall be included in the Operation and Maintenance manual.
- D. In addition to the above, identify fire protection piping and accessories as outlined in Section 21 0000, Common Work Results for Fire Protection, and in NFPA 13.

END OF SECTION 23 0553

**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

**1.2 SCOPE OF WORK**

- A. Procure the services of an independent Test and Balance agency that is independent of any contractor or manufacturer to perform the testing and balancing and to prepare reports to the Architect. The Test and Balance agency shall be a certified member of the Associated Air Balance Council (AABC) or the National Environmental Balancing Bureau (NEBB).
- B. Perform testing and balancing in accordance with the 6th. edition of the AABC National Standards (2002) for Total System Balance, and in accordance with the scope of work defined herein.
- C. The Test and Balance agency, as part of its contract, shall act as an authorized inspection agency, responsible to the Owner and shall, during the test and balance, list all systems that require correction or that have not been installed in accordance with the drawings and specifications.
- D. A single agency shall be responsible for all phases of testing and balancing.
- E. Do not begin testing and balancing until all systems have been completed and are in full working order. Put all heating, ventilating and air conditioning equipment into full operation and continue the operation of same during each working day of testing and balancing.
- F. Upon the completion of the test and balance work the agency shall compile the test data and submit four copies of the complete report to the Architect for his evaluation and approval.
- G. After testing, adjusting and balancing is complete the agency shall visit the job during the heating season and during the cooling season to make adjustments to provide uniform temperatures throughout the building. Schedule the trips during the months of December through February for the heating season, and June through August for the cooling season. Obtain signed statements from the Owner acknowledging these two trips and subsequent adjustments. Submit statements to the Architect.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. Provide all required instrumentation, equipment, tools, devices and utility services to perform the operations as specified herein.

- B. Calibrate instruments used for testing and balancing of systems within six months preceding the tests and check them for accuracy prior to start of work.
- C. Instruments shall be of a type normally recognized as adequate and accurate for the test contemplated. List the types of instruments, including manufacturer, serial number and latest calibration date as a part of the submitted test data.

## 2.2 PATCHING MATERIALS

- A. Unless indicated otherwise, use same products as used in the work for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs and similar purposes.

## PART 3 - EXECUTION

### 3.1 REQUIRED DOCUMENTS

- A. The contractor shall provide the following, in a timely fashion, to the Test and Balance agency:
  - 1. Contract drawings (complete set).
  - 2. Applicable specifications (Divisions 23 and 26 as a minimum).
  - 3. Related addenda, change orders, reviewed shop drawings, reviewed equipment manufacturer's submittal data and reviewed temperature control drawings.

### 3.2 COOPERATION

- A. Cooperate fully with the Test and Balance agency and provide them with completely operable systems, the right to adjust the systems and access to the system components.

### 3.3 BELT DRIVES

- A. Adjustable speed drives are to be adjusted by the Test and Balance agency. In cases where the specified capacities cannot be obtained with the original adjustable sheave or original fixed drive sheave the agency is to report the sheave size required to obtain the specified capacity.
- B. Where larger or smaller sheave sizes are required provide new sheaves and, if required, new belts.

### 3.4 OPERATING TEST

- A. Make a complete system operating test for a period of eight hours with controls set in their various positions to ensure proper operation under the design conditions. Make all tests and final adjustments to the complete satisfaction of the Owner and the Architect.
- B. Schedule the operating test four weeks prior to scheduled completion date.



### 3.5 CONTROL PERFORMANCE CHECK

- A. The results produced by the operation of automatic controls shall be checked by the Test and Balance agency. List and report controls requiring adjustment. The agency shall be responsible only for final settings.

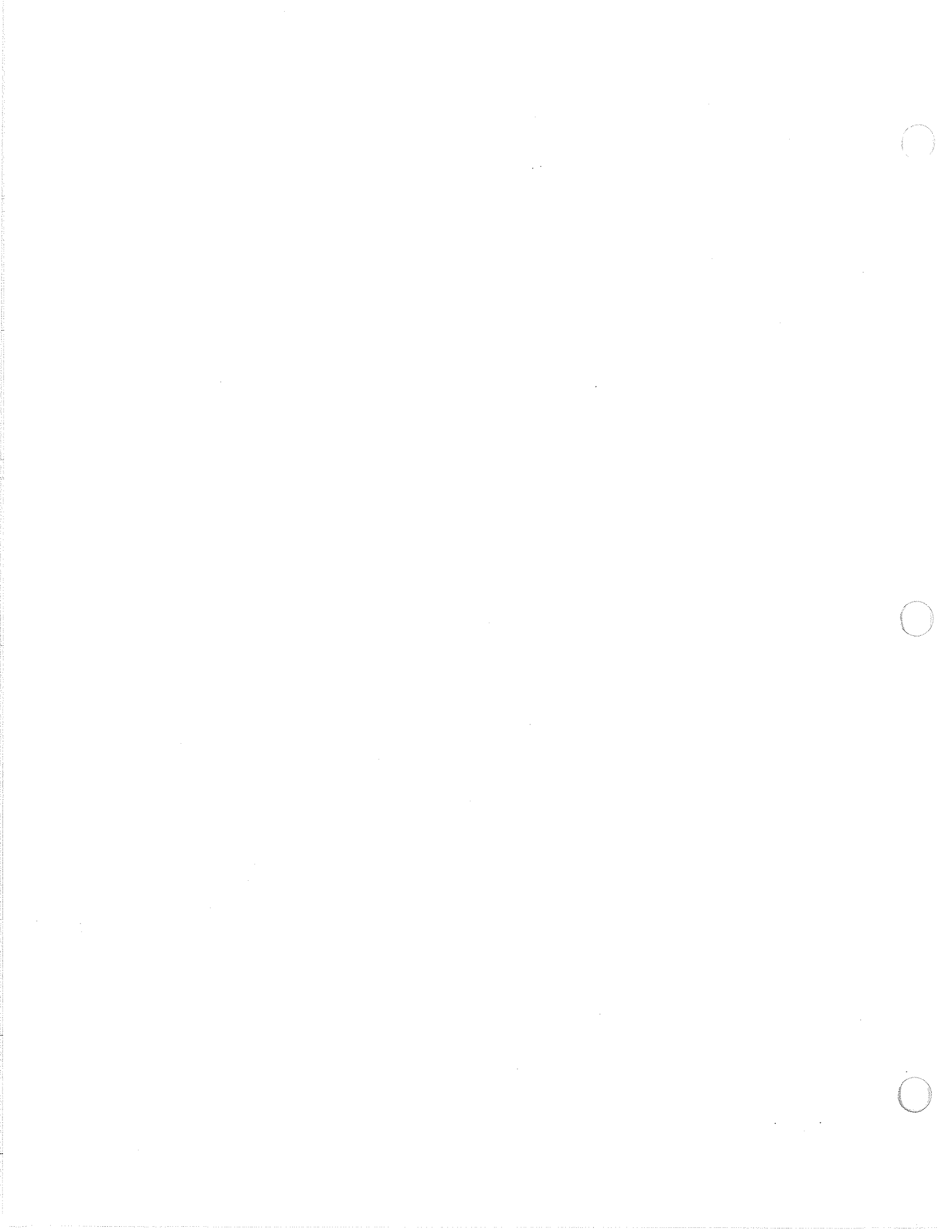
### 3.6 SETTINGS

- A. Permanently mark the settings of all valves, dampers and other adjustment devices in a manner that will allow the settings to be restored. If a balancing device is provided with a memory stop it shall be set and locked.

### 3.7 AIR BALANCING REQUIREMENTS

- A. Test, record and incorporate in the test and balance report the following items. The report shall not be limited to these items, but shall include as minimum requirements:
  1. Record each item of equipment manufacturer, model number and serial number.
  2. Record all installed fan drive assemblies, fan sheaves, motor sheaves and belts.
  3. Record each installed motor manufacturer, motor horsepower, motor name plate and measured voltage and motor name plate and full load amperage.
  4. Test, adjust and record each fan RPM.
  5. Test, adjust and record required and measured total CFM for each fan system by duct traverse. Test and record quantity of supply, return, outside air, exhaust or relief air in CFM.
  6. Test and record required and measured system static pressures, filter pressure differential, coil pressure differential and fan total static pressure.
  7. Test and adjust the CFM delivery of each diffuser, grille and register.
  8. Identify the location of each diffuser, grille and register.
  9. Record the size and type of each diffuser, grille and register.
  10. Include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustment for each diffuser, grille and register.
  11. Adjust all diffusers, grilles and registers to minimize drafts.
  12. Make all tests with supply, return and exhaust systems operating, and with all doors, windows or other openings closed or in their normal operating condition.

END OF SECTION 23 0593



## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

## 1.2 DESCRIPTION

- A. All insulation products shall meet NFPA requirements for a Flame Spread Rating not to exceed 25, a Smoke Developed Rating not to exceed 50 and a Fuel Contributed Rating not to exceed 50.
- B. Do not use staples for securing insulation.
- C. Insulation and vapor barrier shall be continuous through wall and floor sleeves, ceilings and roofs except at fire and fire/smoke dampers.
- D. Supports for insulated piping shall be outside the insulation. Provide pipe shields at pipe hangers.
- E. Do not store insulation materials in the building until it is enclosed and dry. Do not install wet insulation.
- F. Do not apply insulation products with self-sealing type lap jackets at ambient temperatures below 40 degrees F.
- G. Paint ferrous metal piping installed outdoors with one coat of rust inhibiting primer before installing insulation.
- H. Do not insulate the following items:
  - 1. Chromium plated brass connections to plumbing fixtures.
  - 2. Underground domestic cold water piping.
  - 3. Discharge piping from pressure relief devices.
  - 4. Factory pre-insulated ducts.

## 1.3 QUALITY ASSURANCE

- A. Provide minimum R-value listed in State of Georgia requirements and as otherwise indicated in these specifications. Codes and regulations referred to in these specifications are minimum standards, however if the requirements of these specifications exceed those of the codes and regulations, the specifications shall govern.
- B. Any methods of application of insulation products or finishes not specifically detailed herein shall be applied in accordance with the insulation manufacturer's published recommendations. Apply insulation by experienced workers regularly employed in this type of work.

- C. Insulation products manufactured by Owens-Corning, Johns-Manville, CertainTeed, Knauf or Armstrong will be acceptable.
- D. Adhesives, mastics and coatings manufactured by Benjamin Foster, Childers, Insul-Coustic or Minnesota Mining and Manufacturing Co. (3M) will be acceptable.

**PART 2 - PRODUCTS**

**2.1 PRE-MOLDED GLASS FIBER PIPE INSULATION**

- A. Pipe insulation shall be 4 pcf density fibrous glass wool accurately molded to conform to the outside diameter of the pipe. Insulation shall be the one piece snap-on or self-sealing lap type with white all-service jacket and vapor barrier. Insulation shall be suitable for use on hot or cold pipes with a temperature range of 35 to 400 degrees F. Thermal conductivity shall not exceed 0.26 at 75 degrees F mean temperature.

**2.2 PRE-MOLDED GLASS FIBER INSULATION THICKNESS IN INCHES**

<u>Service</u>	Up to 1"	1-1/4" to 2"	2-1/2" and Over
<u>Plumbing systems</u>			
Hot water and hot water circulating	1/2"	1"	1"
Cold water	1/2"	1"	1"

**2.3 GLASS FIBER WRAP PIPE INSULATION**

- A. Pipe insulation shall be 1 pcf density fibrous glass wool wrapping with factory applied all-service jacket. Insulation shall be sealed with vapor barrier tape.
- B. Insulate the following with 1-1/2" thick glass fiber wrap pipe insulation:
  - 1. Horizontal portions of rain leaders including each elbow and the roof drain body.
  - 2. Vertical portions of rain leaders installed in areas of the building defined as plenums.

**2.4 FOAMED PLASTIC TUBING**

- A. Foamed plastic tubing shall have a minimum density of 4.5 pcf. Thermal conductivity shall not exceed 0.28 at 75 degrees F mean temperature.
- B. Apply and secure insulation and seal all joints with Armaflex 520 adhesive so as to maintain a continuous vapor barrier. On piping, do not split the insulation longitudinally except at branch fittings where it cannot be avoided.
- C. Insulate the following with 1/2" thick foamed plastic tubing insulation:
  - 1. Domestic hot water piping below ground.

## 2.5 FIBERGLASS WRAP DUCT INSULATION

- A. Insulation shall be 1 pcf minimum density having a thermal conductivity of 0.27 at 75 degrees F mean temperature. Insulation shall have a factory applied vapor barrier of foil-faced flame resistant kraft paper.
- B. Insulate the following with 2" thick fiberglass wrap duct insulation:
  - 1. All supply ductwork.
  - 2. All return ductwork except ductwork run in return air plenums and internally lined return ducts need not be insulated.

## 2.6 FIBERGLASS BOARD DUCT INSULATION

- A. Insulation shall be 3 pcf semi-rigid board material having a thermal conductivity not to exceed 0.25 at 75 degrees F mean temperature.
- B. Insulate the following with 2" thick fiberglass board duct insulation:
  - 1. All ductwork installed outdoors.

## 2.7 ACOUSTICAL DUCT LINER

- A. Acoustical duct liner shall be a flexible type having long glass fibers with a smooth, firmly bonded fire-resistant surface specifically designed to prevent erosion of the fibers. Thermal conductivity shall not exceed 0.26 at 75 degrees F mean temperature and the noise reduction coefficient shall be not less than 0.60 when based on the Acoustical Materials Test, Mounting No. 6.
- B. Completely coat all duct surfaces with Benjamin Foster 85-15 adhesive. Join sections of liner by coating the edges with Benjamin Foster 30-36. Impale the liner on self-adhering pins, secured with self-locking washers, spacing the pins not more than 4" from the edges and not more than 16" on centers.
- C. Duct liner shall meet the National Board of Fire Underwriters' Standards for Internal Duct Application and shall have a minimum density of 3 pcf. Air friction correction factor shall not exceed 1.40 at 2000 fpm and 1.50 at 4000 fpm.
- D. Provide 1" thick acoustical duct liner on the following ductwork:
  - 1. Return air ductwork where indicated on the drawings.

## 2.8 ADHESIVES, MASTICS, COATINGS AND VAPOR BARRIERS

- A. The treatment of pipe insulation jackets and duct insulation facings to impart flame spread and smoke developed ratings shall be permanent. The use of water-soluble treatments is prohibited.
- B. Vapor barriers shall be installed on all pipe and duct insulation which shall have a perm rating of not more than 0.05 perms. Adhesives, coatings and mastics shall have a perm rating of not less than 0.25 perms.

## 2.9 TAPE

- A. Whenever tape is used for sealing purposes, it shall be of the type and shall be applied as recommended by the covering manufacturer. If there is no such recommendation, the tape used shall be 3M Adhesive EC-1329.

## 2.10 INSULATING CEMENT

- A. Insulating cement shall be Owens-Corning 110 mineral wool, Benjamin Foster, or 3M All Purpose Cement. Where insulating cement is applied to pipe fittings in concealed locations it shall be "one-coat" cement.

## 2.11 GLASS CLOTH JACKET

- A. Glass cloth jacket on pipe, duct and equipment insulation shall be open weave, standard weight.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Clean all surfaces to be insulated of all loose scale, dirt, rust, oil and other foreign matter and thoroughly dry before applying insulation.
- B. Perform pressure tests required by other sections before insulation is applied.
- C. Insulate completely all metal surfaces of piping and ductwork other than hangers.
- D. Insulation surface finishes shall present a tight, smooth appearance and the surface finish shall be extended to protect all raw ends and edges of the insulation.

### 3.2 INSULATION FOR PIPING

- A. Install insulation materials with smooth and even surfaces, with jackets drawn tight and cemented down smoothly at longitudinal seams and end laps. Do not use scrap pieces of insulation where a full length of insulation will fit.
- B. Install insulation, jackets and coatings continuous through wall openings and through pipe sleeves.
- C. Insulate valves, fittings, and flanges with field fabricated, multiple mitered segments of molded pipe insulation of the same thickness and material as the adjoining pipe insulation. Secure segments with 20 gauge galvanized steel wire and apply a smoothing coat of insulating cement. Use white fabric and mastic on all fittings exposed to view.
- E. Butt all joints together and seal with joint straps furnished with the insulation. Secure all jacket laps with lap adhesive.

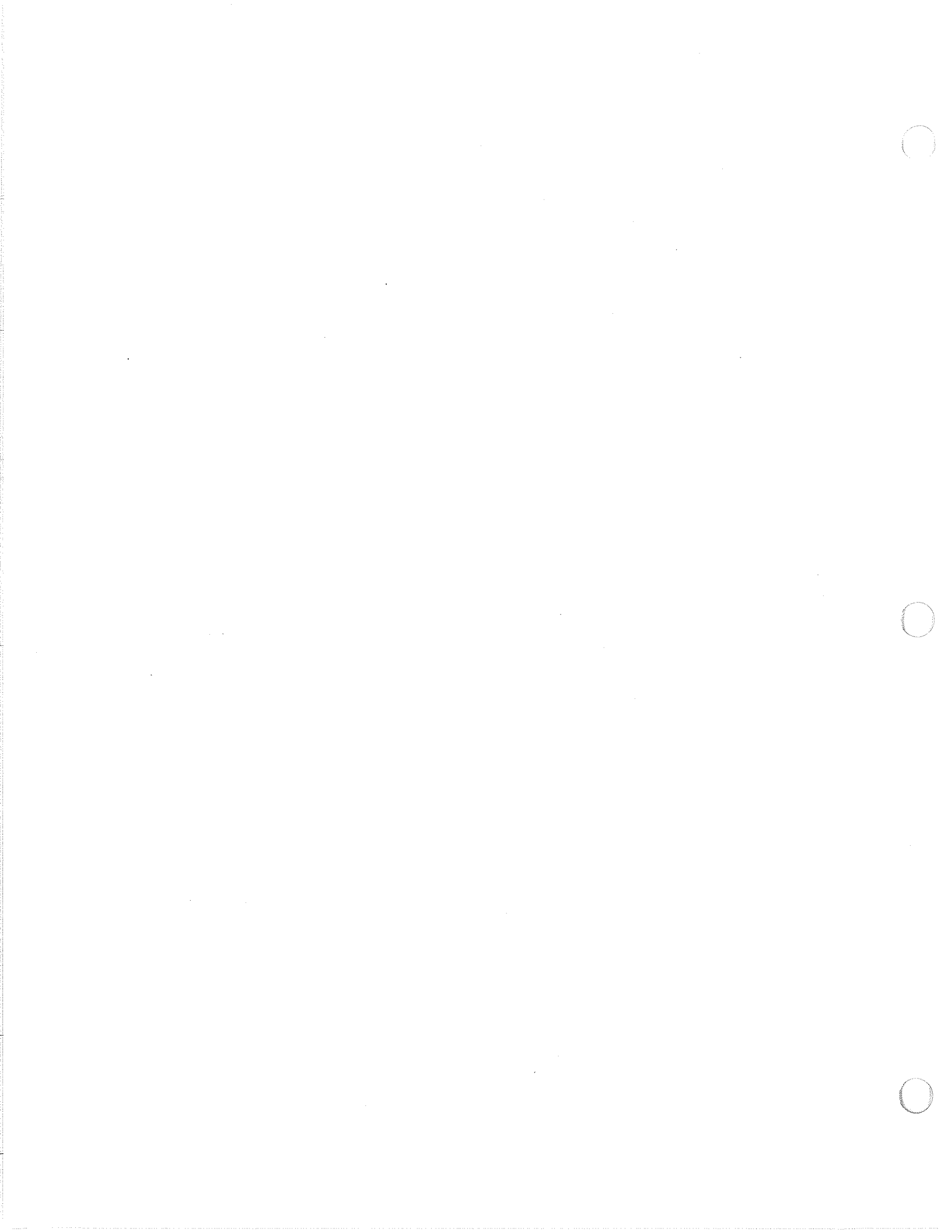
### 3.3 INSULATION FOR DUCTWORK

- A. Cover all standing ribs and seams with insulation. Secure insulation to the duct with Benjamin Foster 85-15 adhesive applied in 4" strips around the duct on 18" centers. Use nylon cord ties at 18" intervals to secure the insulation on round ductwork. On rectangular ductwork 36" wide or more in either dimension, secure the insulation to the bottom of the duct using self-adhering pins and self-locking washers spaced not more than 18" on center. Overlap factory applied insulation, where applicable, a minimum of 2". Seal the vapor barrier at all butt joints, laps and breaks using 4" wide foil-reinforced tape adhered with Benjamin Foster 82-07 adhesive.
- B. Provide insulation, jackets and coatings continuous through wall openings except do not insulate fire dampers.
- C. Insulate all ductwork exposed outdoors with 2" thick, 3 pcf density glass fiber semi-rigid board insulation, secured with self-adhering pins and self-locking washers spaced not more than 18" on center. Seal butt joints and edges with mastic. Finish with standard weight glass cloth set in 1/16" thick weatherproof mastic similar to "Seal-Kote". After drying, apply a 1/16" thick finish coat of waterproof mastic.

### 3.4 CLEANING

- A. Prior to final acceptance, clean the finished surfaces of all exposed insulation of all stains and blemishes. If necessary to obtain a new appearance, coat any discolored insulation with off-white latex based semi-gloss paint or lagging adhesive.

END OF SECTION 23 0770





**PART 1 - GENERAL****1.1 OVERVIEW**

- A. This document contains the specification and input/output summaries for a Building Automation System (BAS) for: Fulton County Board of Education.
- B. The system shall provide the Direct Digital Control (DDC), Energy Management and Building Automation System (BAS) for the air conditioning, heating and ventilating systems and shall interface with other microprocessor based building subsystems as detailed in the Input/Output Summaries and as specified herein. All damper and valve actuators shall be electronic.

**1.2 INSTRUCTIONS TO BIDDERS**

- A. The system specified in this document shall be native BACnet architecture providing full operator access via the Internet or Local Area Network utilizing only a browser for full operator access and control in through a thin-client architecture. The system shall be the Automated Logic WebCTRL system furnished and installed by Automated Logic Georgia. The requirements are described in this specification. No deviations from this specification are acceptable.

**1.3 SCOPE OF WORK**

- A. Contractor's Responsibilities: The Contractor shall furnish and install all necessary software and hardware, wiring, and computing equipment in compliance with this specification. Any variances from this specification or related documentation shall be submitted in writing at the time of bid.
- B. System Requirements
  - 1. Standard Material/Products. All material and equipment used shall be standard components, regularly manufactured and available, and not custom designed especially for this project
  - 2. Modular Design. The system architecture shall be fully modular permitting expansion of application software, system peripherals, and field hardware.
  - 3. Performance. The system, upon completion of the installation and prior to acceptance of the project, shall perform all operating functions as detailed in this specification.
- C. Equipment
  - 1. System Hardware: The Contractor shall provide the following:
    - a. Control modules as specified.
    - b. All sensing devices, relays, switches, indicating devices, and transducers required to perform the functions as listed in the sequence of operations.
    - c. All monitoring and control wiring.
- D. Codes and Regulations

1. Standards Authority. All electrical equipment and material, and its installation, shall conform to the current requirements of the following authorities:
  - a. Occupational Safety and Health Act (OSHA)
  - a. National Electric Code (NEC)
  - b. National Fire Code
  - c. Standard Mechanical Code
  - d. Standard Building Code
  - e. Standard Plumbing Code
2. Product Applicable Standards. All distributed, standalone and unitary controllers supplied shall be in compliance with the following listings and standards:
  - a. UL916 for Open Energy Management (for U.S. and Canada)
  - a. FCC Part 15, Sub-Part B, Class A
  - b. CE Electro Magnetic Compatibility
3. Manufacturer's Quality System. The control system manufacturer shall be ISO9001 listed for design and manufacture of environmental control systems for precise control and comfort, indoor air quality, HVAC plant operation, energy savings and preventative maintenance. ISO Certification shall be by a registrar that is accredited by an internationally recognized organization such as RAB. Copy of ISO9001 certificate shall be submitted with bid.
4. Conflict of Codes. Where two or more codes conflict, the most restrictive shall apply. Nothing in this specification or related documentation shall be construed to permit work not conforming to applicable codes.

#### 1.4 GENERAL CONDITIONS

- A. Changes in Scope of Work: Any changes in the scope of work must be authorized by a written Change Order.
- B. Correction of Work
  1. Contractor's Responsibility. The Contractor shall promptly correct all work found defective or failing to conform to the Contract Documents. The Contractor shall bear all cost of correcting such work.
  2. During Warranty. If, within the warranty period required by the Contract Documents, any of the work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice to do so.
- C. Coordination of Work During Construction
  1. The Contractor shall coordinate any necessary changes in work scheduling to minimize disruption.
    - a. The Contractor shall protect the installed works by other trades.
    - a. The Contractor shall coordinate with other trades.
    - b. The Contractor shall repair any damage caused by his work to building(s) and equipment at no additional cost to the owner.

- D. Warranty : The Contractor shall warrant, from the date of final acceptance, that all systems, subsystems, component parts, and software are fully free from defective design, materials, and workmanship for a period of one year or longer as indicated in this specification.

#### 1.5 SUBMITTALS, DOCUMENTATION, ACCEPTANCE AND TRAINING

##### A. Submittals

1. Shop Drawings. A minimum of four (4) copies of shop drawings shall be submitted and shall consist of a complete list of equipment, materials, manufacturer's technical literature, cut-sheets, and installation instructions. Drawings shall contain proposed layout, complete wiring, routing, schematic diagrams, tag number of devices, software descriptions, calculations, installation details, and any other details required to demonstrate that the system will function properly.
1. Graphical Programming Documentation: The Contractor shall provide a printout all Graphical Programs, identifying the specific HVAC or mechanical/electrical subsystem being controlled
2. Drawing Approval. Shop drawings shall be approved before any equipment is installed. Controls contractor shall allow a minimum of fourteen (14) days for drawing approval.
3. As Built Drawings. All drawings shall be reviewed after the final system checkout and updated or corrected to provide 'as-built' drawings to show exact installation. All shop drawings will be acknowledged in writing before installation is started and again after the final checkout of the system. The system will not be considered complete until the 'as-built' drawings have received their final approval. The Contractor shall deliver 6 sets of 'as-built' drawings.

##### B. Documentation: Operating and Maintenance (O&M) manuals for the system shall be made available electronically using Acrobat (PDF) format and include the following categories: Workstation User's Manual, Project Engineering Handbook, Software Documentation.

1. BAS User's Manual shall contain as a minimum:
  - a. System overview
  - b. Networking concepts
  - c. Launching a web browser from a networked PC/PDA and login
  - d. Graphical User Interface (GUI) screen menus and their definitions
  - e. Creating, modifying or deleting schedules
  - f. Uploading and downloading software to the field hardware
  - g. Creating historical trends, collecting trend data and generating trend graphs
  - h. Enabling and assigning alarms and messages to reporting actions/groups
  - i. Report generation and 'third party software'
  - j. Backing up software and data files
2. Project Engineering Manual shall contain as a minimum:
  - a. System architecture overview
  - b. Hardware cut-sheets and product descriptions

- c. The Contractor shall deliver six (6) sets of 'as-built' drawings. All drawings shall be reviewed after the final system checkout and updated to provide 'as-built' drawings. The system will not be considered complete until the 'as-built' drawings have received their final approval.
  - d. Installation, mounting and connection details for all field hardware and accessories
  - e. Commissioning, setup and backup procedures for all control modules/accessories, BAS server software, and database.
  - f. Listing of basic terminology, alarms/messages, error messages and frequently used commands or shortcuts.
3. BAS Software Documentation shall contain as a minimum:
    - a. The Contractor shall provide a printout all Graphical Programs, detailing their application to specific HVAC equipment and electrical/mechanical subsystems, together with a glossary or icon symbol library detailing the function of each graphical icon. Revisions made as a result of the submittal process, during the installation, start-up or acceptance portion of the project, shall be accurately reflected in the "as-builts".
    - b. Graphical representation of the mechanical equipment hierarchy for the project including all equipment controlled by the BAS. For example: a VAV terminal box may be the source for increased cooling demand and require the primary VAV AHU to operate which, in turn, requires the chillers to operate.
    - c. Detailed listing of all alarm and event messages programmed for designated mechanical/electrical equipment and required operator action.
- C. Acceptance Test
1. Acceptance Testing. Upon completion of the installation, the Contractor shall start up the system and perform all necessary calibration, testing, and debugging operations. The Contractor in the presence of the Owner's representative shall perform an acceptance test.
  2. Notice of Completion. When the system performance is deemed satisfactory, the system parts will be accepted for beneficial use and placed under warranty. At this time, a "notice of completion" shall be issued and the warranty period shall start.
- D. System Training
1. System Use Instructions: Controls Contractor shall provide 24 Hours of training for designated personnel in the operation, maintenance, and programming of the system.

## PART 2 - BAS SERVER & WEB BROWSER GUI

### 2.1 SYSTEM OVERVIEW

The BAS contractor shall provide system software based on a server/thin-client architecture, designed around the open standards of web technology. The BAS server shall communicate using ASHRAE's BACnet/IP protocol. Server shall be accessed using a web browser over the DDC system intranet provided under this contract and remotely over the Internet.

The intent of the thin-client architecture is to provide the operator(s) complete access to the BAS system via a web browser. The thin-client web browser Graphical User Interface (GUI) shall be browser and operating system agnostic, meaning it will support Microsoft Internet Explorer browsers (6.x or later versions), and Windows as well as non-Windows operating systems. No special software, (active-x components or fat java clients) shall be required to be installed on the PC's / PDA's used to access the BAS via a web browser.

The BAS server software must support at least the following server platforms (Windows NT, Sun Solaris and Linux). The BAS server software shall be developed and tested by the manufacturer of the system standalone controllers and network controllers/routers. Third party manufactured and developed BAS software is not acceptable.

The web browser GUI shall provide a completely interactive user interface and must offer the following features as a minimum:

- Trending
- Scheduling
- Downloading Memory to field devices
- Real time 'live' Graphic Program Diagnostics for troubleshooting
- Tree Navigation
- Parameter change of properties
- Setpoint Adjustments
- Alarm / Event information
- Configuration of operators
- Execution of global commands

- A. Software Components: All software components of the BAS system software shall be installed and completed in accordance with the specification. BAS system components shall include:
1. Server Software, Database and Web Browser Graphical User Interface
  2. System Configuration Utilities for future modifications to the system
  3. Graphical Programming
  4. Direct digital control software
  5. Application Software
- B. BAS Server Database: The BAS server software shall utilize a Java DataBase Connectivity (JDBC) compatible database such as: MS Access, MS SQL 7.0,

Oracle 8i or IBM DB2. BAS systems written to Proprietary databases are NOT acceptable.

- C. Database Open Connectivity: The BAS server database shall be Java DataBase Connectivity (JDBC) compatible, allowing real time access of data via the following standard mechanisms:
1. Common Object Request Broker Architecture (CORBA)
  2. OLE/OPC (for Microsoft Client's/Server platform only)
  3. Import/Export of the database from or to XML (extensible Mark-up Language)
- D. Communication Protocol(s): The native protocol for the BAS server software shall be BACnet as defined by ASHRAE standard SPC135. In addition, the software shall be able to support concurrent operation of multiple standard and non-standard protocols such as:
1. MODBUS
  2. SMNP
- E. Cross Platform Capability: The BAS system software (client and server) shall be operating system and hardware agnostic, being able to run on Windows 98, Windows 2000, Windows NT, Sun Microsystems Solaris and Red Hat Linux
- F. Thin Client - Web Browser Based: The GUI shall be thin client or browser based and shall meet the following criteria:
1. Web Browser's for PC's: Only a 6.x browser (Explorer/Navigator) will be required as the GUI, and a valid connection to the server network. No installation of any custom software shall be required on the operator's GUI workstation/client. Connection shall be over an intranet or the Internet. A firewall shall be installed (as necessary) to protect the customer's Intranet.
  2. Secure Socket Layers: Communication between the Web Browser GUI and BAS server shall be encrypted using 128-bit encryption technology within Secure Socket Layers (SSL). Communication protocol shall be Hyper-Text Transfer Protocol (HTTP).
  3. PDA's: BAS Server software must support other browsers used by Personal Digital Assistants like 3Com Palm Pilots and other Internet appliances specified herein.
- 2.2 WEB BROWSER GRAPHICAL USER INTERFACE Web Browser Navigation: The Thin Client web browser GUI shall provide a comprehensive user interface. Using a collection of web pages, it shall be constructed to "feel" like a single application, and provide a complete and intuitive mouse/menu driven operator interface. It shall be possible to navigate through the system using a web browser to accomplish 2.2 B thru 2.2 J of this specification. The Web Browser GUI shall (as a minimum) provide a Navigation Pane for navigation, and a Action Pane for display of animated graphics, schedules, alarms/events, live graphic programs, active graphic setpoint controls, configuration menus for operator access, reports, and reporting actions for events.

- A. Login: On launching the web browser and selecting the appropriate domain name or IP address, the operator shall be presented with a login page that will require a login name and password. Navigation in the system shall be dependent on the operator's role privileges, and geographic area of responsibility (see 3.2 J below).
- B. Navigation Pane: The Navigation Pane shall comprise a Navigation Tree which defines a geographic hierarchy of the proposed BAS system. Navigation through the GUI shall be accomplished by clicking on appropriate level of a navigation tree (consisting of expandable and collapsible tree control like Microsoft's Explorer program), and/or by selecting dynamic links to other system graphics. Both the navigation tree and graphic pane defined in 2.2 D shall be displayed simultaneously, enabling the operator to select a specific system or equipment, and view the graphic corresponding to the highlighted position in the navigation tree. The navigation tree shall as a minimum provide the following views: Geographic, Network, Groups and Configuration.
1. Geographic View shall display a logical geographic hierarchy of the system including cities, sites, buildings, building systems, floors, equipment and BACnet objects.
  2. Network View shall display the hierarchy of the actual BACnet IP Intranet network. This can include: Systems, Site, Networks, Routers, Half-Routers, Devices, Equipment and all the BACnet Objects in a device.
  3. Groups View shall display Scheduled Groups and custom reports.
  4. Configuration View shall display all the configuration categories (Operators, Schedule, Event, Reporting and Roles).
- C. Action Pane: The Action Pane shall provide several functional views for each HVAC or mechanical/electrical subsystem specified. By clicking on a button, an operator shall be able to select the following system page, corresponding to the highlighted area/equipment in the navigation tree:
1. Graphics: Using animated gifs or other graphical format suitable for display in a web browser, graphics shall include aerial building/campus views, color building floor-plans, equipment drawings of each individual piece of equipment with live variable statuses, active graphic setpoint controls, web content, and other valid HTML elements. The data on each graphic page shall automatically refresh at a rate defined by the operator.
  2. Properties: Shall include graphic controls and text for the following: Locking or overriding BACnet objects, demand strategies, and any other valid data required for setup. Changes made to the properties pages shall require the operator to depress a 'accept/cancel' button.
  3. Schedules: Shall be used to create, modify/edit and view schedules based on the systems geographical hierarchy (using the navigation tree) and in compliance with section 2.2.G
  4. Events: Shall be used to view alarm event information geographically (using the navigation tree), acknowledge events, sort events by category, actions and verify reporting actions.
  5. Trends: Shall be used to display associated trend and historical data, modify colors, date range, axis and scaling

6. Logic - Live Graphic Programs: Shall be used to display a 'live' graphic programs of the control algorithm for the mechanical/electrical system selected in the navigation tree. All control outputs and inputs shall displayed on the program giving real-time statuses for use in operator troubleshooting.

The following actions shall be accomplished by clicking appropriate buttons/menu's in the graphic window: Log In/Out, Print and Hide/Show Navigation Pane.



- D. Color Graphics: The Web Browser GUI shall make extensive use of color in the graphic pane to communicate information related to setpoints and comfort. Animated gif's, active setpoint graphic controls and valid web content (like local weather forecast) shall be used to enhance usability:
1. Display Size: The GUI workstation software shall graphically display in 1024 by 768 pixels 24 bit True Color.
  2. General Graphic: General area maps shall show locations of controlled buildings in relation to local landmarks.
  3. Color Floor Plans: Floor plan graphics shall show heating and cooling zones throughout the buildings in a range of colors, which provide a visual display of temperature relative to their respective setpoints (see section 3.2 F below). The colors shall be updated dynamically as a zone's actual comfort condition changes in real-time. Locations of space sensors shall also be shown for each zone. The intent of the specification is to enable the operator to readily assess problems at a glance.
  4. Mechanical Components: Mechanical system graphics shall show the type of mechanical system components serving any zone through the use of a pictorial representation of components. Selected I/O points being controlled or monitored for each piece of equipment shall be displayed with the appropriate engineering units. Animation shall be used for rotation or moving mechanical components to enhance usability.
  5. Minimum System Color Graphics: Color graphics shall be selected and displayed via a web browser for the following:
    - a. Each piece of equipment monitored or controlled including each terminal unit
    - b. Each building
    - c. Each floor and zone controlled
- E. Zone Setpoint Adjustments: Color floor plans displayed via a web browser shall utilize a contiguous band of colors, each corresponding to actual zone temperatures relative to the desired heating and cooling setpoints. The ideal temperature shall be shown as a green color band. Temperatures slightly warmer than ideal shall be shown in yellow, and even warmer temperature band shall be shown in orange. Temperatures slightly cooler than ideal shall be light blue, and even cooler temperatures shall be shown as dark blue. All alarm colors shall be in red.
- F. Hierarchical Schedules: Utilizing the Navigation Tree displayed in the web browser GUI, an operator (with password access) shall be able to define a Normal, Holiday or Override schedule for an individual piece of equipment or room, or choose to apply a hierarchical schedule to the entire system, site or floor area.

All schedules that affect the system/area/equipment highlighted in the Navigation Tree shall be shown in a summary schedule table and graph.

1. BACnet Schedules: Schedules shall comply with the BACnet standard, (Schedule Object, Calendar Object, Weekly Schedule property and Exception Schedule property) and shall allow events to be scheduled based on:

- a. Types of schedule shall be Normal, Holiday or Override
  - b. A specific date,
  - c. A range of dates,
  - d. Any combination of Month of Year (1-12, any), Week of Month (1-5, last, any), Day of Week (M-Sun, Any)
  - e. Wildcard (example, allow combinations like second Tuesday of every month).
2. **Schedule Categories:** The system shall allow operators to define and edit scheduling categories (different types of "things" to be scheduled; for example, lighting, HVAC occupancy, etc.). The categories shall include name, description, icon (to display in the hierarchy tree when icon option is selected) and type of value to be scheduled.
  3. **Schedule Groups:** In addition to hierarchical scheduling, operators shall be able to define functional Schedule Groups, comprised of an arbitrary group of areas/rooms/equipment scattered throughout the facility and site. For example, the operator shall be able to define an 'individual tenant' group - who may occupy different areas within a building or buildings. Schedules applied to the 'tenant group' shall automatically be downloaded to control modules affecting spaces occupied by the 'tenant group'
  4. **Intelligent Scheduling:** The control system shall be intelligent enough to automatically turn on any supporting equipment needed to control the environment in an occupied space. If the operator schedules an individual room in a VAV system for occupancy, the control logic shall automatically turn on the VAV air handling unit, chiller, boiler, and/or any other equipment required to maintain the specified comfort and environmental conditions within the room.
  5. **Partial Day Exceptions:** Schedule events shall be able to accommodate a time range specified by the operator.
  6. **Schedule Summary Graph:** The schedule summary graph shall clearly show Normal versus Holiday versus Override Schedules, and the net operating schedule that results from all contributing schedules. Note: In case of priority conflict between schedules at the different geographic hierarchy, the schedule for the more detailed geographic level shall apply.
  7. **Schedule Distribution:** For reliability and performance, instead of maintaining a single schedule in a field device that writes over the network to notify other devices when a scheduled event occurs, field devices will only keep their part of the schedule locally. The BAS server software shall determine which nodes a hierarchical schedule applies to and will create/modify the necessary schedule objects in each field device as necessary.
- G. **Events ( & Alarms):** Events and alarms associated with a specific system, area, or equipment selected in the Navigation Tree, shall be displayed in the Action Pane by selecting an 'Events' view. Events, alarms, and reporting actions shall have the following capabilities:

1. Events View: Each event shall display an Event Category (using a different icon for each event category), date/time of occurrence, current status, event report, and a URL link to the associated graphic for the selected system, area or equipment. The URL link shall indicate the system location, address and other pertinent information. An operator shall easily be able to sort events, edit event templates and categories, acknowledge or force a return to normal in the Events View as specified in this section.
2. Event Categories: The operator shall be able to create, edit or delete event categories such as HVAC, Maintenance, Fire, or Generator. An icon shall be associated with each Event category, enabling the operator to easily sort through multiple events displayed using a built-in filter.
3. BACnet Event Templates: BACnet Event template shall define different types of alarms and their associated properties. As a minimum, properties shall include a reference name, verbose description, severity of event, acknowledgement requirements, high/low limit and out of range information.
4. Event Areas: Event Areas enable an operator to assign specific Event Categories to specific Event Reporting Actions.
5. Event Time/Date Stamp: All events shall be generated at the DDC control module level and comprise the Time/Date Stamp using the standalone control module time and date.
6. Event Configuration: Operators shall be able to define the type of events generated per BACnet object. A 'network' view of the Navigation Tree shall expose all BACnet objects and their respective Event Configuration. Configuration shall include assignment of event, alarm, type of Acknowledgement and notification for return to normal or fault status.
7. Event Summary Counter: The view of events in the Graphic Pane shall provide a numeric counter, indicating how many events are active (in alarm), require acknowledgement, and total number of events in the BAS Server database.
8. Persistent Data. The system shall allow for external systems to access the event instance data. Event data shall be stored and queried in the database in a relational manner. At a minimum, the fields to be stored in the database are:
  - Event Source
  - Classification of Event
  - Event Generation Time
  - Event Acknowledgement Time
  - Acknowledge Required Flag
  - Return to Normal Time
  - Delivery Priority
  - Operator Comments
  - BACnet Event Type
  - Who Acknowledged the Event
  - Event Message Text

- BACnet Event Parameter
9. Event Auto-Deletion: Events that are acknowledged and closed shall be auto-deleted from the database and archived to a text file after an operator defined period.
  10. Event Reporting Actions: Event Reporting Actions specified shall be automatically launched (under operator defined conditions) after an event is received by the BAS server software. Operators shall be able to fully define these Reporting Actions using the Navigation Tree and Graphic Pane in the web browser GUI. Reporting Actions shall be as follows:
    - a. Print: Alarm/Event information shall be printed to the BAS server's PC or a networked printer.
    - b. Email: Email shall be sent via any POP3-compatible e-mail server (most Internet Service Providers use POP3). Email messages may be copied to several email accounts. Note: Email reporting action shall also be used to support alphanumeric paging services, where email servers support pagers.
    - c. File Write: The ASCII File write reporting action shall enable the operator to append operator defined alarm information to any alarm through a text file. The alarm information that is written to the file shall be completely definable by the operator. The operator may enter text or attach other data point information (such as AHU discharge temperature and fan condition upon a high room temperature alarm).
    - d. Write Property: The write property reporting action updates a property value in a hardware module.
    - e. SNMP: The Simple Network Management Protocol (SNMP) reporting action sends an SNMP trap to a network in response to receiving an event.
    - f. Run External Program: The Run External Program reporting action launches specified program in response to an event.
  11. Event Simulator: The web browser GUI user shall provide an Event Simulator to test assigned Reporting Actions. The operator shall have the option of using current time or scheduling a specific time to generate the Event. Utilizing the Navigation Tree and drop-down menus in the Graphic Pane, the operator shall be able to select the Event Type, Status, Notification, Priority, Message, and whether acknowledgement is required.
  12. External Injection of Events. The BAS server software shall provide a CORBA interface for external injection of events, allowing the system to receive/report events generated from external source other than the BAS system.
- H. Trends: Trends shall conform to the BACnet Trend Log Object specification. The system shall be able to trend and display graphically all analog, digital or calculated points simultaneously. A trend log's properties shall be editable using the Navigation Tree and Graphic Pane.
1. Viewing Trends: The operator shall have the ability to view trends by using the Navigation Tree and selecting a Trends button in the Graphic

- Pane. The system shall allow y- and x-axis maximum ranges to be specified and shall be able to simultaneously graphically display multiple trends per graph.
2. Local Trends: Trend data shall be collected locally by Multi-Equipment/Single Equipment general-purpose controllers, and periodically uploaded to the BAS server if historical trending is enabled for the BACnet object. Trend data, including run time hours and start time date shall be retained in non-volatile module memory
  3. Resolution. Sample intervals shall be as small as one (0.1) second. Each trended point will have the ability to be trended at a different trend interval. When multiple points are selected for display that have different trend intervals, the system will automatically scale the axis.
  4. Dynamic Update. Trends shall be able to dynamically update at operator-defined intervals.
  5. Zoom. It shall be possible to zoom-in on a particular section of a trend for more detailed examination.
  6. Numeric Value Display. It shall be possible to pick any sample on a trend and have the numerical value displayed.
- i. Security Access: Systems that Security access from the web browser GUI to BAS server shall require a Login Name and Password. Access to different areas of the BAS system shall be defined in terms of Roles, Privileges and geographic area of responsibility as specified:
    1. Roles: Roles shall reflect the actual roles of different types of operators. Each role shall comprise a set of easily understood English language' privileges. Roles shall be defined in terms of View, Edit and Function Privileges. Systems that use cryptic Boolean numbers to define system access are not acceptable.
      - a. View Privileges shall comprise Navigation, Network, and Configuration Trees, Operators, Roles and Privileges, Alarm/Event Template and Reporting Action.
      - b. Edit Privileges shall comprise Setpoint, Tuning and Logic, Manual Override, and Point Assignment Parameters.
      - c. Function Privileges shall comprise Alarm/Event Acknowledgement, Control Module Memory Download, Upload, Schedules, Schedule Groups, Manual Commands, Print, and Alarm/Event Maintenance.
    2. Geographic Assignment of Roles: Roles shall be geographically assigned using a similar expandable/collapsible navigation tree.
- 2.3 GRAPHICAL PROGRAMMING: The system software shall include a Graphic Programming Language (GPL) for all DDC control algorithms resident in standalone control modules. Any system that does not use a drag and drop method of graphical icon programming as described herein shall be unacceptable. GPL is a method used to create a sequence of operations by assembling graphic microblocks that represent each of the commands or functions necessary to complete a control sequence of operation. Microblocks represent common logical control devices used in conventional control systems, such as relays, switches, high signal selectors, etc., in addition to the more complex DDC and energy management strategies such as PID loops and optimum start. Each microblock shall be interactive and contain the programming necessary to execute the function of the device it represents.

Graphic programming shall be performed while on screen and using a mouse; each microblock shall be selected from a microblock library and assembled with other microblocks necessary to complete the specified sequence. Microblocks are then interconnected on screen using graphic "wires," each forming a logical connection. Once assembled, each logical grouping of microblocks and their interconnecting wires then forms a graphic function block which may be used to control any piece of equipment with a similar point configuration and sequence of operation.

A. Graphic Sequence

The clarity of the graphic sequence must be such that the operator has the ability to verify that system programming meets the specifications, without having to learn or interpret a manufacturer's unique programming language. The graphic programming must be self-documenting and provide the operator with an understandable and exact representation of each sequence of operation.

B. Simulation

Full simulation capability shall be provided with the graphic programming. Operator shall be able to fully simulate the constructed control sequence prior to downloading into field control modules. Simulation capabilities shall include step-by-step, accelerated time, and operator defined simulation criteria like outside weather, demand, and communication status. Multiple graphic programs shall be simulated and displayed in split screens at the same time.

C. GPL Capabilities

The following is a minimum definition of the capabilities of the Graphic Programming software:

1. Function Block (FB): Shall be a collection of points, microblocks and wires which have been connected together for the specific purpose of controlling a piece of HVAC equipment or a single mechanical system.
2. Logical I/O: Input/Output points shall interface with the control modules in order to read various signals and/or values or to transmit signal or values to controlled devices.
3. BACnet Points: Shall be points that comply with the BACnet structure as defined in the BIBB's Addendum B1/B2, and the BACnet standard.
4. Microblocks: Shall be software devices that are represented graphically and may be connected together to perform a specified sequence. A library of microblocks shall be submitted with the control contractors bid.
5. Wires: Shall be graphical elements used to form logical connections between microblocks and between logical I/O. Different wire types shall be used depending on whether the signal they conduct is analog or digital.
6. Labels: Labels shall be similar to wires in that they are used to form logical connections between two points. Labels shall form a connection by reference instead of a visual connection; i.e. two points labeled 'A'

- on a drawing are logically connected even though there is no wire between them.
7. Parameter: A parameter shall be a value that may be tied to the input of a microblock.
  8. Properties: Dialog boxes shall appear after a microblock has been inserted which has editable parameters associated with it. Default parameter dialog boxes shall contain various editable and non-editable fields and shall contain 'push buttons' for the purpose of selecting default parameter settings.
  9. Icon: An icon shall be graphic representation of a software program. Each graphic microblock has an icon associated with it that graphically describes its function.
  10. Menu-bar Icon: Shall be an icon that is displayed on the menu bar on the GPL screen, which represents its associated graphic microblock.
  11. Live Graphical Programs: The Graphic Programming software must support a 'live' mode, where all input/output data, calculated data, and setpoints shall be displayed in a 'live' real-time mode. For each piece of HVAC equipment, the graphic program shall be complete and viewed on one screen. For example, a graphic program used for an Air Handling Unit shall not be broken down into separate components and require an operator to view only one component at any one time.

### PART 3 - PRODUCTS HARDWARE

#### 3.1 BAS SERVER HARDWARE (Existing)

- A. Computer Configuration (One BAS server to be provided by control contractor under this project, unless there is an existing BAS Server furnished by this Contractor.)
  1. Central Server. The BAS Contractor shall provide a server configuration that includes the following components as a minimum:
    - Server Class computer ie:Dell Poweredge SC430
    - Operating system-Windows 2003 Server
    - Processor - 3GHZ P4, minimum 3 GB RAM
    - 80GB HDD, SCSI
    - CD - CDRW
    - 2 Button Mouse
    - 101 keyboard
    - 17" Monitor
    - SVGA Display card capable of 1024 X 768 resolution in true Color (32bit)
    - 10/100 Ethernet NIC
    - IE 6.0 or later
    - Database engine - MS Access Db < 500MB,MSDE, MS SQL Server

B. Standard Client (Hardware Independent) (Existing)

The thin-client browser interface shall be hardware agnostic, meaning it will support Microsoft browser (6.x versions) as well as most common server platforms (Windows NT, Sun Solaris and Linux). No special software, (active-x components or fat Java clients) shall be required to be installed on the PC's / PDA's used to access the BAS via a web browser. The following is the minimum suggested hardware requirements for a Windows/Intel client:

1. 700Mhz, PIII or higher CPU
2. 256Mb of RAM minimum
3. 20 gigabyte hard disk, SVGA Card with 1024 x 768, 24-bit True Color, 24X CD Rom Drive, 17" SVGA Color Monitor
4. Operating system for the computer operator workstation server shall be Microsoft Windows XP,2000 or RedHat Linux 6.0 or Sun Solaris 7.0
5. Internet Explorer 6.x
6. Connection to the Intranet/Internet

No client hardware is required under this project if the BAS server can act as client in addition to the BAS server applications. Any owner/customer computers may act as client if the client computer has a 6.X browser and has connection capability to the DDC intranet/server.

3.2 NETWORK ROUTERS & BRIDGES

The DDC/BAS controller network shall use BACnet as its native communication protocol. Network bridges and routers must be of a modular design to ensure reliability and system performance.

A. BACnet Router

The central system shall use the DDC/BAS Local Area Network (LAN) provided under this contract for communication. The communication between the central server and the controllers shall be BACnet/IP. A router shall be provided, as required, to bridge BACnet/IP and the data link used between the controllers (BACnet ARCNET and BACnet MS/TP). Proprietary networks and proprietary protocols are not acceptable.

1. Firmware Updates: The BACnet Router must utilize FLASH memory to allow firmware updates to be performed remotely.

3.3 STANDALONE CONTROLLERS

A. General Purpose Multiple Application Controllers

BACnet BIBBS: General Purpose Multiple Application controllers must use BACnet as the native communication protocol between controllers.

1. Communication Speed: Controllers shall communicate at a minimum of 156 Kbps using ARCNET implemented over EIA-485 using an unshielded twisted pair at the Data Link Layer.
2. General Specification: Each General Purpose Multiple Application Controller must be capable of standalone direct digital operation



utilizing its own 32 bit processor, non-volatile flash memory, input/output, 12 bit A to D conversion, hardware clock/calendar and voltage transient and lightning protection devices. A separate co-processor shall be used for communications to the controller network. All non-volatile flash memory shall have a battery backup of at least five years. Firmware revisions to the module shall be made from the BAS server or remotely over the Intranet or Internet. Controllers that require component changes to implement firmware revisions are not acceptable.

3. Point Expansion: The General Purpose Multiple Application Controllers shall be expandable to the specified I/O point requirements. Each controller shall accommodate multiple I/O Expander Modules via a designated expansion I/O bus port. These expander modules shall expand the total point capacity of each controller up to 192 points where specified. The controller, in conjunction with the expansion modules, shall act as one standalone controller.
4. Point Programming: All point data, algorithms and application software within a controller shall be custom programmable from the operator workstation.
5. Program Execution: Each General Purpose Multiple Application Controller shall execute application programs, calculations, and commands via a 32-bit microcomputer resident in the controller. All operating parameters for application programs residing in each controller shall be stored in read/writ able nonvolatile flash memory within the controller and will be able to upload/download to/from the BAS Server.
6. Self-Test Diagnostics: Each controller shall include self-test diagnostics, enabling the controller to report malfunctions to the router and BAS Server.
7. PID Loops: Each General Purpose Multiple Application Controller shall contain both software and firmware to perform full DDC Proportional, Integral, Derivative (PID) control loops and programs.
8. Input-Output Processing:
  - a. Digital Outputs shall be relays, 24 Volts AC or DC maximum, 3-amp maximum current. Each configured as normally open or normally closed using jumpers and either dry contact or bussed. Each output shall have a manual Hand-Off-Auto switch to allow for override and an LED to indicate the operating mode of the output. Triac outputs are unacceptable.
  - b. Universal Inputs shall be Thermistor (BAPI Curve II) 10K Ohm at 77°F (25°C), 0-5VDC, 10K Ohm maximum source impedance, 0-20mA - 24 VDC loop power, 250 Ohm input impedance, dry contact - 0.5mA maximum current.
  - c. Analog Output shall be electronic, voltage mode 0-10VDC or current mode 4-20mA.

B. General Purpose Single Application Controllers

1. BACnet BIBBS: The General Purpose Single Application Controllers must use BACnet as the native communication protocol between controllers.

2. Communication Speed: Controllers shall communicate at a minimum of 156 Kbps using ARCNET implemented over EIA-485 using an unshielded twisted pair at the Data Link Layer.
3. General Specification: General Purpose Single Application controllers must be capable of stand-alone DDC operation utilizing its own 32 bit processor, nonvolatile flash memory, input/output, 8 bit A to D conversion, hardware clock/calendar and voltage transient protection devices. A separate co-processor shall be used for communications to the controller network. All RAM memory shall have a battery backup of at least five years. Firmware revisions to the module shall be made from the BAS server, or remote locations over the Internet. Controllers that require component changes to implement Firmware revisions are not be acceptable.
4. Point Programming: All point data, algorithms, and application software within the controllers shall be custom programmable from the Operator Workstation.
5. Program Execution: Each General Purpose Single Application Controller shall execute application programs, calculations, and commands via a 32-bit microcomputer resident in the controller. All operating parameters for the application program residing in each controller shall be stored in read/writ able nonvolatile flash memory within the controller and will be able to upload/download to/from the Operator Workstation.
6. Self-Test Diagnostics: Each controller shall include self-test diagnostics, enabling the controller to report malfunctions to the router and BAS Server input.
7. PID Loops: Each General Purpose Single Application Controller shall contain both software and firmware to perform full DDC PID control loops.
8. Rooftop Mounting: The General Purpose Single Application Controllers shall be capable of being mounted directly in or on rooftop AHU equipment.
9. Operating Temperature: The General Purpose Single Application Controllers shall be capable of proper operation in an ambient temperature environment of -20°F to +150°F (-28.9° to 65.6°C).
10. Input-Output Processing:
  - a. Digital Outputs shall be relays, 24 Volts AC or DC maximum, 3 amp maximum current. Each output shall have a manual Hand-Off-Auto switch to allow for override and an LED to indicate the operating mode of the output. Triac outputs are unacceptable.
  - b. Universal Inputs shall be Thermistor (BAPI Curve II) 10K Ohm at 77°F (25°C), 0-5VDC - 10K Ohm maximum source impedance, 0-20mA - 24 VDC loop power, 250 Ohm input impedance, Dry Contact - 0.5mA maximum current.
  - c. Analog Electronic Outputs shall be voltage mode 0-10VDC or current mode 4-20mA.
  - d. Enhanced Zone Sensor Input shall provide one thermistor input, one local setpoint adjustment, one timed local override switch, and an occupancy LED indicator.

### 3.4 FIELD HARDWARE/INSTRUMENTATION

#### A. Temperature Sensing Devices

1. Type & Accuracy. Temperature sensors shall be of the type and accuracy indicated for the application. Sensors shall have an accuracy rating within 1% of the intended use temperature range.
2. Outside Air Temperature Sensors. Outside air temperature sensors accuracy shall be within +1°F (0.5°C) in the range of -52°F to 152°F (-46.6°C to 66.6°C).
3. Room Temperature Sensors. Room temperature sensors shall have an accuracy of +0.36°F (0.25°C) in the range of 32°F to 96°F (0°C to 35.5°C).
4. Chilled Water and Condenser Water Sensors. Chilled water and condenser water sensors shall have an accuracy of +0.25°F (0.15°C) in their range of application.
5. Hot Water Temperature Sensors. Hot water temperature sensors shall have an accuracy of +0.75°F (0.3°C) over the range of their application.

#### B. Pressure Instruments

1. Differential Pressure and Pressure Sensors: Sensors shall have a 4-20 MA output proportional signal with provisions for field checking. Sensors shall withstand up to 150% of rated pressure, without damaging the device. Accuracy shall be within +2% of full scale. Sensors shall be manufactured by Leeds & Northrup, Setra, Robertshaw, Dwyer Instruments, Rosemont, or be approved equal.
2. Pressure Switches: Pressure switches shall have a repetitive accuracy of +2% of range and withstand up to 150% of rated pressure. Sensors shall be diaphragm or bourdon tube design. Switch operation shall be adjustable over the operating pressure range. The switch shall have an application rated Form C, snap-acting, self-wiping contact of platinum alloy, silver alloy, or gold plating.

C. Humidity Sensors: Sensors shall have an accuracy of +25% over a range of 20% to 95% RH.

D. Current Sensing Relays: Relays shall monitor status of motor loads. Switch shall have self-wiping, snap-acting Form C contacts rated for the application. The setpoint of the contact operation shall be field adjustable.

E. Output Relay: Control relay contacts shall be rated for 150% of the loading application, with self-wiping, snap-acting Form C contacts, enclosed in dustproof enclosure. Relays shall have silver cadmium contacts with a minimum life span rating of one million operations. Relays shall be equipped with coil transient suppression devices.

F. Solid State Relays: Input/output isolation shall be greater than 10 billion ohms with a breakdown voltage of 15 V root mean square, or greater, at 60 Hz. The contact operating life shall be 10 million operations or greater. The ambient temperature range of SSRs shall be 20°F-140°F. Input impedance shall be greater than 500 ohms. Relays shall be rated for the application. Operating

and release time shall be 10 milliseconds or less. Transient suppression shall be provided as an integral part of the relays.

G. Valve and Damper Actuators

1. Electronic Direct-Coupled: Electronic direct-coupled actuation shall be provided.
2. Actuator Mounting: The actuator shall be direct-coupled over the shaft, enabling it to be mounted directly to the damper shaft without the need for connecting linkage. The fastening clamp assemble shall be of a 'V' bolt design with associated 'V' shaped toothed cradle attaching to the shaft for maximum strength and eliminating slippage. Spring return actuators shall have a 'V' clamp assembly of sufficient size to be directly mounted to an integral jackshaft of up to 1.05 inches when the damper is constructed in this manner. Single bolt or screw type fasteners are not acceptable
3. Electronic Overload Sensing: The actuator shall have electronic overload or digital rotation sensing circuitry to prevent damage to the actuator throughout the entire rotation of the actuator. Mechanical end switches or magnetic clutch to deactivate the actuator at the end of rotation are not acceptable.
4. Power Failure/Safety Applications: For power failure/safety applications, an internal mechanical spring return mechanism shall be built into the actuator housing. Non-mechanical forms of fail-safe operation are not acceptable.
5. Spring Return Actuators: All spring return actuators shall be capable of both clockwise or counterclockwise spring return operation by simply changing the mounting orientation.
6. Proportional Actuators: Proportional actuators shall accept a 0 to 10VDC or 0 to 20mA control input and provide a 2 to 10VDC or 4 to 20mA operating range. An actuator capable of accepting a pulse width modulating control signal and providing full proportional operation of the damper is acceptable. All actuators shall provide a 2 to 10VDC position feedback signal.
7. 24 Volts (AC/DC) actuators: All 24VAC/DC actuators shall operate on Class 2 wiring and shall not require more than 10VA for AC or more than 8 watts for DC applications. Actuators operating on 120VAC power shall not require more than 10VA. Actuators operating on 230VAC shall not require more than 11VA.
8. Non-Spring Return Actuators: All non-spring return actuators shall have an external manual gear release to allow manual positioning of the damper when the actuator is not powered. Spring return actuators with more than 60 in-lb torque shall have a manual crank for this purpose.
9. Modulating Actuators: All modulating actuators shall have an external, built-in switch to allow reversing direction of rotation.
10. Conduit Fitting & Pre-Wiring: Actuators shall be provided with a conduit fitting and a minimum 3ft electrical cable, and shall be pre-wired to eliminate the necessity of opening the actuator housing to make electrical connections.

11. U.L. Listing: Actuators shall be Underwriters Laboratories Standard 873 listed and Canadian Standards Association Class 4813 02 certified as meeting correct safety requirements and recognized industry standards.
12. Warranty: Actuators shall be designed for a minimum of 60,000 full stroke cycles at the actuator's rated torque and shall have a 2-year manufacturer's warranty, starting from the date of installation. Manufacturer shall be ISO9001 certified.

## PART 4 - DDC SOFTWARE

### 4.1 OVERVIEW

The system shall continuously perform Direct Digital Control (DDC) functions at the local control module in a stand-alone mode. The operator shall be able to design and modify the control loops to meet the requirements of the system being operated. The operators shall use system provided displays for tuning of PID loops. These displays shall include the past three input variable values, the setpoint for the loop as well as the sample interval and the results of the proportional, integral and derivative effects on the final output.

- A. Minimum Function. Each control module shall perform the following functions:
  1. Identify and report alarm conditions
  2. Execute all application programs indicated on the I/O Summary table
  3. Execute DDC algorithms
  4. Trend and store data
- B. Control Failure Mode

In the event of a control module failure, all points under its control shall be commanded to the failure mode as indicated on the I/O Summary Table. All DDC software shall reside in the respective control module.

1. Orderly Shutdown: Power failures shall cause the control module to go into an orderly shutdown with no loss of program memory.
2. Automatic Restart: Upon resumption of power, the control module shall automatically restart and print out the time and date of the power failure and restoration at the respective Workstation system.
3. Automatic Restart: The restart program shall automatically restart affected field equipment. The operator shall be able to define an automatic power up time delay for each piece of equipment under control.

## PART 5 - APPLICATIONS SOFTWARE

### GENERAL

The following applications software shall be provided for the purpose of optimizing energy consumption while maintaining occupant comfort:

A. Time of Day Scheduling (TOD)

The system shall be capable of the following scheduling features:

1. Schedule by Type. Scheduling by building, area, zone, groups of zones, individually controlled equipment and groups of individually controlled equipment. Each schedule shall provide beginning and ending dates and times (hours: minutes). A weekly repeating schedule, i.e. between 8:00 a.m. and 5:00 p.m., Monday through Friday shall constitute one schedule, not five.
2. Schedule in Advance. Dated schedules shall be entered up to nine (9) years in advance.
3. Self-Deleting. Schedules shall be self-deleting when effective dates have passed.
4. Leap Year. Leap years shall be adjusted automatically without operator intervention.

B. Optimum Start/Stop (OSS)/Optimum Enable/Disable (OED)

This application provides software to start and stop equipment on a sliding schedule based on the individual zone temperature and the heating/cooling capacity in °F/hour of the equipment serving that zone. The heating/cooling capacity value shall be operator adjustable. Temperature compensated peak demand limiting shall remain in effect during morning start up to avoid setting a demand peak.

C. Source Temperature Optimization (STO)

The system shall automatically perform source optimization for all air handling units, chillers and boilers in response to the needs of other downstream pieces of equipment, by increasing or decreasing supply temperature setpoints, i.e. chilled water, discharge air, etc. using owner defined parameters. In addition to optimization, the STO capability shall also provide for starting and stopping primary mechanical equipment based on zone occupancy and/or zone load conditions.

D. Demand Limiting (DL) - Temperature Compensated

The DL application shall be programmable for a minimum of six separate time of day KW demand billing rate periods. The system shall be capable of measuring electrical usage from multiple meters serving one building and each piece of equipment being controlled on the LAN shall be programmable to respond to the peak demand information from its respective meter.

1. Sliding Window: The demand control function shall utilize a sliding window method with the operator being able to establish the kilowatt threshold for a minimum of three adjustable demand levels. The sliding window interval shall be operator selectable in increments of one minute, up to 60 minutes. Systems that incorporate rotating shed tables will not be acceptable.
2. Setpoints for Defined Demand Level: The operator shall have the capability to set the individual equipment temperature setpoints for

each operator defined demand level. Equipment shall not be shed if these reset setpoints are not satisfied; rather the setpoint shall be revised for the different established demand levels. The system shall have failed meter protection, such that when a KW pulse is not received from the utility within an operator adjustable time period, an alarm will be generated. The system software will automatically default to a predetermined fail-safe shed level.

3. Information Archiving: The system shall have the ability to archive demand and usage information for use at a later time. System shall permit the operator access to this information on a current day, month to date and a year to date basis.

E. Day/Night Setback (DNS)

The system shall allow the space temperature to drift down [up] within a preset [adjustable] unoccupied temperature range. The heating [cooling] shall be activated upon reaching either end of the DNS range and shall remain activated until the space temperature returns to the DNS range.

F. Timed Local Override (TLO)

The system shall have TLO input points that permit the occupants to request an override of equipment that has been scheduled OFF. The system shall turn the equipment ON upon receiving a request from the local input device. Local input devices shall be push button (momentary contact), wind-up timer, or ON/OFF switches as detailed in the I/O summary.

G. Space Temperature Control (STC)

There shall be two space temperature setpoints, one for cooling and one for heating, separated by a dead band. Only one of the two setpoints shall be operative at any time. The cooling setpoint is operative if the actual space temperature has more recently been equal to or greater than the cooling setpoint. The heating setpoint is operative if the actual space temperature has more recently been equal to or less than the heating setpoint. There are two modes of operation for the setpoints, one for the occupied mode (example: heating = 72°F or 22°C, cooling = 76°F or 24.4°C) and one for the unoccupied mode (example: heating = 55°F or 12.7°C, cooling = 90°F or 32°C).

1. Schedule: The occupied/unoccupied modes may be scheduled by time, date, or day of week.
2. Color Code: One of seven colors shall be generated to represent the comfort conditions in the space, and shall be displayed graphically at the operator station.
  - a. If the actual space temperature is in the dead band between the heating setpoint and the cooling setpoint, the color displayed shall be green for the occupied mode, representing ideal comfort conditions. If in the unoccupied mode, the color displayed shall be gray representing 'after-hours' conditions.
  - b. If the space temperature rises above the cooling setpoint, the color shall change to yellow. Upon further rise beyond the cooling setpoint plus an offset, the color shall change to orange.

- Upon further rise beyond the cooling setpoint plus the yellow band offset, plus the orange band offset, the color shall change to red indicating unacceptable high temperature conditions. At this point an alarm shall be generated to notify the operator.
- c. When space temperature falls below the heating setpoint, the color shall change to light blue. Upon further temperature decrease below the heating setpoint minus an offset, the color shall change to dark blue. Upon further space temperature decrease below the heating setpoint minus the light blue band offset minus the dark blue band offset the color shall change to red indicating unacceptable low temperature conditions. At this point an alarm shall be generated to notify the operator.
3. **Operator Definable:** All setpoints and offsets shall be operator definable. When in the occupied mode, start-up mode, or when heating or cooling during the night setback unoccupied mode, a request shall be sent over the network to other equipment in the HVAC chain, such as to an AHU fan that serves the space, to run for ventilation. The operator shall be able to disable this request function if desired.
  4. **Additional Cooling:** When comfort conditions are warmer than ideal, indicated by the colors yellow, orange, and high temperature red, a request for additional cooling shall be sent over the network to other cooling equipment in the HVAC chain, such as a chiller. This information is to be used for optimization of equipment in the HVAC chain. The operator shall be able to disable this function if desired.
  5. **Additional Heating:** When comfort conditions are cooler than ideal; indicated by the colors light blue, dark blue, and low temperature red; a request for additional heating shall be sent over the network to other heating equipment in the HVAC chain, such as a boiler. This information is to be used for optimization of equipment in the HVAC chain. The operator shall be able to disable this function if desired.
  6. **Cooling/Heating Setpoints:** The cooling [and heating] setpoints may be increased [decreased] under demand control conditions to reduce the cooling (heating) load on the building during the demand control period. Up to three levels of demand control strategy shall be provided. The operator may predefine the amount of setpoint increase [decrease] for each of the three levels. Each space temperature sensor in the building may be programmed independently.
  7. **Optimum Start:** An optimum start-up program transitions from the unoccupied setpoints to the occupied setpoints. The optimum start-up algorithm considers the rate of space temperature rise for heating and the rate of space temperature fall for cooling under nominal outside temperature conditions; it also considers the outside temperature; and the heat loss and gain coefficients of the space envelope (AI: Space Temperature).
  8. **PID Loop:** A PID control loop, comparing the actual space temperature to its setpoint, shall modulate the dampers [and heating coil valve or heating stages in sequence] to achieve the setpoint target.



**PART 6 - EXECUTION****6.1 PREPARATION****Protection of Persons and Property**

- A. **Safety Precautions and Programs.** The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work.
- B. **Safety of Persons and Property.** The Contractor shall take all reasonable precautions and provide all reasonable protection to prevent damage, injury or loss to:
  - 1. All employees on the installation sites and all other persons who may be affected.
  - 2.
  - 3. All work, materials, and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody, or control of the Contractor or any Subcontractor or Sub-subcontractor.
  - 4.
  - 5. Other property at the site or adjacent thereto. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders or any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. It shall erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

**6.2 HARDWARE INSTALLATION****A. Utility Company Equipment**

Owner shall arrange installation of electric billing meters, water meters, and gas meters with demand signal pulses, as indicated.

**B. Wiring**

- 1. The Contractor shall install wires for the room temperature sensors (from sensor to the appropriate control module).
- 2. The Contractor shall install all sensing devices and the wiring to modules.
- 3. The Contractor shall install all control and monitoring wiring in Mechanical Room.
- 4. Low voltage wire shall be not less than 18 AWG. All line voltage wire shall be THHN/TFFN, 600 volt rated.
- 5. Control and interlock wiring and installation shall comply with national and local electrical codes, Division 16, and manufacturer's recommendations. Where the requirements of Section 15900 differ from Division 16, Section 15900 shall take precedence.

6. NEC Class 1 (line voltage) wiring shall be UL listed in approved raceway as specified by NEC and Division 16.
7. Low-voltage wiring shall meet NEC Class 2 requirements. Subfuse low-voltage power circuits as required to meet Class 2 current limit.
8. NEC Class 2 (current-limited) wires not in raceway but in concealed and accessible locations such as return air plenums shall be UL listed for the intended application.
9. Install wiring in raceway where subject to mechanical damage and all exposed locations such as mechanical, electrical, or service rooms.
10. Install Class 1 and Class 2 wiring in separate raceways. Boxes and panels containing high-voltage wiring and equipment shall not be used for low-voltage wiring except for the purpose of interfacing the two through relays and transformers.
11. Do not install wiring in raceway containing tubing.
12. Run exposed Class 2 wiring parallel to a surface or perpendicular to it and tie neatly at 2 m (6 ft) intervals.
13. Use structural members to support or anchor plenum cables without raceway. Do not use ductwork, electrical raceways, piping, or ceiling suspension systems to support or anchor cables.
14. Secure raceways with raceway clamps fastened to structure and spaced according to code requirements. Raceways and pull boxes shall not be hung on or attached to ductwork, electrical raceways, piping, or ceiling suspension systems.
15. Size raceway and select wire size and type in accordance with manufacturer's recommendations and NEC requirements.
16. Include one pull string in each raceway 2.5 cm (1 in.) or larger.
17. Use color-coded conductors throughout.
18. Locate control and status relays in designated enclosures only. Do not install control and status relays in packaged equipment control panel enclosures containing Class 1 starters.
19. Conceal raceways except within mechanical, electrical, or service rooms. Maintain minimum clearance of 15 cm (6 in.) between raceway and high-temperature equipment such as steam pipes or flues.
20. Adhere to requirements in Division 16 where raceway crosses building expansion joints.
21. Install insulated bushings on raceway ends and enclosure openings. Seal top ends of vertical raceways.
22. Terminate control and interlock wiring related to the work of this section. Maintain at the job site updated (as-built) wiring diagrams that identify terminations.
23. Flexible metal raceways and liquid-tight flexible metal raceways shall not exceed 1 m (18") in length and shall be supported at each end. Do not use flexible metal raceway less than ½ in. electrical trade size. Use liquid-tight flexible metal raceways in areas exposed to moisture including chiller and boiler rooms.
24. Install raceway rigidly, support adequately, ream at both ends, and leave clean and free of obstructions. Join raceway sections with couplings and according to code. Make terminations in boxes with fittings. Make terminations not in boxes with bushings.

25. Communication wiring shall be low-voltage Class 2 wiring and shall comply with Article 3.7 (Wiring).
26. Install communication wiring in separate raceways and enclosures from other Class 2 wiring.
27. During installation do not exceed maximum cable pulling, tension, or bend radius specified by the cable manufacturer.
28. Verify entire network's integrity following cable installation using appropriate tests for each cable.
29. Install lightning arrestor according to manufacturer's recommendations between cable and ground where a cable enters or exits a building.
30. Each run of communication wiring shall be a continuous length without splices when that length is commercially available. Runs longer than commercially available lengths shall have as few splices as possible using commercially available lengths.
31. Label communication wiring to indicate origination and destination.
32. Ground coaxial cable according to NEC regulations article on "Communications Circuits, Cable, and Protector Grounding."

### 6.3 SMOKE DETECTORS

- A. Smoke detectors approved for duct installation shall be provided by Division 16 for all air systems of 2000 cfm capacity or above or as indicated on the drawings, to automatically shut down the supply fan and close all smoke dampers (as required). Each detector shall have an integral relay and be capable of operating a remote. All wiring shall be in conduit.
- B. Smoke detectors shall be furnished by Division 16000 and installed under Division 15000. All wiring between detector and fire alarm system shall be provided and installed under Division 16000. All wiring between detector and unit and between detector and EMSA shall be provided and installed under Division 15000. All wiring shall be in conduit.

### 6.4 FIRE ALARM INTERLOCK, EQUIPMENT INTERLOCK AND EMERGENCY

- A. Provide relays in the starting circuits of all air moving equipment to stop operation when the building fire alarm system is activated as detected by the BAS. Contacts shall be installed in the central fire alarm panel for this signal; coordinate with fire alarm panel furnished under Division 16.
- B. Provide on the face of the Central Control Panel and remote alarm panel an "Emergency Stop" switch. Switch shall be wired so that all air moving equipment will immediately shut down when switch is depressed.
- C. Provide all interlock wiring between air-conditioning units, fans, dampers, space sensors, clocks, and other related equipment as necessary to achieve the specified operating sequence.

### 6.5 RELAYS

- A. Provide relays in power wiring to stop and start exhaust fans, domestic water heaters, pumps, etc., as required. Relays shall be of the voltage and ampere rating required for the load served and shall have NEMA-1 enclosure.

#### 6.6 DAMPER ACTUATORS

Damper actuators shall be 24 volt proportional motor operators.

#### 6.7 CONTROL PANELS

Furnish formed sheet metal control panels as required with locking door and hinges. All necessary relays, switches and peripheral devices shall be located inside panels. All electric devices shall be connected to numbered terminal strips. All control panels shall be centrally located.

#### 6.8 SEQUENCE OF OPERATION

##### A. Rooftop Unit with Energy Wheel

1. The BAS shall able/disable the rooftop unit according to a pre-determined operating schedule.
2. During the unoccupied mode, the outside air damper at the energy recovery section shall be closed. The fans in the energy recovery section shall be off.
3. During the morning warm-up cycle, the rooftop unit shall start, and shall cycle the compressors, or modulate the stages of heat until the return air temperature reaches 72°F (adjustable). During the morning warm-up cycle, the energy recovery supply, return and wheel shall remain off.
4. During the occupied mode, the rooftop unit supply fan shall operate continuously. The compressors shall cycle to maintain a predetermined space temperature (75°F adjustable). During the heating mode, the rooftop unit gas heat shall modulate to maintain a predetermined space temperature (72°F adjustable). The energy recovery supply and exhaust fans shall operate continuously.
5. During the de-humidification cycle, in a rise in room relative humidity, the compressors shall be energized, and the refrigerant reheat coil shall be activated to reheat the supply air temperature to 70°F.

##### B. VVT System

1. The variable volume and temperature (VVT) control systems shall be controlled and monitored by the BAS. The damper shall modulate to from its minimum position to fully open in order to maintain space temperature at setpoint.
2. The by-pass damper shall modulate, according to the VVT control set point, to by-pass supply air to avoid over pressurization in the supply duct system.

- B. Rooftop Unit - Constant Volume
  - a. The BAS shall able/disable the rooftop unit according to a pre-determined operating schedule.
  - b. During the unoccupied mode, the outside air damper shall be closed.
  - c. During the morning warm-up cycle, the rooftop unit shall start, and shall cycle the compressors, or modulate the stages of heat until the return air temperature reaches 72°F (adjustable). During the morning warm-up cycle, the outside air damper shall remain closed.
  - 4. During the occupied mode, the rooftop unit supply fan shall operate continuously. The compressors shall cycle to maintain a predetermined space temperature (75°F adjustable). During the heating mode, the rooftop unit gas heat shall modulate to maintain a predetermined space temperature (72°F adjustable).
  - 5. During the de-humidification cycle, in a rise in room relative humidity, the compressors shall be energized, and the refrigerant reheat coil shall be activated to reheat the supply air temperature to 70°F.
  
- C. Exhaust fans:
  - 1. The BAS shall able/disable the exhaust fans.
  - 2. A firestat, set at 125 deg. F and located at the inlet to all exhaust fans shall shut down fan operation if excess heat is detected.
  - 3. EF-1 shall be controlled by a room thermostat set at 80°F adjustable. In a rise in space temperature above set point, the fan shall be energized.
  - 4. EF-2 shall operate continuously during the occupied mode.
  
- D. Unit Heaters:
  - 1. The BAS shall able/disable the electric unit heaters.
  - 2. Heaters shall be controlled by a room thermostat set at 68°F adjustable. In a drop in space temperature below set point, the heater shall be energized.
  
- E. Ductless Split System:
  - 1. The BAS shall able/disable the split system.
  - 2. The split system shall be controlled by a room thermostat set at 68°F adjustable.
  - 3. On a call for cooling, the compressors shall cycle to maintain the temperature set point.

END OF SECTION 23 0923



**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Mechanical General, apply to all work specified in this section.

**1.2 DESCRIPTION**

- A. Each zone damper control system shall consist of a programmable room temperature sensor and a zone damper. Each control system shall be capable of operating as a stand-alone system or networked on a communication bus.

**1.3 QUALITY ASSURANCE**

- A. Each control system shall be designed to conform to UL and CSA standards. Zone dampers and control systems manufactured by Johnson Controls, Trane or Carrier will be acceptable.
- B. Each control system shall be compatible with, and shall be capable of communication with, the Building Automation System (BAS) specified in Section 23 0923, Building Automation System. Under that specification section the BAS is required to continually monitor room temperature and room temperature set-point. Therefore, each control system shall include an interface device that will allow the BAS to retrieve this information from every zone controller in each system.

**PART 2 - PRODUCTS****2.1 EQUIPMENT**

- A. Each zone damper control system shall be available as a complete package and shall be capable of providing variable air zone control in both pressure dependent and pressure independent applications.

**2.2 MEMORY AND TIME CLOCK**

- A. The systems shall not require the use of batteries for any data storage. Each room temperature sensor shall have a non-volatile memory indefinite storage of configuration data and shall have an on board 365 day clock with built in daylight savings time and leap year adjustment. In the event of power failure, the time clock shall be backed up for a minimum of 10 hours.
- B. The room temperature sensors shall have the capability of changing occupancy mode by reading a set of discrete, dry contacts controlled by an external time clock.

**2.3 SETPOINTS**

- A. Each room temperature sensor shall utilize and store the following setpoints:
  - 1. Occupied heating setpoint.

2. Occupied cooling setpoint.
  3. Unoccupied heating setpoint.
  4. Unoccupied cooling setpoint.
  5. Cooling setpoint low limit.
  6. Heating setpoint high limit.
- B. Each room temperature sensor shall utilize and store the following additional setpoints:
1. Minimum airflow setpoint.
  2. Maximum airflow setpoint.
- C. All setpoints shall be capable of being modified at the controller display.

#### 2.4 SENSORS AND INPUTS

- A. Each room temperature sensor shall be capable of being read and displayed in 1 degree F increments. Sensors shall have an on board LCD display capable of displaying sensor and input information as follows:
1. Space temperature.
  2. Supply air temperature.
- B. All application sensors shall be accessed for calibration at the controller display.

#### 2.5 ROOM TEMPERATURE SENSORS

- A. Each room temperature sensor shall be capable of controlling space demand in a variable volume application by monitoring space temperature and determining the heating or cooling demand. The space temperature shall be controlled to maintain individual heating and cooling setpoints.
- B. Each room temperature sensor shall have system mode switches (Cool and Heat) for selecting the mode of control. These switches shall be used directly or overridden through configuration. Each sensor shall be capable of operating in manual or automatic change-over mode.

#### 2.6 DDC CONTROL NETWORKING

- A. Each control system shall be capable of sharing the same communication network as all network devices.
- B. Each control system shall be capable of broadcasting time, date and outside air temperature on the network communication bus to DDC controllers existing on the network. Each control system shall also be able to receive this information from other DDC controllers on the network communication bus.
- C. Each control system shall be capable of receiving commands from other DDC controllers existing on the communication bus.



PART 3 - EXECUTION

3.1 SYSTEM DIAGNOSTICS

- A. All controllers shall provide self-test, on board diagnostics and error code display. All controllers shall be capable of performing diagnostics on their critical components as well as all hard wired sensors and inputs. All controllers shall display error messages on their LCD display until the error has been corrected or the error code display has been configured off. All controllers shall store the last five errors for diagnostic monitoring.

3.2 SERVICE AND WARRANTY

- A. After installation, system start-up shall be performed. All controls and related components shall be adjusted. Each entire system shall be in operation for 24 hours prior to acceptance. The control systems specified herein shall be free from defects in workmanship and materials under normal use and service. If within 12 months from date of acceptance any of the equipment is proved to be defective in workmanship or material, it shall be repaired, adjusted or replaced at no additional cost to the contract.

END OF SECTION 23 0935



## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Special Conditions and Section 230000, Mechanical General, apply to all work specified in this section.

## 1.2 QUALITY ASSURANCE

- A. Codes and regulations referred to are minimum standards. Where the requirements of the specifications or drawings exceed those of the codes and regulations the drawings and specifications shall govern.
- B. Firms regularly engaged in the manufacture of piping products of the types, materials and sizes required and whose products have been in satisfactory use in similar service for not less than 5 years will be acceptable.
- C. Certify brazing procedures, brazers and operators in accordance with Section IX, ASME Boiler and Pressure Vessel Code (ANSI B31.5). Submit two copies of the qualification test report and certification to the Architect.
- D. Size refrigerant piping by the compressor manufacturer. Submit a piping diagram showing valves, pipe sizes, line resistance, elbows and traps, approved by the compressor manufacturer.
- E. Refrigerant piping accessories manufactured by Sporlan or approved equal will be acceptable.

## PART 2 - PRODUCTS

## 2.1 REFRIGERANT PIPING

- A. Type: Copper tubing of the pipe sizes listed.
- B. Class: Type "ACR" hard drawn copper tubing, ASTM B-88.
- C. Fittings:
  - 1. Sweat type wrought copper for pipe sizes 4-1/8" O.D. and smaller.
  - 2. Cast brass, hot tin dipped inside and out ASTM B-32 for pipe sizes larger than 4-1/8" O.D.
- D. Joints: Socket brazed with 15% silver, phosphor-copper brazing alloy.

## 2.2 CONDENSATE DRAIN LINES

- A. Located above ceilings and in finished areas:
  - 1. Type: Copper tubing.
  - 2. Class: Type "L" hard drawn.
  - 3. Fittings: Sweat type wrought copper.
  - 4. Joints: Socket brazed using 95-5 tin-antimony.

- B. Located in mechanical rooms and above roof:
  - 1. Type: Galvanized steel pipe.
  - 2. Class: Schedule 40, ASTM A53.
  - 3. Fittings: Standard weight galvanized steel.
  - 4. Joints: Threaded.
- C. Located above roof:
  - 1. Type: Schedule 40 PVC plastic. Foam-core PVC piping will not be acceptable.
  - 2. Fittings: PVC piping fittings shall be Schedule 40 PVC plastic. Foam-core PVC pipe fittings will not be acceptable.
  - 3. Joints: Solvent welded.

### 2.3 FILTER DRIER

- A. For systems 5 tons and over provide a replaceable molded porous-core filter drier in the suction line near the compressor but upstream of the service valves. For systems less than 5 tons provide a sealed type filter drier.
- B. For heat pump systems, provide a reversible flow filter drier with replaceable core and check valves at either end.

### 2.4 MOISTURE AND LIQUID INDICATOR

- A. Provide a moisture and liquid indicator with reversible color change for wet and dry conditions and large full view sight glass with cap in the liquid line ahead of each expansion valve.

### 2.5 CONDENSATE PUMPS

- A. Provide where indicated on the drawings a pump designed to lift and remove condensate. The pump shall be suitable for use with equipment rated up to 5 tons.
- B. Each pump shall contain a reservoir, float switch, electric pump and LED signal light. Unit shall be mounted on the side of the air handling unit or mounted on the wall or floor adjacent to the air handling unit. The LED signal light shall give visual verification that the unit is operating correctly.
- C. Provide an electrical interlock to shut down the air handling unit fan in the event of the condensate pump malfunctioning.
- D. Condensate pumps shall be manufactured by Hartell Pumps or approved equal.

## PART 3 - EXECUTION

### 3.1 GENERAL PIPING SYSTEM

- A. Where nonferrous metallic pipe such as copper tubing crosses any ferrous piping material maintain a separation between pipes.

- B. Cut pipe accurately to field measurements and ream free of burrs and cutting splatter. Carefully align and grade pipe and work accurately into place without springing or forcing. Fittings shall be used for changes in direction. [Provide for expansion at every building expansion joint.] Protect open pipe ends to prevent trash being placed in the lines during installation. Clean all dirt and cutting debris from pipes before making the next joint.
- C. Install piping so as to preserve access to all valves, air vents and other equipment and to provide the maximum headroom possible.
- D. Make joints in refrigerant lines with nitrogen gas in the pipes to prevent oxidation. Install all piping parallel to or at right angles to building walls, columns and partitions.
- E. Clean inside of refrigerant lines with methyl alcohol before assembly and tape thereafter to prevent foreign matter from entering and being sealed in. Cut pipe ends square and deburr. Clean pipe and fitting with #00 steel wool before joining. Make joints without burning.
- F. Supports for PVC condensate drain lines shall be spaced no further than 5'-0" on center or closer if required to prevent sagging.

### 3.2 TESTS

- A. Test refrigerant piping, equipment, valves and fittings at a pressure of 450 psig by introducing refrigerant and dry carbon dioxide or nitrogen throughout the refrigerant circuit. Bubble test joints with soap lather, clean joints of soap and leak-test with a halide torch. Pump out the system, place the entire circuit under 27 inches of vacuum and allow to stand sealed off for a period of eight hours without any loss of vacuum.
- B. Submit an affidavit signed by the Contractor's representative stating they have witnessed and approved the dehydration test.

### 3.3 SUBMITTALS

- A. Submittals shall include but shall not be limited to a diagram approved by the compressor manufacturer to include the size and length of the refrigerant piping, all offsets and elbows required for the installation, location of all valves, filter driers, moisture and liquid indicators and flexible connectors where required.

END OF SECTION 23 2300



## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

## 1.2 PRESSURE CLASSIFICATION

- A. SMACNA standards referred to herein shall mean standards published by the Sheet Metal and Air Conditioning Contractor's National Association, Inc. Ductwork shall be constructed in complete conformance with the latest edition of the SMACNA manual.
- B. Pressure classification shall be low pressure, 2" wg static pressure, Class A seals.

## PART 2 - PRODUCTS

## 2.1 LOW PRESSURE DUCT CONSTRUCTION

- A. Construct low pressure rectangular ductwork from lock forming quality galvanized steel sheets having a galvanized coating of 1-1/4 ounces total for both sides per one square foot of sheet. Metal stamp shall be visible after installation. Inside of unlined ducts visible through sidewall grilles and registers shall be paint flat black.
- B. Construction methods, metal gauges and stiffening shall be in accordance with the latest edition of SMACNA HVAC Duct Construction Standards, Metal and Flexible. All duct dimensions indicated are clear inside dimensions.
- C. Low pressure round ductwork up to and including 12" in diameter shall be longitudinal lock seam construction. Round ducts larger than 12" shall be spiral lock seam construction.
  - 1. Girth joints in ducts up to and including 12" shall be beaded-crimp type and each joint shall be fastened with sheet metal screws, equally spaced, not more than 8" on centers and with a minimum of three screws in each joint. The beaded-crimp joint shall provide at least a 1" lap to accommodate the sheet metal screws.
  - 2. Girth joints in ducts larger than 12" shall be the beaded sleeve type. The beaded sleeve joints shall be fabricated of the same gauge galvanized sheet steel as the duct and shall be a minimum of 4" in length. Each section of duct shall be fastened to the sleeve with sheet metal screws, equally spaced, not more than 8" on centers and with a minimum of three screws in each joint.
- D. Install turning vanes in all 90 degree square or rectangular elbows and at other locations shown. The turning vanes shall be large size, double thickness airfoil style with vanes secured to the runners and runners secured to the duct. Elbows in round ductwork and other radiused elbows shall have an inside radius

equal to the depth of the duct.

## 2.2 DUCT HANGERS AND SUPPORTS

- A. Duct hangers and supports shall be in accordance with the Hangers and Supports section of the referenced SMACNA standards, except:
  - 1. Do not space hangers over 8'-0" on centers.
  - 2. For rectangular ductwork with the longest dimensions up through 60", hangers shall be the galvanized steel strap type. For rectangular ductwork with the longest dimension 61" and larger, hangers shall be trapeze type constructed of galvanized steel angles with round hanger rods. Sizes for strap hangers and trapeze angles and rods shall be based on duct size as scheduled in the SMACNA standard for strap hangers and for trapeze hangers.
  - 3. For round ductwork, hangers shall be galvanized steel strap hangers. Sizes and number of strap hangers shall be based on the duct size as scheduled in the SMACNA standard.
- B. Support ductwork in concrete construction with adjustable type inserts, Grinnell Fig. 285. Where the load exceeds the recommended load of the insert, use two inserts with a trapeze-type connecting member below the concrete.
- C. Support ductwork in steel construction with side beam brackets bolted or welded to the side of the beam, Grinnell Fig. 202.
- D. Lower attachment fasteners which penetrate the duct shall be sheet metal screws, blind rivets or self tapping metal screws. Cover all ductwork penetrations with mastic to provide air tight closures.

## 2.3 MANUAL DAMPERS AND DAMPER HARDWARE

- A. Construct splitter dampers of not less than 20 gauge galvanized steel sheet. The length of the damper blade shall be the same as the width of the widest duct section at the split, but in no case shall blade length be less than 12".
- B. Volume control dampers shall be low leakage single blade butterfly type in ducts up to and including 18" x 12" size. For ducts larger than 18" x 12", in either or both dimensions, the dampers shall be the low leakage multi-blade type. All dampers in outdoor air intake ductwork shall shut tightly and have vinyl blade edge and end seals.
  - 1. Single blade butterfly dampers shall be constructed of not less than 16 gauge galvanized steel mounted in a steel frame. For rectangular dampers, the top and bottom edges of the blade shall be crimped to stiffen the blade. Dampers shall be provided with an extended rod to permit installation of a quadrant or actuator on the exterior of the insulation.
  - 2. Multi-blade dampers shall be the opposed blade type, constructed of not less than 16 gauge galvanized steel blades mounted in a galvanized steel channel frame. Blade spacing shall not exceed 6" and the top and bottom edges of the blade shall be crimped to stiffen the blades. Damper blades shall be interconnected by rods and linkages to



of not less than 16 gauge galvanized steel blades mounted in a galvanized steel channel frame. Blade spacing shall not exceed 6" and the top and bottom edges of the blade shall be crimped to stiffen the blades. Damper blades shall be interconnected by rods and linkages to provide simultaneous operation of all blades. Dampers shall be provided with an extended rod to permit installation of a quadrant or actuator on the exterior of the insulation.

3. Dampers manufactured by Ruskin, Cesco, Carnes or Louvers and Dampers, Inc. will be acceptable.

C. Hardware for manual dampers:

1. When neither dimension of the splitter damper exceeds 18" the damper shall be provided with a ball joint bracket attached to the outside of the duct. The bracket shall have a set screw for securing the damper rod in position. The damper operating rod shall be not less than 1/4" diameter steel rod and shall be secured to the damper blade with a clip. When either dimension of the damper exceeds 18" the damper shall be provided with two ball joint brackets and rods. The rods shall be located at quarter points on the damper.
2. Duct mounted regulators with operating handle and locking quadrant shall be provided on all manual volume control dampers.
3. Damper hardware manufactured by Ventfabrics, Young Regulator or Duro-Dyne will be acceptable.

2.4 FLEXIBLE ROUND DUCTWORK

- A. Flexible round ductwork shall be Class 1, UL 181 air duct with an aluminized mylar or polyester inner liner laminated to a corrosion resistant steel wire helix. Aluminum helix is not acceptable.
- B. A 1" thick, one pound density fiberglass insulation and vinyl outer jacket shall cover the wire helix.
- C. Flexible ductwork shall be designed for pressures up to 4" wg. The maximum allowable length of flexible ductwork shall be 5'-0" and shall be limited to short run-outs connected to round neck ceiling supply diffusers. Provide a spin-in fitting with integral volume damper at all flexible run-out connections.
- D. Flexible ductwork manufactured by Genflex Type SLR.25, McGill Airflow LLC or Flexmaster Type 3 will be acceptable.

2.5 FLEXIBLE DUCT CONNECTORS

- A. Flexible duct connectors shall be non-combustible, installed at the intake and discharge connections of all belt-driven equipment and where shown. Material shall be glass fabric double coated with neoprene (30oz. per square yard minimum). Provide duct supports on each side of flexible connectors.
- B. Flexible duct connectors manufactured by Vent Fabrics, Duro-Dyne or Young

damper type shall be as follows:

1. Type 'A' with blades and blade channels in the air stream for use behind sidewall registers and grilles.
  2. Type 'B' with blades out of the air stream for rectangular ductwork passing completely through walls, floors and partitions.
  3. Type 'C' with blades and blade channels out of the air stream for round and flat oval ductwork passing completely through walls, floors and partitions.
- B. Fire dampers shall be rated as either static (for use in HVAC systems that are automatically shut down in the event of a fire), or dynamic (for use in HVAC systems that are operational in the event of a fire), as appropriate for the application.
- C. Fire dampers manufactured by Prefco, Nailor, Ruskin or Air Balance will be acceptable.

## 2.7 DUCT ACCESS DOORS

- A. Provide a duct access door at each fire damper. Access doors shall be a minimum 18" x 18", duct size allowing, and shall have a continuous hinge on one side with latch on the other side. Access door shall be designed for five times the pressure of the duct in which it is mounted. Access doors shall be of sufficient size to provide access to the dampers for resetting or replacing thermal links.
- B. Do not locate duct access doors above inaccessible ceilings unless approved by the Architect prior to installation.

## 2.8 ROOF EQUIPMENT SUPPORT RAILS

- A. Factory fabricated roof equipment support rails shall be constructed of 18 gauge galvanized steel and shall be 12" high. Support rails shall be canted and shall be field-flashed to make watertight. Field-flashing shall extend up the sides of the support rails with washers and sheet metal screws placed not more than 12" on centers. Wood nailer strips shall be provided. Coordinate the installation of the roof equipment support rails with the roof installer and with the manufacturer of the equipment to be supported.
- B. Provide equipment support rails under each support for ductwork installed above the roof.
- C. Roof equipment support rails manufactured by Pate, Thy Curb or Roof Products and Systems will be acceptable.

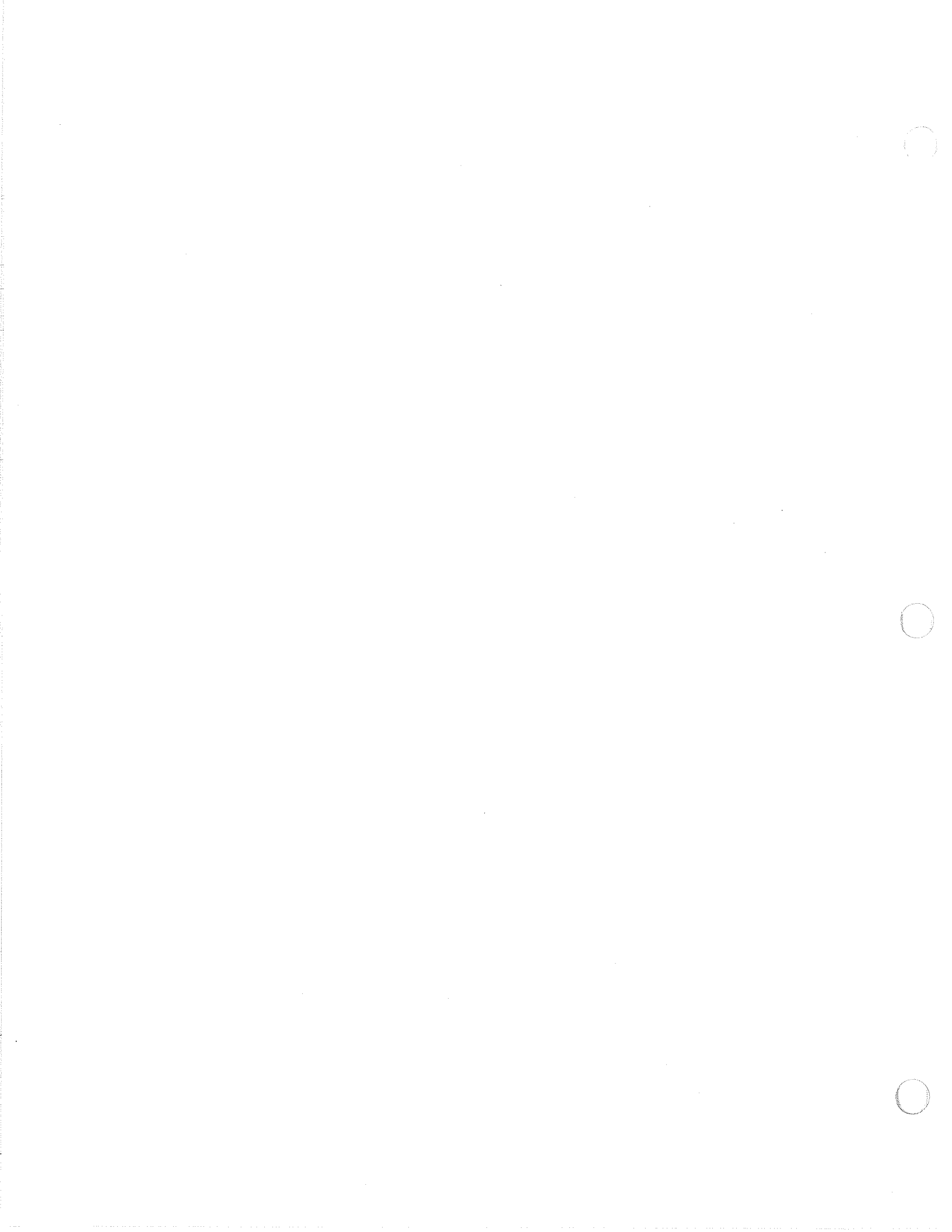
## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install all ductwork and accessories as shown and in accordance with applicable SMACNA standards.

- B. Seal all joints in ductwork with a fire retardant sealant. Tape is not acceptable.

END OF SECTION 23 3100



**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

**1.2 QUALITY ASSURANCE**

- A. Fans shall be tested and rated in accordance with the Air Moving and Conditioning Association, Inc. Standard NO. 210, Test Code for Air Moving Devices and shall bear the AMCA Seal.
- B. Acceptable manufacturers: Greenheck, Carnes, Cook, Penn.

**PART 2 - PRODUCTS****2.1 GENERAL**

- A. Fan motor enclosure shall be the drip-proof type unless specifically indicated otherwise. Motors 2 horsepower and greater shall be the high efficiency type, Century-Plus or approved equal.
- B. Roof mounted fans shall be waterproof design so that water cannot enter the building though the fan housing whether or not the fan is operating.
- C. Centrifugal fan wheels shall be statically and dynamically balanced. All fans shall be supplied with a factory installed safety disconnect switch.

**2.2 CENTRIFUGAL ROOF EXHAUST FAN**

- A. Centrifugal roof exhaust fans shall have a spun aluminum housing enclosing the motor drive, a spun aluminum shroud enclosing the fan wheel, an aluminum centrifugal fan wheel, a backdraft damper and birdscreen.
- B. Motor shall be single speed, single winding and the motor and drive shall be located in a ventilated compartment out of the exhaust air stream. A safety disconnect switch shall be factory installed in the motor compartment and shall be factory wired to the fan motor.

**2.4 FACTORY FABRICATED ROOF CURB**

- A. Factory fabricated roof curb shall be constructed of aluminum. Curb shall be the canted, insulated type and shall be field-flashed to make watertight. Field flashing shall extend up the sides of the curb and shall be fastened to the top flange of the curb with washers and sheet metal screws spaced not more than 6" on centers but in no case using less than two screws per side.

- B. Curb shall have 2" thick walls which shall be insulated with two inch thick rigid insulation. Insulation shall have a smoke developed rating not to exceed 50 and a flame spread rating not to exceed 25 when tested in accordance with ASTM E84. Wood nailer strips shall be provided.
- C. When installed on sloping roofs of a slope of 1/4" per foot or greater the roof curb shall be fabricated with the base angled to match the roof slope so that the top of the curb is level.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Fans shall be installed in complete conformance with the manufacturer's recommendations.

#### 3.2 ADJUSTMENT

- A. The fans shall be tested and adjusted in accordance with Section 23 0593, Test and Balance, to provide the scheduled capacities.

END OF SECTION 23 3400

**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

**1.2 COORDINATION**

- A. The grilles, registers and diffusers of one manufacturer have been used as the basis of design. Any modifications to the ductwork or building structure that result from the use of any other manufacturer's units shall be coordinated with all trades, especially architecture. Any modifications shall be performed without incurring any additional cost to the Contract.
- B. The color of all grilles, registers and diffusers shall match the surface in which they are installed or shall be as selected by the Architect. Ceiling mounted devices shall be selected to be compatible with the ceiling types in which they are installed.

**1.3 ACCEPTABLE MANUFACTURERS**

- A. Grilles, registers and diffusers manufactured by Krueger, Carnes, Titus, Metal\*Aire or E.H. Price will be acceptable.

**PART 2 - PRODUCTS****2.1 SUPPLY DIFFUSERS**

- A. Ceiling supply diffusers shall be square or round neck as indicated, extruded aluminum square louver face type with mitered corners. Where indicated, square neck diffusers shall be provided with a square-to-round adapter. Louver cores shall be removable and held in place with spring loaded pins. Stamped aluminum diffusers will not be acceptable. Provide a steel opposed blade damper for balancing. Radial 'butterfly' dampers will not be acceptable. Provide a factory applied enamel finish of a color as selected by the Architect.

**2.2 RETURN AND EXHAUST REGISTERS AND GRILLES**

- A. Where indicated, ceiling return grilles or exhaust registers shall be square neck, aluminum 1/2" x 1/2" x 1/2" eggcrate grid. Registers shall have a face operable steel opposed blade volume damper for balancing, or shall be panel only as indicated. Lay-in return grilles shall have a U-channel frame. Finish shall be factory applied enamel finish of a color as selected by the Architect.

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Grilles, registers and diffusers shall be installed as indicated and in

conformance with the manufacturer's recommendations. Coordinate the actual units to be provided with all trades. Ceiling mounted units shall match the ceiling type provided to ensure proper installation.

- B. Grille, register and diffuser locations shall be coordinated with the architectural reflected ceiling plans.

### 3.2 ADJUSTMENT

- A. The grilles, registers and diffusers shall be balanced and adjusted to provide the scheduled capacities in accordance with Section 23 0593, Test and Balance.

END OF SECTION 23 3700



**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

**1.2 QUALITY ASSURANCE**

- A. Electric heating equipment of a specific manufacturer has been used as the basis of design. Any modifications to controls, electrical connections or structural supports that result from the use of equipment by any other manufacturer shall be coordinated with all other trades before delivery of the equipment to the job site. Any modifications shall be performed without incurring any additional cost to the Contract.
- B. Electric ceiling heaters manufactured by Reznor, Markel or Berko which complies with this specification will be acceptable.

**PART 2 - PRODUCTS****2.1 DESCRIPTION**

- A. All electric heating equipment shall be UL listed and labeled.
- B. Refer to Division 26 of these specifications and to the electrical drawings for electrical characteristics and power connections to all equipment. Coordinate all electric heating equipment with the electrical drawings and specifications.

**2.2 ELECTRIC CEILING HEATERS**

- A. Electric ceiling heaters shall be recessed mounted type suitable for mounting in a lay-in T-bar ceiling grid and shall have a steel enclosure with a one-piece heavy gauge steel return grilles and concentric ring discharge grille. The grille assembly shall be fastened using tamper-proof screws. The enclosure shall be zinc coated and finished with off-white baked-on enamel paint.
- B. Heating elements shall consist of corrosion-resistant, steel-sheathed elements mechanically bonded to steel fins and each sheathed element shall consist of helically coiled nickel chromium alloy resistant wire completely embedded in magnesium oxide. Elements shall have cold conductor pins extending into the sheath and shall have a maximum density of 60 watts per inch.
- C. Electric ceiling heaters shall be provided with a manual reset thermal overload, permanently lubricated, totally enclosed shaded pole type motor with impedance protection, 24 volt control transformer and disconnect switch.
- D. Each heater shall be provided with a unit mounted, tamper-proof thermostat.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Electric ceiling heaters shall be installed in complete conformance with the manufacturer's recommendations.

END OF SECTION 23 5423

**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Special Conditions and Section 23 0000, Common Work Results for Mechanical, apply to all work specified in this section.

**1.2 SCOPE**

- A. Furnish and install a curb mounted packaged rooftop air conditioning unit where shown on the drawings.
- B. The unit shall be complete with all components, controls and internal wiring necessary for their proper functioning.
- C. Unit shall be designed for outdoor installation.

**1.3 ACCEPTABLE MANUFACTURERS**

- A. The roof mounted air conditioning unit of one manufacturer has been used as the basis of design. Any modification to piping, controls, electric connections and structural supports that result from the use of equipment by other manufacturers shall be coordinated with all other trades; this coordination shall occur before delivery of the equipment from the manufacturer. Any modifications shall be performed without incurring any additional cost to the Contract.
- B. Packaged rooftop air conditioning unit manufactured by Carrier, Trane, or McQuay will be acceptable.

**1.4 WARRANTY**

- A. Provide a four year non-prorated extended warranty on each compressor in addition to the standard one year warranty.

**PART 2 - PRODUCTS****2.1 GENERAL REQUIREMENTS**

- A. All electrical components shall comply with the National Electrical Code.
- B. All materials, including adhesives and sealants, shall comply with provisions of NFPA 90A. Flame spread rating shall not exceed 25, smoke developed rating shall not exceed 50.
- C. Cooling capacity shall be rated in accordance with ARI Standard 360.
- D. The unit shall be factory assembled, internally wired and fully charged with refrigerant. Unit shall be designed and capable of operating at outdoor

temperatures up to 120 degrees. Unit shall be UL listed and labeled for central cooling air conditioners.

## 2.2 CASINGS

- A. Unit shall be constructed of a minimum 16 gauge welded frame and 20 gauge access panels. All exposed surfaces of the unit casing shall be galvanized steel, phosphatized and finished with a coating of paint.
- B. All portions of casing panels exposed to the air stream shall be insulated with a minimum of 1" thick mat-faced fiberglass insulation. Casings shall be weather proof and air tight with gasketed joints. Units shall have a continuous airtight floor constructed of the same gauge material as the casing panels.
- C. Unit shall be designed for curb mounting and mate with a full perimeter weathertight roof curb. Unit sides shall overhang the roof curb a minimum of 1" to form a protective drip lip.
- D. Unit shall have access panels to gain access to the control panel, filter section, supply fan and return/exhaust air section. Panels shall be bolted lift off or hinged type.
- E. Unit shall have factory installed lifting lugs capable of accepting standard lifting slings and spreader bars to facilitate hoisting.

## 2.3 ROOF CURB

- A. Curb for mounting on roof shall be constructed of not less than 16 gauge galvanized steel, a minimum of 14" high with a wood nailer and continuous gasket at the top, designed such that the unit shall sit level on the curb. The curb shall be internally insulated with 2 inch thick fiberglass insulation.
- B. Curb design shall be approved by the National Roofing Contractor's Association.
- C. The curb shall be anchored to the roof structure and installed in such a manner so that curb top is level to within 1/8" per foot, with any slope to be in the direction of the condensate drain connection.
- D. Provide single roof curb for the rooftop unit and the energy recovery wheel module.

## 2.4 REFRIGERATION SYSTEM

- A. Compressors:
  - 1. Each hermetic compressor shall be reciprocating type, 1750 RPM with a minimum of 2 steps of unloading, or scroll type 3600 RPM. Compressors shall be isolated from the unit casing by rubber-in-shear or spring vibration isolators.
  - 2. Each compressor shall have a centrifugal oil pump, oil charging valve, oil level sight glass, crankcase heater, suction inlet screen and suction and discharge valves.

3. Safety controls shall include high and low refrigerant cut-out, oil pressure cut-out with not over 60 second time delay, time delay relay to prevent short cycling and reset relay.
4. Each compressor shall have an individual refrigerant circuit including accumulator and sub-cooling circuit.
5. Multiple compressors on a single refrigerant circuit will not be acceptable. Single compressor units with only two steps of unloading shall also have hot gas bypass capability.
6. For each refrigeration system provide controls to permit starting and operation down to 0 degrees F outdoor temperatures.
7. Provide a 4 year extended warranty on all compressors in addition to the standard one year warranty.

B. Evaporator coil:

1. Tubes shall be copper and fins shall be aluminum mechanically bonded to tubes.
2. Coils shall be factory tested to 300 psig and shall include factory installed thermal expansion valve, liquid line filter and solenoid valve.
3. When multiple compressors are used, coil circuits shall be entwined. Horizontal or vertical split row coils will not be acceptable.

C. Condenser coil:

1. Tubes shall be copper and fins shall be aluminum mechanically bonded to tubes.
2. Coils shall be factory tested to 425 psig.
3. Protective hail guards shall be provided over all exposed portions of the condenser coils.

D. Condenser fans and motors:

1. Fans shall be vertical discharge, direct drive propeller type with statically and dynamically balanced zinc plated steel blades and hubs.
2. Motors shall be single or three phase with permanently lubricated ball bearings and with built-in current and thermal overload protection and weathertight slingers over bearings.

## 2.5 DRAIN PAN

- A. Provide a drain pan below the cooling coil and extend it a sufficient distance downstream to collect any water carryover.
- B. Drain pan shall be of zinc coated steel sandwich construction with insulation enclosed within the sheet metal.
- C. Drain pan shall have threaded drain line connections on both sides of the unit.
- D. Provide a float switch or equivalent device to shut down unit in the event that the condensate line or drain is blocked.
- E. Where multiple coil sections are furnished, provide an intermediate drain pan under each upper coil section, with drain tube down to main pan.

## 2.6 AIR FILTERS

- A. Provide 2" thick pleated media throw-away filters with a minimum efficiency of 30%.
- B. Pressure drop across clean filter media shall not exceed 0.20" wg. at a media velocity of 500 FPM.
- C. One set of filter media shall be installed before fans are operated. A second set of filter media shall be installed at completion of construction.

## 2.7 SUPPLY AND RETURN AIR OR RETURN/EXHAUST FANS

- A. Fans shall be double inlet, double width, forward-curved design, Class I or II as determined by system operating conditions.
- B. Exhaust fans may be propeller type, belt driven or direct drive.
- C. Supply fans shall be belt driven with variable pitch sheave on the motor and fixed pitch sheave on the fan shaft. When multiple belt arrangements are required belts shall be matched sets.
- D. Fan wheels and blades constructed of ferrous metal shall have corrosion-resistant coating.
- E. Shafts shall be supported in ball type bearings with extended lubrication lines. Bearing mountings shall be pillow block type.
- F. Fan wheel and shaft shall be statically and dynamically balanced as an assembly.
- G. Fan and motor shall be mounted on a common rail-type isolation base. Motors shall be mounted on slide rails. Isolation shall be either rubber-in shear or spring.
- H. Provide a guard for each belt.
- I. For each fan motor, rated motor horsepower shall not be less than brake horsepower required at scheduled capacity plus ten percent.

## 2.8 OUTSIDE AIR ECONOMIZER CONTROL

- A. Provide complete operating outside air economizer system integrated with the energy recovery module. During the economizer mode, the air shall by pass the energy recovery wheel. Provide all facilities necessary for its functioning, including dampers and control devices, except for any control devices specified to be remote from the unit.

## 2.9 GAS HEATING SECTION

- A. Units shall be suitable for use with natural gas. Gas fired heat exchanger shall be constructed of heavy gauge aluminized steel or stainless steel, factory tested for leaks and shall have a non-prorated ten year warranty.
- B. Burners shall be constructed of aluminized steel or stainless steel.
- C. Heating controls shall consist of a redundant gas valve, intermittent spark pilot ignition system with electronic flame supervision and a two-stage gas valve for units over six tons, limit switches and combustion air proving switch with minimum 30 second delay.
- D. Design shall be specifically for outdoor application and certified by the AGA.

## 2.10 ELECTRICAL POWER SUPPLY

- A. Provide single point for power supply for rooftop unit and energy recovery cassette, including all internal power wiring and motor control for all motors. All electrical work shall comply with the National Electrical Code.
- B. Unit shall be suitable for use with voltages and phases as scheduled on the electrical drawings. Power wiring to control transformers shall be factory wired.

## 2.11 TEMPERATURE AND OPERATIONAL CONTROLS

- A. Provide all internal control devices; control power transformers and wiring necessary for the proper functioning of the unit.
- B. Control devices shall be mounted in the control panel with access door or panel as described above.
- C. Control voltage shall not exceed 120 volts. Provide necessary control transformers.
- D. Start-stop and operating control shall be initiated and operate as described under Section 23 0923, Building Automation System.

## 2.12 FIRE AND SMOKE CONTROL

- A. Provide contacts or relays in unit control panel for interface with the building fire alarm system as specified in Section 23 0923, Building Automation System.

## 2.13 ADAPTIVE DEHUMIDIFICATION SYSTEM

- A. The unit shall be provided with a dehumidification system. In sub-cooling mode the system shall further sub-cool the hot liquid refrigerant leaving the

condenser coil when both space temperature and space humidity are above set-point. In hot gas reheat mode a portion of the refrigerant hot gas shall be mixed with the hot liquid refrigerant leaving the condenser coil to create a two-phase heat transfer in the system, resulting in a neutral leaving air temperature when only space humidity is above the set-point.

- B. The system shall consist of a sub-cooling/reheat dehumidification coil located downstream of the standard evaporator coil. The system shall include a crankcase heater for the compressor and a low outdoor air temperature switch to lock out both sub-cooling and hot gas reheat when the outdoor temperature is below 40 degrees F.
- C. The system shall include a low ambient control to ensure the operation of normal design cooling mode of down to 0 degrees F. A low pressure switch shall be provided on the suction line to ensure low pressure start-up of hot gas reheat mode at lower outdoor temperature conditions.
- D. The system shall include a thermal expansion valve to ensure a positive superheat condition and a balance of pressure drop.

#### 2.14 ENERGY RECOVERY WHEEL (where indicated on the drawings)

- A. Provide as a package with the rooftop unit an energy recovery cassette housed in a galvanized cabinet.
- B. The cabinet shall be constructed of galvanized steel, coated with a pre-painted baked enamel finish. Cabinet shall be insulated with 1" thick, 2-lb density fiberglass insulation.
- C. Fans shall be direct drive, double inlet, forward-curved blades. Fan shall be mounted on neoprene vibration isolation pads. Motors shall be variable speed to accommodate demand ventilation.
- E. Energy recovery media shall be certified by ARI Standard 1060, and bear the ARI Certified product Seal. The energy recovery media shall have a minimum 70% effectiveness. The wheel shall be coated with silica gel desiccant, permanently bonded without the use of binders or adhesive.
- F. Coated wheels shall be washable with detergent or alkaline coil cleaner and water.
- G. The wheel frame shall be a welded hub spoke and rim assembly of stainless, plated, and or coated steel and shall be self-supporting without the wheel segments in place.
- H. Provide factory installed frost protection, and economizer option to stop the wheel when economizer mode is on.
- I. Provide CO2 sensor for demand control ventilation. The CO2 sensor shall be connected to the rooftop unit digital controller.



**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Manufacturer's published installation instructions shall be followed.
- B. After the curb is set, it shall be filled with two layers of 4 inch thick mineral wool batt insulation over the entire area inside the curb, except at the supply and return duct connections. Below each layer of mineral wool, install two layers of 5/8 inch thick gypsum board with staggered joints sealed with drywall mud. All voids between the supply and return duct connections and the roof openings shall be caulked with mineral wool fiber and caulked top and bottom with mastic.

**3.2 START-UP, TEST AND ADJUST**

- A. Provide services of the unit manufacturer as required to inspect and approve final installation of the unit and to supervise start-up and placing into proper operation of the unit.
- B. Rooftop air conditioning unit shall not be operated unless the filters are installed.
- C. Do not operate the unit until authorized manufacturer's representative has inspected installation for compliance with equipment manufacturer's published installation instructions.

**3.3 INSPECTION**

- A. Before request for final inspection submit three copies of inspection report to the Architect, signed by the authorized representative of the unit manufacturer, certifying that the installation and operation of the unit is in compliance with the requirements of the manufacturer's recommended practices.

**END OF SECTION 23 7415**



**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Special Conditions and Section 230000, Mechanical General, apply to all work specified in this section.

**1.2 DESCRIPTION OF WORK**

- A. Materials and equipment furnished under this specification shall be standard cataloged products of manufacturers regularly engaged in production of such materials or equipment and shall be the manufacturer's latest design that complies with these specifications.
- B. Each component shall be factory tested, dehydrated and charged. All equipment capacities shall be certified in accordance with ARI 240 and sound levels shall comply with the requirements of ARI 270 and ARI 350. All components shall be UL listed. Each outdoor condensing unit and indoor fan coil unit shall be factory rated for use together to provide the heating and cooling capacities and operating efficiencies within 5% of that indicated on the drawings.

**1.3 QUALITY ASSURANCE**

- A. Ductless split systems manufactured by Carrier, Mitsubishi or Daikin will be acceptable.

**PART 2 - PRODUCTS****2.1 OUTDOOR CONDENSING UNITS**

- A. Outdoor air cooled condensing units shall be completely packaged, factory assembled, electrically operated units consisting of hermetic reciprocating or rotary compressor with crankcase heater, high and low pressure safeties, operating controls, air-cooled condenser coil with direct drive propeller fan, suction and liquid line service valves, service gauge connection port, liquid line accumulator, filter drier and wiring.
- B. Each entire condensing unit shall be completely factory charged with the amount of refrigerant and lubricating oil as recommended by manufacturer.
- C. Condensing units shall have isolation mountings under the compressor and shall be enclosed in a weatherproof cabinet constructed of galvanized steel, bonderized and coated with a baked-on enamel finish. Condenser coil shall be constructed of aluminum fins mechanically bonded to seamless copper tubes which have been cleaned, dehydrated and sealed.
- D. Motor shall be NEMA rated class F suitable for operation in a refrigerant atmosphere. Provide each motor with thermal overload protection. Provide overload protective devices either integral to motor or controller or mounted in separate enclosure.

- E. Operating and safety controls shall include time delay restart, automatic restart on power failure, high pressure and liquid line low pressure switches, start capacitor and relay, compressor motor current and temperature overload protection and outdoor fan failure protection.

## 2.2 HIGH WALL INDOOR FAN COIL UNITS

- A. Indoor fan coil units shall be the high wall mounted type complete with blower, cooling coil, [electric heating element], piping connectors, microprocessor control system and integral [remote wall mounted] temperature sensing within unit cabinet, allowing replacement or removal of all items of equipment.
- B. Direct drive fan shall have capacity for distributing and conditioning air over evaporator coil [and heating element] to provide cooling [and heating] allowance not exceeding 10% above or below specified capacities. A user adjustable horizontal and vertical air sweep shall be provided.
- C. Each unit shall consist of a reinforced sheet metal enclosure with baked-on enamel finish and with high impact polystyrene discharge and inlet grilles. Furnish each unit with wall mounting bracket and mounting hardware.
- D. Ship coil after dehydration with a holding charge of refrigerant provided by the manufacturer. Evaporator coil shall be constructed of seamless copper or galvanized steel tubes with aluminum plate fins mechanically bonded to tubes.
- E. Provide evaporator coil with a drip pan of nonferrous material or with steel pan completely waterproofed with a non-hardening type mastic on water side and with thermal insulation to prevent casing condensation.

## 2.3 FILTER

- A. Provide cleanable type air filter 1" thick. Filters shall be Class 2, conforming to the requirements of UL.
- B. Filter shall be easily removable for cleaning without use of special tools.

## 2.4 CONTROLS

- A. Furnish microprocessor-based controls for each ductless split system.
- B. System controls shall have the following characteristics:
  - 1. Automatic restart after power failure at the same conditions as at failure.
  - 2. Return air temperature sensor and indoor high discharge temperature shutdown.
  - 3. Wireless infrared remote integral controller to enter set points and operating conditions.
  - 4. Dehumidification mode to provide increased latent removal capability by modulating fan speed and temperature set point.

5. Diagnostics to provide continuous checks of all unit operations with error messages displayed at the unit and remote controller.
6. Fan speed controls for high, medium and low modes.
7. Demand defrost with internal timer and indoor coil freeze protection.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Ductless split systems shall be installed in accordance with the manufacturer's recommendations.

END OF SECTION 23 8133



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 26

ELECTRICAL





## PART 1 - GENERAL

## 1.1 DESCRIPTION AND DEFINITIONS

- A. This division of the Specifications covers the complete electrical systems as indicated on the drawings or as specified herein. Provide all equipment, materials, labor, and supervision to install electrical systems. The requirements of this Section apply to all electrical work hereinafter described. The General and Special Conditions are considered a part of this Division of the Specifications and all provisions contained therein which affect this work are as binding as though incorporated herein.
- B. The following words and phrases shall be interpreted as indicated:
1. "approved": approved or accepted by Governing Officials or Authorities Having jurisdiction
  2. "materials": equipment and/or materials
  3. "provide": furnish, install, connect, and test the operation thereof
  4. "work": materials provided - see above definitions
  5. "wiring": conductors/cablings and raceway system, including fittings, boxes, connectors, supports, hardware, labeling, and related accessories

## 1.2 QUALITY ASSURANCE

- A. All electrical work shall be in accordance with the latest locally adopted edition of the following codes and agency standards:
1. Georgia State Minimum Standard Electrical Code (National Electrical Code 2005 edition with Georgia State Amendments through 2007).
  2. The National Electrical Safety Code (ANSI C-2), 2005 Edition.
  3. The Life Safety Code (NFPA 101), 2000 Edition as modified by the Rules and Regulations of the Safety Fire Commissioner Chapter 120-3-3 effective 2/1/2007.
  4. Occupation Safety and Health Administration (OSHA) regulations.
  5. Regulations of the local serving utility company regarding metering and service entrance.
  6. Accessibility Codes: Americans with Disabilities Act Guidelines (ADA), ANSI A117.1, and Georgia Accessibility Code, 2007 Edition.
  7. Georgia State Minimum Standard Building Code (International Building Code with Georgia State Amendments through 2007).
  8. International Energy Conservation Code, with Georgia Amendments through 2007.
  9. Georgia State Minimum Standard Fire Code (International Fire Code with Georgia State Amendments).
  10. Municipal or other locally enforced ordinances governing electrical work.
- B. Material Standards: All material shall conform to the standards where such standards have been established for the particular material indicated.

Publications and standards of the organizations listed below are applicable to materials specified herein.

1. American National Standards Institute (ANSI)
2. Insulated Cable Engineers Association (ICEA)
3. Institute of Electrical and Electronic Engineers (IEEE)
4. National Electrical Manufacturers Association (NEMA)
5. National Fire Protection Association (NFPA)
6. Underwriters' Laboratories, Inc. (UL)

C. Listing and Labeling: Provide equipment assemblies that are listed and labeled.

1. The terms "listed" and "labeled": As defined in the National Electrical Code, Article 100.
2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

### 1.3 PERMITS

- A. Obtain all permits and inspections for the installation of this work and pay all charges incident thereto. Deliver to the Owner all certificates of said inspection issued by authorities having jurisdiction.

### 1.4 WARRANTY

- A. The Contractor warrants to the Owner and Architect that materials and equipment furnished under this Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. Refer to Division 0 and the Owner Contractor General Agreement for other warranty requirements.

### 1.5 PROJECT DOCUMENTS

- A. Keep on hand at the project site a complete set of all project drawings and specifications, including, but not limited to, all architectural and engineering drawings. Refer to these documents as necessary; coordinate and install all work accordingly so that all electrical equipment will be properly located and accessible.
- B. The drawings are diagrammatic and are intended to indicate the arrangements of electrical equipment. Do not scale drawings. Obtain dimensions for layout

of equipment from drawings of other trades unless indicated on Electrical plans. Review drawings of other trades for door swings, cabinets, counters, and built-in equipment; conditions indicated on Architectural plans shall govern. Coordinate installation of electrical equipment with structural system and mechanical equipment and access thereto. Coordinate installation of electrical equipment with ductwork and piping, and wall thickness. Verify construction dimensions at the site and make changes necessary to conform to the building as constructed. Work improperly installed due to lack of construction verification shall be corrected at no additional cost to the Owner.

- C. Equipment layout is based on one manufacturer's product. Where equipment selected by the Contractor for use on the project differs from layout indicated, the Contractor shall be responsible for coordinating space requirements and connection arrangements.
- D. Bring all discrepancies shown on different drawings, between drawings and specifications or between documents and field conditions to the immediate attention of the Architect.

#### 1.6 SUBMITTALS

- A. Shop Drawings and Product Data:
  - 1. Submit for review by the Architect data for materials and equipment to be used on the project. Submittals shall be supported by descriptive material, catalog cuts, diagrams, and performance charts published by the manufacturer to show conformance to specification and drawing requirements. Model numbers alone will not be acceptable. Provide documentation of complete electrical characteristics for all equipment.
  - 2. Provide equipment layout plans, drawn to  $\frac{1}{4}''=1'-0''$ , showing the space arrangement of electrical spaces such as main service equipment area, electrical closets, and each area where electrical distribution equipment is to be installed. Base layout on dimensions of the equipment actually submitted for use on the project. Submit plans for review with shop drawings.
  - 3. Refer to the individual sections for indication of equipment for which submittals are required.
  - 4. Refer to Division 1 for additional information on submittal requirements.
- B. Record Documents: Refer to Division 1 for requirements for record documents, as-built drawings, and related submittals.

#### 1.7 EQUIPMENT REQUIRING ELECTRICAL SERVICE

- A. Review all specification sections and drawings for equipment requiring electrical service. Provide service to and make connections to all equipment requiring electrical service.
- B. Drawings indicate equipment with loads, horsepower, voltages, and corresponding control equipment, feeders, and overcurrent devices which were used as a basis for design. If equipment actually furnished have loads other than those indicated on the drawings or specified herein, control equipment,

feeders, and overcurrent devices shall be adjusted in size accordingly at no additional cost to the Owner. Such adjustment shall be subject to the review of the Architect.

- C. Incidental items not indicated on the drawings or mentioned in the specifications but that can legitimately and reasonably be inferred to belong to the work or be necessary in good practice to provide a complete system, shall be furnished and installed as though itemized here in detail.

## 1.8 MECHANICAL SYSTEMS INTERFACE

- A. All control wiring and associated raceway systems for mechanical systems shall be provided under Divisions 21, 22, 24, and 25, unless otherwise shown on the Electrical drawings. Review Divisions 21, 22, 24, and 25 specifications, project drawings, and shop drawings for control systems to assure compatibility between equipment furnished under Division 26 and wiring furnished under Divisions 21, 22, 24, and 25.
- B. Unless otherwise indicated, motor controllers (starters) shall be provided under Divisions 21, 22, 24, and 25 or as an integral component of Divisions 21, 22, 24, and 25 equipment.
- C. Power wiring to all motors and controllers and between motors and controllers shall be provided under Division 26.
- D. All electric heating equipment shall be provided and installed under Division 23. Power wiring to all electric heating equipment shall be provided under Division 26.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Furnish all materials specified herein or indicated on the drawings. All materials shall be new, unless otherwise indicated.
- B. Where Underwriters' Laboratories (UL) testing standards and listings exist for an item of material or equipment, the listed material shall bear the UL label.

## PART 3 - EXECUTION

### 3.1 PRODUCT DELIVERY, STORAGE, HANDLING, AND PROTECTION

- A. Inspect materials upon arrival at site and verify conformance with project requirements. Prevent unloading of unsatisfactory material. Handle materials in accordance with applicable standards and recommendations, and in a manner to prevent damage to materials. Store packaged materials in original undamaged condition with manufacturer's labels and seals intact. Containers which are broken, opened, damaged, or watermarked are unacceptable and shall be removed from the premises and replaced.

- B. All material, except items specifically designed to be installed outdoors, shall be stored in an enclosed, dry building or trailer. Areas for general storage shall be provided. Provide temperature and/or humidity control where necessary. All material for interior installation, including conductors, shall be stored in an enclosed weathertight structure and shall be protected from water, direct sunlight, cold or heat. Equipment stored other than as specified above shall be removed from the premises and replaced.
- C. Equipment and materials shall not be installed until such time as the environmental conditions of the job site are suitable to protect the equipment or materials. Conditions shall be those for which the equipment or materials are designed to be installed.

### 3.2 CLEANING, PAINTING, AND IDENTIFICATION

- A. Remove oil, dirt, grease and foreign materials from all raceways, boxes, panelboard trims and cabinets to provide a clean surface for painting. Touch-up scratched or marred surfaces of lighting fixtures, panelboard and cabinet trims, or other equipment enclosures with paint furnished by the equipment manufacturer specifically for that purpose.
- B. Where painting of trim covers for flush mounted panelboards, communication equipment cabinets, pull boxes, junction boxes, and control cabinets is required under this or any other Division of these specifications, remove trim covers before painting. Do not paint locks, latches, hinges, or exposed trim clamps.
- C. Where plywood backboards are used to mount equipment provided under Divisions 26, 27, or 28, paint backboards with two coats of light gray paint. Provide fire-retardent plywood, 3/4" thick minimum.
- D. Identify electrical components where required in the individual specification sections.
  - 1. Equipment connected to utility power shall have black faced nameplates. Equipment connected to emergency power shall have red faced nameplates
  - 2. Nameplates shall be constructed from laminated phenolic engraved plastic three-ply with a white interior core at least 1/16 inch thick.
  - 3. Plastic strips shall be stamped, pressure-sensitive adhesive type labels, with white letters.
  - 4. Stencils shall be machine cut with 1/4-inch high minimum size letters. Paint shall be enamel or lacquer type. Unless otherwise indicated, labeling shall use condensed gothic letters and arabic numerals properly spaced for easy and legible reading.
  - 5. Nameplates for surface mounted equipment shall be installed on the exterior, and for flush or recessed mounted equipment shall be installed on the inside of the door or cover with epoxy cement adhesive, unless otherwise indicated.

### 3.3 EXCAVATION, TRENCHING AND BACKFILLING

- A. Perform all excavation to install underground circuiting and raceway systems indicated on the drawings or specified herein. During excavation, pile material for backfilling back from the banks of the trench to avoid overloading and to prevent cave-ins. Remove and dispose of all excavated materials not to be used for backfill. Grade to prevent surface water from flowing into trenches and excavation. Remove any water accumulating therein by pumping.
- B. Grade the bottom of trenches to provide uniform bearing and support for underground circuiting and raceway systems on undisturbed soil at every point along entire length. Tamp overdepths with loose, granular, moist earth. Remove unstable soil that is not capable of supporting equipment or installation and replace with specified material for a minimum of 12" below invert of equipment or installation.
- C. Backfill the trenches with excavated materials approved for backfilling, consisting of earth, loam, sandy clay, or sand and gravel, free from large clods of earth and stones, deposited in 6" layers and tamped until the installation has a cover of not less than the adjacent ground but not greater than 2" above existing ground. Backfill simultaneously on both sides of the trench. Compaction of the filled trench shall be at least equal to that of the surrounding undisturbed material. Do not settle backfill with water. Reopen any trenches not meeting compaction requirements or where settlement occurs, refill, compact, and restore surface, mounded over and smoothed off.
- D. Refer to Division 31 for additional requirements.

### 3.4 COORDINATION AND COOPERATION

- A. Schedule the work, coordinate, and cooperate with all trades to avoid interferences, delays, and unnecessary work. If any conflicts occur which, in the installer's opinion, necessitate departures from the drawings and specifications, details of departures and reasons therefore shall be submitted in writing for the Architect's consideration.
- B. Notify other trades of dedicated electrical space to ensure those spaces stay clear of pipes, duct work and other foreign systems.

### 3.5 OPERATION AND MAINTENANCE MANUALS AND INSTRUCTIONS

- A. Provide printed material for binding in operation and maintenance manuals. Include electrical equipment shop drawings as a minimum, and other information as necessary. Refer to Division 1 for additional information on submittal requirements.
- B. Instructions of Owner Personnel:
  - 1. Before final project review, as designated by the Architect, provide a competent representative to instruct Owner's designated personnel in systems indicated.
  - 2. Use Operation and Maintenance Manuals as basis of instruction. Review contents with personnel in detail to explain all aspects of operation and maintenance.

3. Prepare and insert additional data in Operation and Maintenance Manuals when the need for such data becomes apparent during instruction.

### 3.6 ELECTRICAL ACCEPTANCE TESTS AND MANUFACTURERS CERTIFICATION

- A. Refer to the individual specification sections and the Electrical Acceptance Testing section for equipment or system test requirements. Testing documentation shall be provided for reference at the time of final project review.
- B. Where specified under the individual system specification sections, the systems shall be reviewed for compliance with these specifications, installation in accordance with the manufacturer's recommendations, and system operation by a representative of the manufacturer. The manufacturer shall submit certification that the system has been reviewed by the manufacturer, is installed in accordance with the manufacturer's recommendations, and is operating in accordance with the specifications.

### 3.7 CONSTRUCTION OBSERVATION ASSISTANCE

- A. Provide personnel to assist the Architect or his representative during all construction observation visits. Provide tools and equipment as required to demonstrate the system operation and provide access to equipment, including screwdrivers, wrenches, ladders, flashlights, circuit testing devices, meters, keys, etc.
- B. Remove panelboard trims, motor controls covers, device plates, junction box covers, etc. as directed for inspection of internal wiring. Turn over to the Owner one set of keys for all lockable electrical equipment on the project. Accessible ceilings shall be removed as directed for inspection of equipment installed above ceilings.
- C. Energize and de-energize circuits and equipment as directed. Demonstrate operation of equipment and systems as directed.
- D. Provide authorized representatives of the manufacturers to demonstrate to the Architect compliance with the Contract Documents at a time designated by the Architect.

END OF SECTION 26 0500





## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The work required under this section of the specifications consists of the furnishing, installation and connection of the building wiring system. Exterior branch circuit wiring and feeder conductors extended beyond the building are included. Wiring systems for communication and other signaling systems are not included in this section unless specified to be included, by reference, in the respective specification sections for these systems.

## 1.2 QUALITY ASSURANCE

- A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
1. Underwriters' Laboratories, Inc. (UL) Publications:
    - a. No. 44 Rubber - Insulated Wire and Cables
    - b. No. 83 Thermoplastic - Insulated Wires
    - c. No. 493 Thermoplastic - Insulated Underground Feeder and Branch Circuit Cables
    - d. No. 486 Wire Connectors and Soldering Lugs
    - e. No. 486A Wire Connectors and Soldering Lugs for Use with Copper Conductors.
    - f. No. 486C Splicing Wire Connectors.
    - g. No. 486D Insulated Wire Connectors for Use With Underground Conductors.
  2. Insulated Cable Engineers Association (ICEA) Standards:
    - a. S-61-402 Thermoplastic Insulated Wire and Cable
  3. National Electrical Manufacturers' Association (NEMA) Standards:
    - a. WC-5 Thermoplastic Insulated Wire and Cable
  4. National Fire Protection Association (NFPA) Publications:
    - a. No. 70 National Electrical Code (NEC)
  5. Institute of Electrical and Electronics Engineers (IEEE) Standards:
    - a. No. 241 IEEE Recommended Practice for Electric Power Systems in Commercial Buildings.
    - b. No. 404 Standard for Power Cable Joints.
  6. American Society for Testing and Materials (ASTM):
    - a. No. B3 Soft or Annealed Copper Wire.
    - b. No. B8 Concentric Lay Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
    - c. No. B33 Tinned Soft or Annealed Copper Wire for Electrical Purposes
    - d. No. B172 Rope Lay Stranded Copper Conductors, Having Bunch Stranded Members for electrical Conductors.
    - e. No. B539 Standard Methods for Measuring Contact Resistance of Electrical Connections (Static Contacts).
  7. American National Standards Institute (ANSI) Standards:
    - a. CC3 Connectors for use between aluminum or aluminum-copper overhead conductors.
    - b. RS-364-21A Insulation Resistance Test.

- c. SG-14 Unplated split-bolt and Vice-Type Electrical Connectors for Copper Conductors.
  8. National Electrical Contractors' Association (NECA):
    - a. Standards of Installation
- B. Acceptable Manufacturers. Products by the following manufacturers which conform to this specification are acceptable.
  1. Insulated cable - copper:
    - a. Cablec
    - b. Carol
    - c. Okonite
    - d. Southwire
    - e. American Insulated Wire
    - f. Rome
  2. Mechanically applied (crimp) conductor terminations:
    - a. Scotch (3M)
    - b. Ideal
    - c. Thomas and Betts (T&B)
    - d. Burndy
  3. Vinyl electrical insulating tape:
    - a. Scotch (3M)
    - b. Tomic
    - c. Permacel
  4. Twist-On Wire Connectors:
    - a. Scotch (3M)
    - b. Ideal
    - c. Buchanan
  5. Encapsulated insulating kits:
    - a. Scotch (3M)
    - b. Raychem
    - c. Essex Group, Inc.
  6. Portable cable fittings:
    - a. Crouse Hinds
    - b. Appleton
    - c. Thomas and Betts (T&B)
  7. Hydraulically applied conductor terminations:
    - a. Square D
    - b. Burndy
    - c. IlSCO
    - d. Scotch (3M)
    - e. Thomas and Betts (T&B)

**PART 2 - PRODUCTS****2.1 GENERAL MATERIALS REQUIREMENTS**

- A. Provide all materials under this section of the specifications.
- B. All wire and cable shall be UL listed and shall bear a UL label along the conductor length at intervals not exceeding 24 inches.
- C. All conductors shall have size, grade of insulation, voltage and manufacturer's name permanently marked on the outer cover at intervals not exceeding 24 inches.
- D. Conductor size shall be a minimum of No. 12 AWG, but shall not be less than indicated on the drawings.
- E. Insulation voltage level rating shall be 600 volts.

**2.2 MATERIALS DESCRIPTION**

- A. Conductors No. 10 AWG and smaller shall be solid copper, 90 degrees centigrade type THHN/THWN or XHHW, unless otherwise indicated on the drawings, required by the National Electrical Code or specified elsewhere in Division 16.
- B. Conductors larger than No. 10 AWG shall be stranded copper, 90 degrees centigrade, type THHN/THWN, XHHW, unless otherwise indicated on the drawings, required by the National Electrical Code, or specified herein.
- C. Lighting fixture wire shall be No. 16 AWG silicone rubber insulated, stranded fixture wire, type SFF-2 (150 degrees centigrade), or No. 16 AWG thermoplastic, nylon jacketed stranded fixture wire, type TFFN (90 degrees centigrade).
- D. Portable power cables and outlets shall be provided where indicated on the drawings. Cables shall be sized as indicated on the drawings with equal size green equipment ground. #14/2 with ground may be used for connection to lighting fixtures. Cables shall be jacketed 600 volt SO type. Cable connectors shall be steel case liquid tight sized for cable diameter and shall use strain relief gland fitting to prevent tension on conductor terminations. Use wire mesh strain relief cable grips at both ends of cable. Use cast type outlet device box for device cable drops.
- E. Splices and taps.
  - 1. No. 10 AWG and smaller: Dry type connectors shall have live spring allowing reentry twist-off operation without damaging conductors. Connectors for solid conductors shall be solderless, screw-on, spring pressure cable type, 600 volt, 105 degree centigrade with integral insulation, UL approved for aluminum and copper conductors. Connectors for stranded conductors shall be crimp-on type with integral insulation cover.

2. No. 8 and larger: Hydraulically applied crimping sleeve or tap connector sized for the conductor or indent, split-bolt or bolt clamp-type connectors. Insulate the hydraulically applied connector with 90 degree centigrade, 600 volt insulating cover. Insulate the mechanically applied connectors with heat shrink insulator sleeve or plastic electrical insulating type. Insulator materials and installation shall be approved for the specific application, location, voltage and temperature.
- F. General requirements for connections: For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire-nuts, and other items and accessories as needed to complete splices and terminations of types indicated.
- G. Connectors and Terminals: Provide electrical connectors and terminals which mate and match, including sizes and ratings, with equipment terminals which are recommended by equipment manufacturer for intended applications.
- H. Electrical Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing and boots, wirenuts and cable ties as recommended for use by accessories manufacturers for type services indicated.
- I. Electrical insulating tape shall be 600 volt, flame retardent, cold and weather resistant, .85 mil thick minimum plastic vinyl.

### PART 3 - EXECUTION

#### 3.1 EXECUTION

- A. Install all wiring in raceway system, except where conductors are indicated or specified not to be installed in raceway. No conductors shall be installed into conduit until the conduit system is complete. Ideal #77, Carlon-Slikum, Burndy "Slikon", or other approved pulling compound shall be used when pulling conductors into conduit.
- B. Do not install more conductors in a raceway than indicated on the drawings. A maximum of three branch circuits are to be installed in any one conduit, on a 3 phase 4 wire system, unless specifically indicated otherwise on the drawings. No two branch circuits of the same phase are to be installed in the same conduit, unless specifically indicated on the drawings.
- C. Conductors shall be electrically continuous and free from short circuits or grounds. All open, shorted or grounded conductors and any with damaged insulation shall be removed and replaced with new material free from defects.

- D. Color code all service, feeder, and branch circuit conductors. Control and signal system conductors need not be color coded. Phase conductors No. 10 and smaller shall have solid color compound insulation or color coating. Phase conductors No. 8 and larger shall have solid color compound, color coating or colored phase tape. Colored tape shall be installed on conductors in every box, at each terminal point, cabinet, pullbox or other enclosure. Grounded conductor (i.e., neutrals and equipment grounds) color coding shall comply with the National Electrical Code requirements. Coding shall be as follows:
1. 208Y/120 volt three phase four wire system - Phase A: Black, Phase B: Red, Phase C: Blue, Neutral: White
  2. 480Y/277 volt three phase four wire system - Phase A: Brown, Phase B: Orange, Phase C: Yellow, Neutral: Gray
  3. Grounding conductors shall be green. Grounding conductors for isolated ground circuits shall be green with a yellow trace.
- E. Maintain phase rotation established at service equipment throughout entire project.
- F. Group and lace with nylon tie straps all conductors within enclosures, i.e. panels, motor controllers, and cabinets.
- G. Support conductors installed in vertical raceways at intervals not exceeding those distances indicated in the National Electrical Code. Support conductors in pull boxes with bakelite wedge type supports provided for the size and number of conductors in the raceway.
- H. Connect all conductors. Install electrical connections as indicated, in accordance with equipment manufacturer's written instructions and with recognized industry practices, and complying with applicable requirements of Industry Referenced Standards.
- I. Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's written instructions and wiring diagrams. Mate and match conductors of electrical connections for proper interface between electrical power supplies and installed equipment.
- J. Cover splices with electrical insulating material of equivalent, or of greater insulation resistivity rating, than electrical insulation rating of those conductors being spliced.
- K. Prepare cables and wires by cutting and stripping covering armor, jacket, and insulation properly to ensure uniform and neat appearance where cables and wires are terminated. Exercise care to avoid cutting through tapes which will remain on conductors. Also avoid "ringing" copper conductors while skinning wire.
- L. Trim cables and wires as short as practicable and arrange routing to facilitate inspection, testing and maintenance.

- M. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturers' published torque tightening values for equipment connectors. Tighten by utilizing proper torquing tools, including torque screwdriver, beam-type torque wrench, and ratchet wrench with adjustable torque settings. Where manufacturer's torquing requirements are not available, tighten connectors and terminals to comply with torquing values contained in UL Standards listed.
- N. Terminate conductors No. 10 AWG and smaller specified to be stranded, with crimp type lug or stud. Direct termination of stranded conductors without crimp terminator to terminal screws, lugs, or other points is not permitted even if terminal is rated for stranded conductors. Crimp terminal shall be the configuration type suitable for terminal point.
- O. Make splices in conductors only within junction boxes, wiring troughs and other enclosures as permitted by the National Electrical Code. Do not splice conductors in pull boxes, panelboards, disconnect switches, motor control enclosures. Splices in conductors installed below grade are not permitted, unless indicated on the drawings. For taps and splices indicated on the drawings, connections shall be made in flush mounted watertight junction box with crimp connectors and watertight resin encapsulation kit.

### 3.2 FIELD QUALITY CONTROL

- A. Upon completion of installation of electrical connections, and after circuitry has been energized with power source, test connections to demonstrate capability and compliance with requirements. Ensure that direction of rotation of each motor fulfills requirement. Correct malfunctioning units at site, then retest to demonstrate compliance.

END OF SECTION 26 0519

## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The work required under this section of the specifications consists of the furnishing, installation, and connections of the project grounding systems. The project electrical system is a 3 phase, 4 wire grounded wye system supplemented with an equipment grounding system. Equipment grounding system shall be established with equipment grounding conductors; the use of metallic raceways for equipment grounding is not acceptable.

## 1.2 QUALITY ASSURANCE

- A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
1. Underwriters' Laboratories, Inc. (UL) Publications:
    - a. Rubber-Insulated Wire and Cables
    - b. Thermoplastic - Insulated Wires
    - c. Electrical Grounding and Bonding Equipment
    - d. Thermoplastic - Insulated Underground Feeder and Branch Circuit Cables
    - e. Wire Connectors and Soldering Lugs
  2. National Electrical Manufacturers' Association (NEMA) Standards:
    - a. WC-5 Thermoplastic Insulated Wire and Cable
    - b. WC-7 Cross-Linked-Thermosetting
  3. National Fire Protection Association (NFPA) Publications:
    - a. National Electrical Code (NEC)
  4. National Electrical Contractors' Association (NECA):
    - a. Standards of Installation
  5. Bellcore (Telecordia) Standards:
    - a. TR-NWT-000295 Isolated Ground Planes: Definition and Application to Telephone Central Offices
- B. Acceptable Manufacturers. Products by the following manufacturers which conform to this specification are acceptable.
1. Hydraulically applied conductor terminations:
    - a. Burndy
    - b. IlSCO
    - c. Scotch/3M
    - d. Thomas and Betts (T & B)
    - e. Anderson
  2. Mechanically applied (crimp) conductor terminations:
    - a. Scotch/3M
    - b. Ideal
    - c. Thomas and Betts (T & B)
    - d. Burndy
  3. Exothermic connections:
    - a. Erico/Cadweld
    - b. Harger
    - c. Thompson

## PART 2 - PRODUCTS

### 2.1 GENERAL MATERIALS REQUIREMENTS

- A. Provide all materials under this section of the specifications.

### 2.2 MATERIALS DESCRIPTION

- A. Grounding Conductors
1. Equipment grounding conductors shall be green insulated type THW, THWN, or XHHW conductors sized as indicated on the drawings. Where size is not indicated on the drawings, conductor size shall be determined from the National Electrical Code table on sizes of equipment grounding conductors.
  2. Grounding electrode conductors shall be bare or green insulated copper conductor sized as indicated on the drawings. Where size is not indicated on the drawings, conductor size shall be determined from the National Electrical Code table on sizes of grounding electrode conductors. Bonding jumpers shall be flexible copper bonding jumpers sized in accordance with the National Electrical Code tables for grounding electrode conductors.
- B. Disconnect Switches, Transformers, and Motor Controllers: Provide a conductor termination grounding lug bonded to the enclosure of each equipment item.
- C. Devices: Each receptacle and switch device shall be furnished with a grounding screw connected to the metallic device frame.
- D. Ground Rods shall be 3/4" x 10'-0" copper clad steel.
- E. Other Materials: Reference Ground Bus (RGB). Bus shall be solid copper 1/4"x4"x24", mounted 48" AFF on C-channel. Terminations onto the bus shall be two hole lug type. Bus shall be pre-drilled for conductor termination lug connections and pre-drilled for five future connections.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Ground all non-current carrying parts of the electrical system, i.e., wireways, equipment enclosures and frames, junction and outlet boxes, machine frames and other conductive items in close proximity with electrical circuits, to provide a low impedance path for potential grounded faults. Metal raceways shall be electrically continuous throughout the entire system. Metal raceways into electrical equipment components and cabinets such as disconnect switches, panelboards, etc. shall be connected to the equipment grounding buses by means of grounding bushings. Connections of raceways that employ locknuts shall use two locknuts to insure grounding continuity. Heavy duty thermowelds shall be employed if connections are buried under floor slab or



grade. Buried connections shall be painted with a corrosion-inhibiting material.

B. Equipment Grounding Conductors

1. Grounding conductors for branch circuits are not shown on the drawings; however, grounding conductors shall be provided in all branch circuit raceways. Grounding conductors shall be the same AWG size as branch circuit conductors, unless otherwise indicated. Grounding conductors for feeders are typically indicated on the drawings and the raceway is sized to accommodate grounding conductor shown. Where grounding conductor size is not indicated on the drawings, conductor shall be in accordance with the equipment grounding conductor table of the National Electrical Code.
2. A grounding conductor shall be installed in all flexible conduit installations. For branch circuits, grounding conductor shall be sized to match branch circuit conductors.
3. The equipment grounding conductor shall be attached to equipment with bolt or sheet metal screw used for no other purpose. Where grounding conductor is stranded, attachment shall be made with lug attached to grounding conductor with crimping tool.
4. Equipment grounding conductors shall be attached to outlet boxes with bolt or sheet metal screw used for no other purpose. Where grounding conductor is stranded, attachment shall be made with lug attached to grounding conductor with crimping tool. Connect equipment grounding conductor from wiring device outlet box to wiring device.
5. Ground all motors by drilling and tapping the bottom of the motor junction box and attaching the equipment grounding conductor to the box with a round head bolt used for no other purpose. Conductor attachment shall be through the use of a lug attached to conductor with crimping tool.
6. Equipment grounding conductors shall terminate on distribution equipment grounding bus only. Do not terminate on neutral bus. Provide a single terminal lug for each conductor. Conductor shall terminate in the same section as the phase conductors originate. Do not terminate neutral conductors on the ground bus.

C. Service entrance and separately derived electrical systems, grounding electrode system.

1. The neutral conductor of the electrical service serving the premises wiring system shall be grounded to the ground bus bar in the service equipment. The ground bus bar in the service equipment shall be grounded to the cold water system, the ground rod system, and other grounding electrodes specified herein or indicated on the drawings. Grounding electrode conductors shall be installed in rigid, non-metallic conduit to point of ground connection, unless subject to physical damage in which case they shall be installed in galvanized rigid steel. Where metallic conduit is permitted, bond conduit at both ends to grounding electrode conductor with a UL bonding bushing.
2. Make connection to main metallic water pipe entering the building. Make connections ahead of any valve or fittings whose removal may

- interrupt ground continuity. Install a bonding jumper of the same size as the grounding conductor around the water meter.
3. Bond together the following systems to form the grounding electrode system. All system connections shall be made as close as possible to the service entrance equipment and each connected at the service entrance equipment ground bus. Do not connect electrode systems together except at ground bus.
    - a. Cold water piping system
    - b. Ground rod system
    - c. Structural steel metal building frame or main rebar in a foundation footing, for a concrete structure
    - d. Lightning protection system
  4. Grounding electrode connections to structural steel, reinforcing bars, ground rods, or where indicated on the drawings shall be with chemical exothermic weld connection devices recommended for the particular connection type. Connections to piping shall be with UL listed mechanical ground clamps.
  5. Bonding shall be in accordance with the National Electrical Code.
  6. Install ground rods where indicated on the drawings or as required, with the top of the ground rods 12" below finished grade.
  7. Ground the neutral of all dry type transformers to building steel which shall serve as the grounding electrode for the separately derived system. In reinforced concrete structures building steel shall be considered to be reinforcing steel of vertical columns or the reinforcing steel of the ground floor slab. Make connection to building steel with an exothermic weld in a location in unfinished space where the connection will not be subject to physical abuse.
  8. Ground the neutral and frame of the emergency generator to building steel and the ground rod system, which shall serve as the grounding electrode for the separately derived system. In reinforced concrete structures building steel shall be considered to be reinforcing steel of vertical columns. Make connection to building steel with an exothermic weld in a location in unfinished space where the connection will not be subject to physical abuse.
  9. Where more than one service serves a building, connect each service equipment ground bus together with a #4/0 copper conductor in PVC conduit.

D. Other Grounding Requirements

1. Lighting fixtures shall be grounded with a green insulated ground wire secured to the fixture with a UL listed bond lug, screw, or clip specifically made for such use.
2. Outlet boxes shall have grounding jumper connecting device and outlet box. Refer to the CONDUITS AND BOXES specification section.
3. Mount Reference Ground Bus 48" above finished floor on C-channel. Homerun #4/0 cable from communication backboards and separately derived systems to the RGB. This is in addition to other grounding requirements of this section. Bus shall be mounted in the adjacent to the service entrance or where shown on plans.
4. At each building expansion joint flexible copper bonding jumpers shall be attached to building structure by exothermic weld process. Install

bonding jumpers in concealed locations that will not subject connections or jumpers to physical abuse. Install 100' on centers across expansion joints.

### 3.2 FIELD QUALITY CONTROL

- A. Upon completion of installation, test the installation in accordance with the ELECTRICAL ACCEPTANCE TESTING section of this specification. Grounding resistance reading shall be taken before connection is made to the building cold water piping system. Ground resistance readings shall not be taken within forty-eight hours of rainfall. Results of ground resistance readings shall be forwarded, in writing, immediately to the Architect. Remedy any deficient components of the grounding system, then retest to demonstrate compliance.

END OF SECTION 26 0526



## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. This section covers the complete conduit raceway system, including outlet boxes, junction boxes, and pullboxes.
- B. Definitions: The term conduit, as used in this Specification, shall mean any or all of the raceway types specified. The following abbreviations are referenced in this section:
  - 1. RGS Rigid Galvanized Steel
  - 2. IMC Intermediate Metallic Conduit
  - 3. EMT Electrical Metallic Tubing
  - 4. "Box" includes all outlet, device, junction, and pull boxes

## 1.2 QUALITY ASSURANCE

- A. Referenced Industry Standards: The following specifications and standards are incorporated into and become a part of this Specification by reference.
  - 1. Underwriters' Laboratories, Inc. (UL) Publications:
    - a. No. 1 Flexible Metal Electrical Conduit
    - b. No. 6 Rigid Galvanized Conduit
    - c. No. 467 Electrical Grounding and Bonding
    - d. No. 651 Rigid Nonmetallic Electrical Conduit
    - e. No. 797 Electrical Metallic Tubing
    - f. No. 1242 Intermediate Metal Conduit
    - g. Electric Cabinets and Boxes
    - h. Electrical Grounding and Bonding Equipment
    - i. Electrical Outlet Boxes and Fitting
  - 2. American National Standards Institute (ANSI):
    - a. C-80.1 Rigid Galvanized Conduit.
    - b. C-80.3 Electrical Metallic Tubing.
  - 3. National Fire Protection Association (NFPA):
    - a. No. 70 National Electrical Code (NEC).
  - 4. American Society for Testing and Materials (ASTM):
    - a. A123 Zinc (Hot Galvanized) Coating on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strips.
    - b. A153 Zinc (Hot Dipped) Coating on Iron and Steel Hardware.
- B. Acceptable Manufacturers: Products of the following manufacturers, which comply with these specifications, are acceptable.
  - 1. Metallic Conduit and Fittings:
    - a. Appleton
    - b. Crouse Hinds
    - c. Killark
    - d. O-Z/Gedney
    - e. RACO
    - f. Wheatland
    - g. Allied
    - h. Steel City, compression fittings

2. Support Channel:
  - a. Kindorf
  - b. Unistrut
  - c. B-line
3. Non-Metallic Conduit and Fittings:
  - a. Carlon
  - b. Queen City
  - c. Thomas & Betts
4. Galvanizing Compound:
  - a. ZRC Products Company
  - b. Galva-Weld
  - c. ZYP Coatings
5. Fire-rated foam sealant:
  - a. Dow-Corning
  - b. G.E.
  - c. Dap
6. Electrical tape:
  - a. Scotch
  - b. Tomic
  - c. Permacel
7. Floor Boxes:
  - a. FSR, Inc.
  - b. Hubbell
  - c. Steel City
  - d. Walker/Wiremold.

### 1.3 STORAGE, HANDLING, AND COORDINATION

- A. Refer to the COMMON WORK RESULTS FOR ELECTRICAL section of the specification for storage and handling requirements.
- B. Non-metallic conduits stored on site prior to installation shall be stored on a surface off of the ground and shall be protected from direct sunlight and from construction debris.
- C. Damaged, oxidized, warped, improperly stored material or material with excessive amounts of foreign debris shall be removed and replaced with new materials.
- D. Coordination: Review architectural drawings for areas where outlets occur within specific architectural or structural features and install outlets as shown; or if not shown, accurately center and align boxes within the architectural features or detail.

## PART 2 - PRODUCTS

### 2.1 GENERAL MATERIALS REQUIREMENTS

- A. All conduit, fittings, and boxes shall be listed and bear a label by Underwriters' Laboratories (UL) for use as raceway system for electrical conductors.

- B. Raceway is required for all wiring, unless specifically indicated or specified otherwise.
- C. Size: The minimum size of conduit shall be 1/2". The size of all conduits shall be in accordance with the NEC, but not less than indicated on the drawings.

## 2.2 CONDUIT AND FITTINGS

- A. Electrical Metallic Tubing: EMT couplings and connectors shall be steel water-tight and concrete-tight. Malleable iron, die cast or pressure cast fittings are not permitted. Fittings 2.0" and smaller shall be compression type or steel set screw type. Connectors for conduits 2.5" and larger shall be set screw type with four screws each. All connectors shall be insulated throat type.
- B. Rigid Galvanized Steel and Intermediate Metallic Conduit: Fittings for RGS and IMC shall be standard threaded couplings, locknuts, bushings and elbows. All materials shall be steel or malleable iron only. Bushings shall be metallic insulating type consisting of insulating insert molded or locked into the metallic body of the fittings.
- C. Non-Metallic Conduit: Non-metallic conduit shall be heavy wall, Schedule 40 PVC, unless otherwise indicated on the drawings. Non-metallic conduit fittings shall be of the same material as the conduit furnished and be the product for the same manufacturer.
- D. Flexible Conduit
  - 1. Flexible conduit shall be steel metallic type. Where specified herein, indicated on the drawings, or when used in damp or wet locations, as classified by the National Electrical Code, flexible conduit shall be liquid tight.
  - 2. All flexible conduit shall be classified as suitable for system grounding.
  - 3. Connectors for flexible conduit shall be steel insulated throat type rated suitable for system ground continuity. Connectors for liquid tight flexible conduit shall be screw-in ground cone type.
  - 4. Flexible conduit use for other than connections to lighting fixtures shall not be less than 1/2" trade size and in no case shall flexible conduit size be less than permitted by the National Electrical Code for the number and size of conductors to be installed herein. 3/8" flexible conduit may be used for connection to lighting fixtures providing conduit fill requirements of the National Electrical Code are not exceeded.

## 2.3 MISCELLANEOUS CONDUIT FITTINGS AND ACCESSORIES

- A. Electrical tape for corrosion protection shall be vinyl all-weather type.
- B. Expansion and deflection couplings shall accommodate 3/4" deflection, expansion, or contraction in any direction and shall allow 30 degree angular deflections. Couplings shall contain an internal flexible metal braid to maintain raceway system ground continuity.

- C. Fire and smoke stop materials shall be rock wool fiber, silicone foam, or silicone sealant, UL rated to maintain the fire floor or fire wall partition rating.
- D. Corrosion-inhibiting coatings shall be cold-galvanizing compound type.
- E. Conduit Supports
  - 1. All parts and hardware shall be zinc-coated or have equivalent corrosion protection.
  - 2. Conduit straps shall be single hole cast metal type or two hole galvanized metal type. Conduit clamps shall be spring steel type for use with exposed structural steel.
  - 3. Conduit support channels shall be 1.5" x 1.5" x 14 gauge galvanized steel channel. Channel suspension shall be by threaded steel rods. Use swivel type connector to attach suspension rods to structure. Spring steel clips are not acceptable. Conduit straps shall be spring steel straps compatible with channel. Wire or chain is not acceptable for conduit hangers.
  - 4. Individual conduit hangers shall be galvanized spring steel specifically designed for the purpose, sized appropriately for the conduit type and diameter, and have pre-assembled closure bolt and nut and provisions for receiving threaded hanger rod. Support with 1/4" threaded steel rod for individual conduits 1.5" and smaller and 3/8" rod for individual conduits 2.0" and larger.
  - 5. Individual conduit straps on metal studs shall be spring steel and shall wrap around entire face of stud securely biting into both edges and have provisions for screwing into stud. Size for conduit to be supported. Tie wraps are not acceptable.
  - 6. Support multiple conduits from metal studs using pre-assembled bar hanger assembly consisting of hanger bar, retaining clips and conduit straps.
  - 7. Supports for 3/8" flexible conduit to lighting fixtures shall be secured to ceiling grid wire hangers with a metal clip specifically designed for this purpose. Caddy #PCS2. No other conduit shall be supported from the ceiling system.

#### 2.4 SURFACE METALLIC RACEWAY AND WIREWAY

- A. Surface Metal Raceway shall be a two-piece raceway of galvanized steel, consisting of a cover and a base. The surface metal raceway shall accommodate single or two gang receptacles rated up to 100 amps at 208 or 600 volts as indicated on the plans. The system shall be a complete system with necessary fittings and outlets. The system shall be listed by Underwriters' Laboratories, Inc. for service as equipment grounding conductors. Surface Metal Raceway shall be the type indicated on the plans.
- B. Wireway shall be a steel enclosed wiring trough with removable cover. Wireway systems shall be furnished complete with necessary fittings. Wireway shall be the type as indicated on the plans.



## 2.5 BOXES

- A. Boxes shall be as follows, unless otherwise specified, indicated on the drawings, or required by the NEC:
1. Sheet metal boxes of 50 cubic inches internal capacity and smaller shall be sheet steel, galvanized, with suitable covers and screws.
  2. Sheet metal boxes larger than 50 cubic inches internal capacity shall be constructed of code gauge welded sheet steel, reinforced if required, and finished with standard gray enamel or galvanized and shall have removable screw mounted covers with brass machine screws.
  3. Cast metal "FS" or "FD" type boxes shall have threaded hubs. In special cases where standard types are not available, blank boxes may have threaded hubs brazed on, or if necessary suitably thick boxes may be drilled and tapped.
- B. Outlet boxes for surface mounted and pendant mounted lighting fixtures shall be 4" octagon boxes, 1-1/2" deep.
- C. Outlet boxes for flush mounted lighting fixtures shall be 4" square boxes 1-1/2" deep, with blank cover, installed adjacent to fixture. Connection to fixture shall be with flexible conduit.
- D. Outlet boxes for switches, receptacles and wall mounted junction boxes shall be 4" square boxes, 1-1/2" deep with square edge tile type cover. Where only one conduit enters box, 3-1/2" deep single gang switch box may be used.
- E. Outlet boxes for switches and receptacles in exposed wiring system shall be cast FS boxes with matching device plate. Surface outlet boxes for dry locations shall be the cast type for locations requiring rigid or IMC raceway types. Switch and receptacle boxes for exposed wiring in equipment rooms may be surface mounted "handy" type boxes. Wall boxes for outdoor or wet locations use shall be the cast type furnished complete with weatherproof covers and rubber or neoprene gaskets. Device plates for exterior installations shall be weatherproof, spring loaded hinged covers. Use FD box for GFI receptacle.
- F. Outlet boxes for individual switches, and receptacles flush mounted in exposed concrete block shall be single gang masonry boxes 3-1/2" deep.
- G. Outlet boxes for devices mounted in metal door jambs shall be sheet metal partition boxes 1-6/16" wide and 1-5/8" deep.
- H. Outlet boxes for support of surface or pendant mounted lighting fixtures shall be provided with fixture stud.
- I. Outlet boxes shall be provided with green sheet metal screw for attachment of equipment grounding conductor.
- J. Where actual device provided requires larger outlet box than specified herein, provide outlet box suitable for specific device. These outlet boxes shall be of the same type as specified herein for the installation required.

- K. Outlet boxes installed in poured concrete or cast in place shall be concrete-tight type. The box depth shall allow 2" minimum of concrete cover.
- L. Dimensions of pull boxes and junction boxes shall not be less than those dimensions required by the National Electrical Code for the number, size and position of conductors entering the box. Only a single extension ring shall be permitted on a box to increase the volume.
- M. Horizontal pull boxes containing more than one feeder shall be provided with reinforced flange and removable 12 gauge 1-1/2" x 1-1/2" galvanized channel for support of conductors. Wood supports within pull boxes are not acceptable.
- N. Provide box covers for all junction and pull boxes.
- O. Exterior junction or pull boxes shall be cast aluminum or PVC raintight and watertight boxes with screw cover lids. Box dimensions shall be sized in accordance with the National Electrical Code minimum requirements, unless otherwise indicated on the drawings. Covers shall be galvanized steel, checkered pattern, suitable for pedestrian traffic secured to box with stainless steel screws. Box shall be furnished with continuous neoprene gasket to seal cover. Conduit entry shall be by factory drilled and tapped openings. Provide PVC adapter fitting for PVC conduits. Metallic boxes shall be provided with grounding lug secured by bolt to the enclosure.
- P. Provide floor outlet boxes compatible with devices indicated on drawings.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. General
  1. Conceal all conduits, except in unfinished spaces such as equipment rooms or where indicated on the drawings.
  2. Leave all empty conduits with a 200 pound test nylon pull cord.
  3. Install as complete raceway runs prior to installation of cables or wires.
  4. Flattened, dented, or deformed conduits are not acceptable and shall be removed and replaced.
  5. Secure RGS and IMC to sheet metal enclosures with two locknuts and insulated bushing. Secure EMT to sheet metal enclosures with insulated throat connectors.
  6. Fasten conduit support device to structure with wood screws on wood, toggle bolts on hollow masonry, anchors as specified on solid masonry or concrete, and machine bolts, clamps, or spring steel clips, on steel. Nails are not acceptable.
  7. Protect conduits against dirt, plaster, and foreign debris with conduit plugs. Plugs shall remain in place until all masonry is complete. Protect conduit stub-ups during construction from damage: any damaged conduits shall not be used.

8. Provide seal-off fittings and sealants for all conduits originating from outside building, from below grade, all conduits entering refrigerated spaces, i.e., freezers and coolers, and all conduits entering exterior mounted electrical equipment with insulating putty to prevent entrance of moisture.
9. Install conduit with wiring, including home runs, as indicated on the drawings. Deviations shall be made only where necessary to avoid interferences and when approved by Architect by written authorization.
10. Conduits which penetrate roof membranes shall be installed in accordance with roofing system manufacturer's recommendations and architectural specifications with a sheet metal pitch pocket filled with asphaltic compound, unless otherwise indicated.
11. Use flexible conduit for connection to vibrating equipment and rotating machinery and for connection from junction box to flush mounted lighting fixtures.
12. Separate raceway systems are to be installed for power systems and for control, signal and communications systems. Do not install control, signal or communications cables in the same raceways as branch circuit or feeder cables, unless indicated otherwise.
13. Provide expansion fitting in all conduits where length of run exceeds 200 feet or where conduits pass building expansion joints.
14. Holes and sleeves shall be provided through floors, walls and roofs as necessary for conduit installation, including flashing and waterproofing as required at exterior walls and roofs. Install sleeves or forms for openings in new work. Provide inserts and holes as required, sleeved, bonded, curbed, flashed, and finished, whether in concrete, steel grating, metal panels, roofs, or other building features.
15. Provide nonshrink grout or foam sealant at all sleeves or holes after the installation of conduit and at all unused sleeves. Install fire- and smoke-rated seals at all conduit penetrations or sleeves of fire-rated floors, ceilings, walls, or partitions.
16. Coat all field-cut threads in galvanized conduit with aluminum paint, zinc treatment cold galvanizing compound, or other approved treatment material.

### 3.2 APPLICATIONS FOR CONDUIT PERMITTED

- A. Interior Installations, Concealed in Walls or Above Ceilings, or Exposed
  1. Unless excluded below, not permitted in accordance with the National Electrical Code, or otherwise indicated, all conduit shall be Electrical Metallic Tubing.
  2. Conduit shall be run parallel or at right angles to existing walls, ceilings, and structural members.
  3. Support branch circuit conduits at intervals not exceeding 10 ft. and within three feet of each outlet, junction box, cabinet or fitting. Attach individual branch circuit conduits to structural steel members with spring steel type or beam conduit clamps and to non-metallic structural members with one hole conduit straps. For exposed conduits and where conduits must be suspended below structure, single conduit runs shall be supported from structure by hangar rod and conduit clamp assembly. Multiple conduits shall be supported by trapeze type support

suspended from structure. Do not attach conduits to ceiling suspension system channels or suspension wires.

4. Attach feeder conduits larger than 1" trade diameter to or from structure on intervals not exceeding 12 ft. with conduit beam clamps, one hole conduit straps or trapeze type support in accordance with support systems described for branch circuit conduits.
5. Exposed conduits shall be painted as specified under the PAINTING section of the specifications, or as otherwise indicated in the Architectural documents.
6. Do not install conduits through structural members.
7. Install conduit sleeves in slabs where conduits 2.0" and larger pass through. Sleeves shall extend 1" minimum above finished slab.
8. Install all conduits or sleeves penetrating rated fire walls or fire floors to maintain fire rating of wall or floor.
9. Conduits attached to building construction on opposite sides of a building expansion joint shall be provided with an expansion and deflection coupling. In lieu of an expansion coupling, conduits 2-1/2" and smaller may be provided with junction boxes on both sides of the expansion joint connected by 15" of slack flexible conduit with bonding jumper.
10. No conduit installation requiring cutting of cross-webs of concrete masonry units is permitted. Conduit shall be threaded through cells or concrete masonry units lowered around conduit. Neither horizontal joint reinforcement nor bond beam reinforcement shall be cut for conduit installation.
11. Conduit types shall not be mixed indiscriminately with other types in the same run, unless specified herein or required by the NEC.
12. Conduits which penetrate the building exterior walls or roof shall be RGS or IMC.

B. Underground Raceway Installations

1. Direct Burial Conduit
  - a. Install top of conduits 18" minimum below finished grade. Maximum depth shall be 36".
  - b. Install top of conduits 6" minimum below bottom of building slabs.
  - c. Where transition is made from below grade PVC installation to above grade or slab, make transition with rigid galvanized elbow and extend through slab or above grade with galvanized rigid steel conduit. For corrosion protection, where the elbow penetrates surface, wrap with vinyl all-weather electrical tape or coat with bituminous asphaltic compound, for 6" above and below concrete surface.
  - d. For other excavation and backfilling requirements, refer to EARTHWORK specification section.
  - e. Conduit shall be run following the most direct route between points.

C. Installations Within or Below Concrete Floor Slabs

1. Conduits installed within concrete floor slabs which are in direct contact with grade shall be RGS or IMC. Conduits installed within

- concrete floor slabs which are above grade shall be RGS, IMC, or schedule 40 Heavy Wall PVC. Where transition is made from raceway in slab to any type of raceway out of slab, make transition with RGS elbow. For corrosion protection, where elbow penetrates surface, wrap with vinyl all-weather electrical tape or coat with bituminous asphaltic compound, for 6" above and below concrete surface.
2. Service entrance conduits shall be either RGS or, where installed underground, schedule 40 heavy wall PVC encased in a concrete ductbank. Service entrance conduits shall be installed "outside the building" as defined by the National Electrical Code. Other conduit in direct contact with earth shall be either schedule 40 heavy wall PVC or RGS.
  3. Conduit shall be run following the most direct route between points.
  4. Raceways routed in concrete floor slabs shall be located with minimum separation and cover for raceways and fittings as follows:
    - a. Minimum top cover of 1-inch for conduits 1-1/4-inch and smaller.
    - b. Minimum top cover of 1-1/2 inches for conduits 1-1/2-inch and larger.
    - c. Conduits routed parallel in finish floor slab concrete shall be spaced a minimum distance of three times their trade diameters apart, with a maximum of three conduits in any two foot wide section.
    - d. Conduits located on top of structural floor slabs shall be spaced such that a minimum bottom cover of one inch shall be maintained for conduits and fittings.
  5. Conduit shall not be installed in concrete which is less than 3" thick or where the outside diameter is larger than 1/3 of the slab thickness.
  6. Conduits installed in concrete slabs shall be buried in the concrete slab. Wire low conduits to upper side of the bottom reinforcing steel, and upper conduits to the lower side of the top reinforcing steel. Separate parallel runs of conduits within slab by at least 1".
  7. Conduits shall not be installed within shear walls unless specifically indicated on the drawings. Conduits shall not be run directly below and parallel with load bearing walls.
  8. Protect each metallic conduit installed in concrete slab or conduits 1.5" and smaller passing through a concrete slab against corrosion where conduit enters and leaves concrete by wrapping conduit with vinyl all-weather electrical tape.
  9. Protect all conduits entering and leaving concrete floor slabs from physical damage during construction.
  10. Install all conduits penetrating rated fire floors to maintain the fire rating of the floor penetrated.
  11. The maximum projection of conduit stub-up and bushing above slab shall be 3". Install flush with finished slab where indicated.
- D. Miscellaneous Applications
1. Use flexible conduit for connections to flush- or chain-mounted lighting fixtures, motors, dry type transformers, plumbing or HVAC equipment, and kitchen/laundry equipment.
    - a. Flexible conduit used for connection of motors, dry type transformers, plumbing and HVAC equipment, kitchen

equipment, and laundry equipment shall not exceed 18" in length for trade diameter sizes 3" or less, 21" in length for 3 1/2" trade diameter size, and 24" in length for 4" trade diameter size.

- b. Flexible conduit from outlet box to lighting fixtures shall not exceed 6 feet in length.
  - c. Maintain ground continuity through flexible conduit with green equipment grounding conductor; do not use flexible conduit for ground continuity.
  - d. Liquid tight conduit shall be used to connect equipment in mechanical equipment rooms, exterior installations, kitchen areas, and where equipment is subject to dripping oil, moisture, or corrosive atmospheres.
2. All conduits entering refrigerated spaces shall be RGS.

### 3.3 BOX INSTALLATION

- A. All boxes shall be completely accessible as required by the NEC. Provide access panels in any non-accessible spaces if required.
- B. Provide an outlet box for each lighting fixture and for each device. Boxes shall not be smaller than indicated in this section of the specifications and shall be larger if required by Article 370 of the National Electrical Code for the number and size of conductors installed. Where lighting fixtures are installed in continuous rows, only one outlet box is required.
- C. Outlet boxes for flush mounted lighting fixtures shall be accessible. Where fixture installation is in an inaccessible ceiling, outlet box shall be accessible when fixture is removed.
- D. Set outlet boxes for flush mounted devices to within 1/8" of finished wall. Spacers or shims between box and device are not acceptable.
- E. Where low voltage device is to be installed in common outlet boxes with line voltage device, provide metal barrier within outlet box to establish two separate compartments.
- F. Where ganged installations of switches controlling lighting circuits of opposite phase are indicated, separate switches with permanently installed nonmetallic barrier. Where space available for horizontal ganged installation is not adequate, install switches vertically to maintain required clearances between energized terminals.
- G. Where an emergency powered device is to be installed in common outlet boxes with an utility powered device, provide metal barrier within outlet box to establish two separate compartments.
- H. Support every box from structure:
  1. Secure to wood with wood screws.
  2. Secure to hollow masonry with toggle bolts.
  3. Secure to metal with sheet metal screws, machine bolts, or clamps.

4. Anchors for solid masonry and concrete shall be self drilling expansion shields, insert expansion shields, or lead shields with machine bolts. Power actuated pin studs may be used in concrete.
  5. Secure outlet boxes to metal studs with spring steel clamp which wraps around entire face of stud and digs into both sides of stud. Clamp shall be screwed into stud.
  6. Where box is suspended below structure, support from structure with threaded steel rod. Secure rod directly to outlet boxes with double nuts. For pull boxes larger than 18" x 18" x 6", construct 1-1/2" x 1-1/2" x 14 gauge metal channel frame. Connect frame to box by bolting and secure frame to threaded rod at each corner.
  7. Hub type cast boxes need not be directly attached to structure if rigid conduit is used and supported in conformance with the National Electrical Code.
- I. Support outlet boxes for support of surface mounted lighting fixtures by light weight channel spanning between and attached to main ceiling support member. Attach channel to ceiling support members.
  - J. Do not use outlet boxes for support of fixtures not recommended by fixture manufacturer to be supported by outlet box; boxes shall be used only as junction boxes.
  - K. Remove only knockouts required and plug all unused openings. Use threaded plugs for cast boxes and snap-in metal plugs for sheet metal boxes.
  - L. Outlet boxes in the same wall shall not be mounted back-to-back. Offset 6" minimum. Offset 24" minimum at fire rated partitions.
  - M. Install pull boxes only in unfinished spaces or concealed above ceilings, except when indicated on the drawings.
  - N. Install pull boxes for any of the following conditions:
    1. Where indicated on the drawings.
    2. Where conduit run exceeds 200 ft. from box to box or box to terminal.
    3. Where conduit contains more than 4-90 degree bends or the equivalent offsets.
    4. To facilitate conductor installation or to insure that the manufacturer's maximum pulling tension is not exceeded.
  - O. Do not splice conductors in pull boxes. Splices are not permitted in pull boxes except where shown on the drawings. Where splices are permitted, make splices with splicing sleeves attached to conductors with hydraulic crimping tool. Split bolt connectors are not acceptable for splices within pull boxes.
  - P. Where a pull box for multiple circuits is required, separate circuits as follows:
    1. Circuit conductors and feeders shall be individually laced with nylon tie straps. Boxes installed in masonry walls shall have covers of required depth to avoid cutting of masonry. Boxes for exterior work shall be FS or FD Series, with cadmium plated covers. the type with enlarged tab

- to permit identification of each circuit and feeder within pull box. Identify each with respect to load served.
2. Circuits shall be separated by full height and length sheet metal or polyester resin barrier secured to box by angle brackets.
- Q. Box covers shall be in place and secured to box.
- R. Box identification: Using an indelible wide tip black marker, indicate on the cover of each junction and pull box the designation of the circuits contained therein, e.g., HDA-1,3,5. Where painting of boxes is specified under this Division or elsewhere in these specifications, marking shall be done after final finish coat is applied. If painting is due to finished spaces, marking shall be done on inside face of cover.
- S. Exterior pull or junction boxes
1. Exterior pull or junction boxes shall be mounted flush with finished grade, unless specified elsewhere or indicated to be above ground on the drawings.
  2. Flush mounted boxes shall be surrounded on all sides and bottom with 6" minimum of concrete. Top of concrete shall be flush with grade.
  3. Seal conduit entries into box with duct seal to prevent entrance of moisture, after conductors are installed.
  4. Taps and splices, where permitted by these specifications within exterior junction boxes, shall be performed with an encapsulating watertight splice or tap kit which insulates and moisture seals the connection.
- T. After completion, clean all box interiors and exteriors of dirt and construction debris.
- U. Where exposed wiring in rigid steel conduit is indicated, provide cast outlet box with threaded hubs.
- V. Where conduits enter sheet-steel outlet boxes, cabinets or pull boxes, fasten with two locknuts and insulating bushings or single locknut and combination locknut/bushing.
- A. Unless otherwise indicated, boxes not containing wiring devices or lighting fixtures shall be provided with suitable blank cover plates. Blank cover plates shall match any nearby switch or receptacle plates, or other type necessary to achieve matching appearance

### 3.4 ADJUSTMENT, CLEANING AND PROTECTION

- A. Upon completion, clean all installed materials of excess paint, dirt, and construction debris. All conduit systems shall be cleaned of water and debris prior to the installation of any conductors.

END OF SECTION 26 0533



**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. The work required under this section of the specifications consists of the start-up testing and inspection of the electrical equipment designated within. All labor and testing equipment which is required shall be provided under this section of the specifications.

**1.2 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.3 GENERAL**

- A. The Contractor shall perform the tests as outlined below to insure system acceptance and shall engage the services of an approved testing organization to provide start-up testing and inspection of the electrical equipment as specified in this section.
- B. The testing organization shall be a full service company that employs factory trained test engineers capable of trouble shooting as well as identifying equipment problems. All work outlined shall be performed under the full time on-site supervision of a graduate engineer with a minimum of five years of field testing experience. The test, plan, procedures, and report shall be reviewed and approved by one of the testing company's electrical engineers. Upon request, the testing company shall submit proof of its qualifications.
- C. The testing organization shall provide the equipment and technical personnel to perform such tests and inspections. The contractor shall, at his expense, furnish any personnel necessary to assist in the testing and inspection.
- D. When the tests and inspections have been completed, a label shall be attached to all devices tested. The label shall provide the name of the testing company, the date the tests were completed, and the initials of the engineer who performed the tests.
- E. The tests shall insure that the equipment is operational and functioning within industry standards and manufacturer's tolerances. Forward all test reports to the Architect at least two weeks prior to the project final inspection for review. Reports shall be bound as required by Division 1 of this specification.

**1.4 QUALITY ASSURANCE**

- A. Industry Referenced Standards. The testing and inspection shall comply with all applicable sections of the following codes and standards:
  - 1. American National Standards Institute - ANSI
  - 2. American Society for Testing and Materials - ASTM
  - 3. Association of Edison Illuminating Companies - AEIC

4. Institute of Electrical and Electronics Engineers - IEEE
5. Insulated Power Cable Engineers Association - IPCEA
6. International Electrical Testing Association - NETA Acceptance Testing Specifications
7. National Electrical Code - NEC
8. National Electrical Manufacturers Association - NEMA
9. National Fire Protection Association - NFPA
10. State and Local Codes and Ordinances
11. National Electrical Contractors' Association (NECA): Standards of Installation

- B. The inspection and testing shall comply with the project plans and specifications as well as with the manufacturer's drawings, instruction manuals, and other applicable data for the apparatus tested.

#### 1.5 SUBMITTALS

- A. Refer to COMMON WORK RESULTS FOR ELECTRICAL for submittal requirements.

#### 1.6 DIVISION OF RESPONSIBILITY

- A. The Contractor shall:
1. Perform routine insulation-resistance, continuity, and rotation tests for all distribution and utilization equipment prior to and in addition to tests performed by the testing firm specified herein.
  2. Supply a suitable and stable source of electrical power to each test site.
  3. Notify the testing firm when equipment becomes available for acceptance tests. Work shall be coordinated to expedite project scheduling.
  4. Provide a complete set of electrical plans, specifications, and any pertinent change orders to the testing firm prior to commencement of testing.
- B. The testing firm shall:
1. Notify the Architect prior to commencement of any testing.
  2. Report to the Architect any system, material or workmanship which is found defective on the basis of acceptance tests.
  3. Maintain a written record of all tests and, upon completion of project, shall assemble and certify a final test report.

#### 1.7 SAFETY AND PRECAUTIONS

- A. Safety practices shall comply with applicable state and local safety orders. Compliance with the National Fire Protection Association standard NFPA 70E and the Accident Prevention Manual for Industrial Operations of the National Safety Council shall be observed.
- B. Tests shall only be performed on apparatus which is de-energized. The testing company's lead test engineer for the project shall be a designated safety representative and shall supervise testing observations and safety

requirements. Work shall not proceed until he has determined that it is safe to do so.

- C. Power circuits shall have conductors shorted to ground by a hotline grounded device approved for the purpose. Warning signs and protective barriers shall be provided as necessary to conduct the tests safely.

## 1.8 REPORTS

- A. The test report(s) shall include the following sections:
  - 1. Scope of testing
  - 2. Electrical equipment tested
  - 3. Description of test procedures
  - 4. Test results
  - 5. Conclusions and recommendations
  - 6. Appendix, including test forms
- B. Each piece of equipment shall be recorded on a data sheet listing the condition of the equipment as found and as left. Included shall be recommendations for any necessary repair and/or replacement parts. The data sheets shall indicate the name of the engineer who tested the equipment and the date of the test completion. All test reports shall bear the seal of an electrical engineer registered in the project state.
- C. Record copies of the completed test report shall be submitted no more than 14 days after completion of the testing and inspection.

## 1.9 TEST EQUIPMENT

- A. All test equipment shall be in good mechanical and electrical condition. All field instruments shall have been calibrated within six months of the testing date, and dated calibration labels shall be visible on the testing equipment. Submit calibration certification in the final report.

## PART 2 - PRODUCTS

### 2.1 GENERAL MATERIALS REQUIREMENTS

- A. All materials are specified under other sections of this specification. All testing equipment required shall be provided under this section of the specifications.

## PART 3 - EXECUTION

### 3.1 EQUIPMENT TO BE TESTED

- A. Equipment shall be tested in accordance with the following scopes of work.
  - 1. Dry Type Transformers
  - 2. Low Voltage Switchgear and Switchboards
  - 3. Low Voltage Power Circuit Breakers and Insulated Case Circuit Breakers
  - 4. Molded Case Circuit Breakers
  - 5. Motor Controllers

6. Automatic Transfer Switches
7. Engine Driven Emergency Power Supply
8. Lighting Control System
9. Grounding System
10. Cables, 600 Volts
11. Ground Fault Systems

### 3.2 DRY TYPE TRANSFORMERS

#### A. Visual and Mechanical Inspection

1. With case covers removed, inspect transformer core and coil assembly and enclosure interior. Cloth wipe and/or brush major insulating surfaces.
2. Check primary, secondary, and ground connections.
3. Check tap connections and tap changer.
4. Inspect all bolted connections. The electrical contractor shall torque wrench tighten or remake any questionable connections.
5. Inspect insulators, spacers, and windings.
6. Inspect for adequate electrical clearance.
7. Check base or support insulators, including vibration isolation supports.
8. Check accessory devices for condition and proper operation.
9. Verify that the transformers have been provided with adequate spacing for ventilation.

#### B. Electrical Tests

1. Insulation Resistance Test: Megger transformer windings high to low and ground, low to high and ground, and high and low to ground.
2. Perform turns Ratio Test.
3. Where auxiliary cooling has been provided, verify proper operation of such equipment.
4. Include measured secondary voltage (line-to-line and line-to-ground) for each transformer in the test report. Verify that the taps on all transformers with primary voltages above 600 volts are set to deliver voltage indicated in the Contract Documents with the system in full operation. Secondary voltage readings, at each transformer, phase to phase neutral, and phase load readings shall be recorded and tap positions of transformer taps noted. This test shall be conducted with a calibrated voltmeter.
5. Each ground rod installation shall be tested after all connections to ground rods are made before grounding conductor connection is made to the transformer. Ground rod installations shall be tested by "fall of potential" measuring method using ground resistance test meter and two auxiliary electrodes driven into the earth, interconnected through the meter with the ground rod installation being tested.
6. Placement of auxiliary electrodes shall be in accordance with operating instructions of test meter, but in no case shall auxiliary current electrodes be placed within 70' of the grounding system being tested. Test data shall indicate placement of auxiliary electrodes with respect to systems being tested, date readings were taken and lowest resistance recorded.

### 3.3 LOW VOLTAGE SWITCHGEAR AND SWITCHBOARDS

#### A. Visual and Mechanical Inspection

1. Verify that the contractor has cleaned enclosure interiors of accumulated dust, dirt, oil films, and other foreign materials.
2. Inspect all electrical and mechanical components for condition and any evidence of defects or failure.
3. Check for proper travel and alignment of any drawout or plug-in circuit breakers.
4. Check breaker connections to bus.
5. Inspect bolted connections. The electrical contractor shall torque wrench tighten or remake any questionable connections. Refer to manufacturer's instructions for proper torque values.
6. Inspect for missing or loose hardware or accessories.
7. Inspect ground bus connections.
8. Operate key and door interlock devices to assure proper operation.
9. Inspect for labels, and nameplate compliance with up-to-date circuit connections.
10. Verify that potential transformers, including their overcurrent protection and current transformers, meet specified requirements.
11. Check switchboard anchorage, area clearances, and alignment and fit of components.

#### B. Electrical Tests

1. Insulation Resistance Test: Megger main secondary bus and feeder circuits phase-to-phase and phase-to-ground.
2. Energize any space heater circuits to insure proper operations.
3. Insulation resistance test of buses and portions of control wiring that disconnect from solid state devices through normal disconnecting features. Insulation resistance less than 100 megohms is not acceptable.

#### C. Check phase rotation with a Biddle phase rotation meter. Check phasing of alternate supply sources to the same bus.

#### D. Instruments and Meter Tests

1. Inspect panel mounted instruments and meters. Clean and check for calibration accuracy. Make minor adjustments as necessary.
2. Ratio and polarity tests on current and voltage transformers.
3. Calibrate ammeters and voltmeters at midscale. Use check instruments with documented up-to-date calibration traceable to NIST standards.
4. Verify appropriate capacity, overcurrent protection, and operating voltage of control power elements including control power transformer and control power wiring.
5. Calibrate watt-hour and demand meters to 0.5 percent, and verify meter multipliers. Use check instruments with documented up-to-date calibration traceable to NIST standards.

#### E. Infrared Scanning:

1. Use an infrared scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
2. After Substantial Completion, but not more than 2 months after Final Acceptance, perform an infrared scan of switchboard bus joints and connections. Open or remove metal doors, covers, inspection plates, and barriers to make joints and connections accessible to a portable scanner.
3. Follow-up Infrared Scanning: Perform 2 additional follow-up infrared scans of the same joints and connections, one 4 months after Substantial Completion and one 11 months after Substantial Completion.
4. Record of Infrared Scanning: Report shall identify all connections checked and describe results of scanning. Include graphic indication of scanning results, notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 3.4 LOW VOLTAGE POWER CIRCUIT BREAKERS AND INSULATED CASE CIRCUIT BREAKERS

#### A. Visual and Mechanical Inspection

1. Remove each draw-out type circuit breaker.
2. Inspect arc chutes of power circuit breakers.
3. Inspect circuit breaker for defects or damage.
4. Inspect and check contacts. Check alignment, over-travel, and pressure. Adjust if necessary.
5. Inspect finger clusters on line and load stabs of draw-out circuit breakers.
6. Check for proper mechanical operation. Lubricate where necessary.
7. Check auxiliary devices for proper operation.
8. Check breaker racking device (if applicable) for alignment and friction-free operation. Lubricate if necessary.

#### B. Electrical Tests

1. Insulation Resistance Test: Megger main poles of breaker pole-to-pole, from each pole to ground, and across the open contacts of each pole.
2. Contact Resistance Test: Ductor across main pole contacts with breaker closed and latched to check for good, low resistance contact.
3. Test overcurrent trip device by primary injection and calibrate to settings provided by the Owner's engineer. Static overcurrent trip devices shall be tested per the manufacturer's instructions. Test each pole of the breaker individually. Data shall be compared with manufacturer's published data.
  - a. Test for minimum pick-up current.
  - b. Apply 300% of pick-up current and measure time necessary to trip breaker (long time delay).
  - c. Where short time delay characteristics are provided, test short time pick-up and delay.
  - d. Test instantaneous trip by passing current sufficiently high to trip breaker instantaneously.
  - e. Where ground fault protection is provided, test ground fault pick-up and delay.

- f. Check reset characteristics of trip unit.
4. Electrically test any auxiliary devices such as shunt trips, undervoltage trips, alarm contacts, and auxiliary contacts.

### 3.5 MOLDED CASE CIRCUIT BREAKERS

#### A. Visual and Mechanical Inspection

1. Inspect cover and case, and check for broken or loose terminals.
2. Operate breaker to check operation.

#### B. Electrical Tests (200 ampere frame and larger)

1. Insulation Resistance Test: Megger main poles of breaker pole-to-pole, from each pole to ground, and across the open contacts of each pole.
2. Contact Resistance Test: Ductor across main pole contacts with breaker closed and latched to check for good, low resistance contact.
3. Test overcurrent trip device and calibrate to settings provided by the engineer. Where primary injection testing is specified, test each pole of the breaker individually. Data shall be compared with manufacturer's published data.
  - a. All trip units shall be tested by primary injection.
  - b. Static overcurrent trip devices shall be tested per manufacturer's instructions.
  - c. Test for minimum pick-up current.
  - d. Apply 300% of pick-up current and measure time necessary to trip breaker (long time delay).
  - e. Where short time delay characteristics are provided, test short time pick-up and delay.
  - f. Test instantaneous trip by passing current sufficiently high to trip breaker instantaneously.
  - g. Where ground fault protection is provided, test ground fault pick-up and delay.
  - h. Check reset characteristics of trip unit.
4. Electrically test any auxiliary devices such as shunt trips, undervoltage trips, alarm switches, and auxiliary switches.

### 3.6 MOTOR CONTROLLERS

#### A. Visual and Mechanical Inspection

1. Verify that the contractor has cleaned structure interiors and starter cells of accumulated dust, dirt, oil films, and other foreign material.
2. Inspect bolted connections. The electrical contractor shall torque wrench tighten or remake any questionable connections.
3. Check mechanical operation of starters for freedom from binding.
4. Check motor circuit protector setting and overload relay heater size against contractor furnished list of motor nameplate full load current values.

#### B. Electrical Tests

1. Verify operation of each starter.

2. Test each overload relay by current injection through relay heaters. Record heater catalog numbers for each starter and submit list for maintenance. List shall contain circuit number, description of equipment and motor full load amps.
3. Contact Resistance Test. Ductor across main pole contacts of each breaker or switch with device closed and latched to check for good, low resistance contact.
4. Test overcurrent trip device of each circuit breaker trip device by current injection.

### 3.7 AUTOMATIC TRANSFER SWITCHES

#### A. Visual and Mechanical Inspection

1. Verify that contractor has cleaned enclosure interiors and all components of accumulated of dust, dirt, oil films, and other foreign material.
2. Inspect all electrical and mechanical components for condition and any evidence of defect or failure.
3. Perform inspection checks on individual components as recommended by the manufacturer.
4. Inspect connections for looseness. The electrical contractor shall torque wrench tighten or remake any questionable connections.
5. Inspect for missing or loose hardware or accessories.
6. Check for proper mechanical operation and lubricate, as necessary.
7. Check transfer mechanism for alignment and friction-free operation. Lubricate, as necessary.
8. Check all connecting wiring for condition.

#### B. Electrical Tests

1. Use test switch, when available, to check the electrical operation of the transfer switch.
2. When a test switch is not available, a failure of the normal source power will be simulated by disconnecting a voltage sensing lead.
3. Test and adjust all sensing relays, and other devices specifically associated with the transfer switch.
4. Contact Resistance Test: Ductor across main pole contacts of power switching circuit breakers, switches or contactor contacts with device closed and latched to check for good, low resistance contact.

### 3.8 EMERGENCY POWER SUPPLY-ENGINE DRIVEN

#### A. Visual and Mechanical Inspection

1. Verify that contractor has cleaned enclosure interiors of accumulated dust, dirt, oil films, and other foreign material.
2. Inspect all electrical and mechanical components for condition and any evidence of defects or failure.
3. Check output circuit breaker(s) bus connection.
4. Inspect bolted connections. The electrical contractor shall torque wrench tighten or remake any questionable connections.
5. Inspect for missing or loose hardware or accessories.
6. Inspect grounding system connections.



7. Operate key and door interlock devices to assure proper operation.
8. Inspect all associated systems and circuits for proper operation, including but not limited to the fuel supply system, jacket heater, battery charger, engine mounted control panel, remote monitoring and control panel, emergency cut-off, battery lighting system, exhaust system, radiator system, and ventilator system.
9. Inspect anchoring and vibration isolation systems.

B. Electrical Tests.

1. Insulation resistance test: Megger main poles of output circuit breaker(s) pole-to-pole, from each pole to ground, and across the open contacts of each pole.
2. Contact Resistance Test: Ductor across main pole contacts of output circuit breaker(s) with breaker closed and latched to check for good, low resistance contact.
3. Follow completely the load testing procedures of the latest issue of NFPA-110 for EPS systems, including prior notification of the local inspection authority having jurisdiction. Include all measured data and conditions in the final report. All non-compliance items shall be corrected by the contractor and retested until full compliance with NFPA-110 is achieved.

### 3.9 LIGHTING CONTROL SYSTEM

A. Visual and Mechanical Inspection

1. Inspect each device for physical damage.
2. Check for proper labeling of conductors
3. Inspect all system lamps and LED's for proper operation. Replace all non-operational equipment.
4. Check all cabinet doors, latches, and hinges for proper operation. Adjust, lubricate, and/or repair as required.

B. Electrical Tests

1. Verify the absence of unwanted voltages between circuit conductors and ground that would constitute a hazard or prevent proper system operation.
2. Meggar test all conductors (other than those intentionally grounded) for isolation from ground.
3. Test all conductors (other than those intentionally connected together) for conductor-to-conductor isolation using as insulation testing device.
4. The control unit shall be tested to verify it is in the proper operating condition as detailed in the manufacturer's manual.
5. Each control circuit shall be tested to confirm proper operation of the circuit. Monitor the system with all building equipment energized, such as variable speed controllers, to verify the absence of control inhibiting electrical noise.

### 3.10 GROUNDING SYSTEM

A. Visual and Mechanical Inspection

1. Inspect wiring system outlet and junction boxes for proper grounding. Green grounding conductor shall be connected to outlet and junction boxes. Inspect a minimum of 5% of project boxes.
2. Verify connections of grounds for the secondary of separately derived grounding systems, i.e. at dry type transformers. Note type of connection, i.e. mechanical or exothermic.
3. Verify proper connection to all components of building service entrance grounding system. Note all system components which are interconnected and type of connection either mechanical or exothermic. Note depth of driven ground rods.

B. Electrical Tests

1. Perform ground-impedance measurements utilizing the fall-of-potential method per ANSI/IEEE Standard 81 "IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System". Instrumentation utilized shall be specifically designed for ground impedance testing. Provide sufficient spacing so that plotted curves flatten in the 62% area of the distance between the item under test and the current electrode.
2. When sufficient spacing of electrodes described above is impractical, perform ground-impedance measurements utilizing either the intersecting curves method or the slope method. (Ref. Nos. 40 and 41 in IEEE Std. 81.)

C. Equipment Grounds

1. Utilize two-point method of IEEE Std. 81. Measure between equipment ground being tested and known low-impedance grounding electrode or system.

D. Test Values

1. The main ground electrode system impedance-to-ground should be no greater than five (5) ohms for commercial or industrial systems and one (1) ohm or less for generating stations, transmission stations, and large industrial systems. Equipment grounds, depending on size and length of grounding conductor, should be only fractionally higher than system ground.

3.11 CABLES - 600V

A. Visual and Mechanical Inspection

1. Inspect cables for physical damage and proper connection in accordance with single-line diagram.
2. Test cable mechanical connections to manufacturer's recommended values using a calibrated torque wrench.
3. Check cable color coding with applicable engineer's specifications and National Electrical Code standards.

B. Electrical Tests

1. Perform insulation-resistance test on each feeder on the riser diagram with respect to ground and adjacent conductors. Applied potential shall be 1000 volts dc for 1 minute.

2. Perform continuity test to insure proper cable connection.
3. Evaluate results by comparison with cables of same length and type. Investigate any values less than 50 megohms.

### 3.12 GROUND-FAULT SYSTEMS (NEC 230-95)

#### A. Visual and Mechanical Inspection

1. Inspect for physical damage and compliance with drawings and specifications.
2. Inspect neutral main bonding connection to assure:
  - a. Zero-sequence sensing system is grounded.
  - b. Ground-strap sensing systems are grounded through sensing device.
  - c. Ground connection is made ahead of neutral disconnect link on zero-sequence sensing systems.
  - d. Grounded conductor (neutral) is solidly grounded.
3. Inspect control power transformer to ensure adequate capacity for system.
4. Manually operate monitor panels (if present) for:
  - a. Trip test
  - b. No trip test
  - c. Nonautomatic reset
5. Record proper operation and test sequence.
6. Set pickup and time-delay settings in accordance with the settings provided.

#### B. Electrical Tests

1. Measure system neutral insulation to ensure no shunt ground paths exist. Remove neutral-ground disconnect link. Measure neutral insulation resistance and replace link.
2. Determine the relay pickup current by current injection at the sensor and operate the circuit interrupting device.
3. Test the relay timing by injecting three hundred percent (300%) of pickup current, or as specified by manufacturer.
4. Test the system operation at fifty-seven percent (57%) rated control voltage, if applicable.
5. Test zone interlock systems by simultaneous sensor current injection and monitoring zone blocking function.
6. On multiple source, tie breaker, etc., systems, devise a simulation scheme that fully proves correct operation.

## C. Test Parameters

1. System neutral insulation shall be a minimum of one hundred (100) ohms, preferably one (1) megohm or greater.
2. Relay timing shall be in accordance with manufacturer's published time-current characteristic curves but in no case longer than one (1) second for fault currents equal to or greater than 3,000 amperes.
3. Relay pickup value shall be within +/- 10% of setting and in no case greater than 1200A.

END OF SECTION 26 0800

## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The work required under this section of the specifications consists of the furnishing, connection and installation of dry type transformers.
- B. Definition: Dry type transformers, as described herein, applies to those with primary and secondary voltage connections of 600 volts and less.

## 1.2 QUALITY ASSURANCE

- A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
  - 1. Underwriter's Laboratories, Inc. (UL) Publications:
    - a. Transformers (1000 KVA, 3 phase and below; 167 KVA, 1 phase and below)
  - 2. National Fire Protection Association (NFPA):
    - a. National Electrical Code (NEC)
  - 3. National Electrical Manufacturers Association (NEMA):
    - a. ST-20 Dry-type transformers for general applications
    - b. TP-1 Guide for determining energy efficiency of transformers
    - c. TP-2, TP-3 Related NEMA standards
  - 4. American National Standards Institute (ANSI):
    - a. C57.12.80 Terminology for Power and Distribution
    - b. C57.12.90 Guide for Short Circuit Testing of Distribution and Power Transformers
    - c. No. C57.94 Recommended Practice for Installation, Application, Operation and Maintenance of Dry-Type General Purpose Distribution and Power Transformers
  - 5. National Electrical Contractors' Association (NECA):
    - a. Standards of Installation
- B. Acceptable Manufacturers. Products by the following manufacturers which conform to this specification are acceptable.
  - 1. Eaton
  - 2. General Electric
  - 3. Square D
  - 4. Siemens
- C. Coordination: Coordinate installation with architectural and structural features, equipment installed under other sections of the specifications and electrical equipment to insure transformer access and clearance minimums are provided, and adequate ventilation is permitted.

## 1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 SUBMITTALS

- A. Refer to Division 1 section "Submittals" for submittal requirements.
- B. Manufacturers Product Data:
  - 1. Submit material specifications and installation data for products specified under PART 2 - PRODUCTS. Product data shall indicate sound and temperature rating, overload capacity and energy efficiency at 25%, 50% and 100% load, available taps, voltage, impedance, nameplate data, wiring diagrams, physical dimensions and net weight. Product data shall also contain certification that transformers are constructed and tested in accordance with standards specified herein.
  - 2. Each transformer shall be subjected to the following factory production tests as a minimum: Applied potential, Induced potential, No load losses, Voltage ratio, Polarity, and Continuity. Provide documentation of testing with submittal.
- C. Record Drawings. Include in each set:
  - 1. A complete set of manufacturers product data indicating all post bid revisions and field changes.

PART 2 - PRODUCTS

2.1 GENERAL MATERIALS REQUIREMENTS

- A. Provide all materials under this section of the specifications.
- B. Transformers shall be self-cooled, rated for continuous operation at rated KVA, 24 hours per day, 365 days per year with normal life expectancy (IEEE Standard No. 65). Transformer overload capabilities shall be in accordance with ANSI Standard C57.12. KVA ratings shall be as indicated on the drawings.

2.2 MATERIALS DESCRIPTION - DRY TYPE TRANSFORMERS

- A. Insulation System
  - 1. Transformer standard insulation systems rated 600 volts and below and classified by total temperature of windings (coil) shall be as follows:

Class	Rise	Hot SBT	Max.Ambien t	Avg. Ambient
220°C.	150 °C.	30°C.	40°C.	30°C.
185°C.	115 °C.	30°C.	40°C.	30°C.
150°C.	80 °C.	30°C.	40°C.	30°C.

- 2. Transformers shall be rated by temperature rise as follows:
  - a. Single phase 25 - 167 kVA and three phase 30 - 1500 kVA: 150°C.
  - b. Three phase 3 - 15 kVA: 115 C.
  - c. Single phase up through 250 VA: 55 C.
  - d. Single phase 0.5 - 3.0 kVA: 115 C.

- B. Sound rating shall not exceed ANSI C89 standards for KVA rating. Internal vibration dampening shall be provided. Vibration isolators shall be installed properly torqued at the factory. The torque value shall be permanently indicated on the transformer nameplate or by other label.
- C. Single phase transformers rated up to 15 KVA shall have two, 5 percent full capacity taps below normal rated primary voltage. All other single phase and all three phase transformers shall be provided with six 2-1/2% full capacity taps, two above and four below normal voltage. Transformers shall be connected using the primary tap that produces the secondary output voltage that is closest to rated voltage while the electrical system is energized.
- D. Construction and Enclosures - The core and coils and electrical connections shall be enclosed within a sheet metal enclosure housing providing ventilation and wiring compartment space, and having easily removable wiring compartment panels. The enclosure shall have two suitably sized grounding lugs. Enclosure surface temperature shall not exceed a maximum of 40°C. ambient, at the top of the enclosure, without supplemental cooling devices.
  - 1. Transformers 30 - 1500 KVA: Transformer enclosures shall be open, ventilated, drip-proof. Transformers shall be suitable for floor mounting, unless wall mounting is indicated on the drawings.
- E. Unless otherwise indicated, dry type transformers shall provide 3 phase 4 wire 208Y/120 volt service to designated panelboards or other equipment. Primary rating shall be 480 volts.
- F. Nominal transformer impedance shall be 4.5 percent minimum, unless otherwise indicated on the drawings.
- G. Transformer energy efficiency ratings shall be per applicable NEMA standards.
- H. Core assemblies and the center ground connection point of the coil secondaries shall be grounded to their enclosures by adequate, flexible ground straps. Provide grounding lug at the strap to enclosure bonding location for connection of three conductors; the primary and secondary equipment grounding conductors and the grounding electrode conductor.
- I. Dry type transformer K-factors shall be as indicated on the drawings and as outlined in ANSI C57.110 "Recommended Practice for Establishing Transformer Capability when Supplying Nonsinusoidal Load Currents." Electrostatic shielded isolation transformers shall comply with the requirements of General Purpose Dry Type Transformers, and have the additional features specified herein.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Dry transformers larger than 15 KVA shall be floor mounted, unless wall or suspension mounting is indicated on the drawings. Transformers 15 KVA and smaller shall be wall mounted. Installation shall provide not less than twelve inch clearance from walls, ceilings, or other equipment. Floor mounted transformers shall be mounted on neoprene, waffle type vibration pads 5/8" thick. Where transformers are indicated on the drawings, or specified herein to be mounted on suspended channel systems or wall mounted, transformers shall be bolted to structure with 5/8" thick vibration pad between transformer base and structural surface. Loosen shipping bolts or blocking to free up internal vibration mounts on core and coil assembly.
- B. The secondary windings of each dry type transformer shall be grounded in accordance with the National Electrical Code requirements for separately derived electrical systems. Extend a grounding electrode conductor from the transformer grounding lug to the nearest building structural steel or main column rebar. Connect the primary and secondary feeder equipment grounding conductors to the grounding lug. Refer to the secondary grounding section of these specifications for additional requirements.
- C. Primary and secondary connections to dry type transformers shall be made with flexible conduit. Install secondary overcurrent protective device within 10 feet of conductor length. Where none is indicated on plans, provide enclosed circuit breaker within 10 feet rated at 125 percent of the transformer full load ampacity but not greater than the secondary conductor ampacity.
- D. Locate transformers to provide working clearance, accessibility, and ventilation as required by the National Electrical Code.

### 3.2 CLEANING, ADJUSTMENT, AND IDENTIFICATION

- A. After completion, clean the interior and exterior of dirt, paint and construction debris. Touch up paint all scratched or marred surfaces with factory furnished touch up paint of the same color as the factory applied paint.
- B. Refer to the COMMON WORK RESULTS FOR ELECTRICAL section of these specifications for identification requirements.

### 3.3 FIELD QUALITY CONTROL

- A. Refer to the ELECTRICAL EQUIPMENT ACCEPTANCE TESTING section of this specification.

END OF SECTION 26 2200



**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. The work required under this section of the specifications consists of the furnishing, installation, and connection of lighting and appliance panelboards and distribution type panelboards and accessories.
- B. Panelboards designated as HDA, DA, etc., or indicated on the drawings are distribution type panelboards. Those designated as HA, A, etc., are lighting and appliance type panelboards.
- C. Definitions: The term panelboard, as used in this specification or on the drawings, shall mean the complete assembly including the enclosure, bus work, trim hardware and circuit breaker or fused devices. The words panel and panelboard are used synonymously in these documents.

**1.2 QUALITY ASSURANCE**

- A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
  - 1. Underwriters' Laboratories, Inc. (UL) Publications:
    - a. No. 50 Cabinets and Boxes, Electrical
    - b. No. 67 Panelboards
    - c. No. 489 Molded Case Circuit Breakers and Circuit Breaker Enclosure
  - 2. National Electrical Manufacturer's Association (NEMA) Publications:
    - a. No. PB-1 Panelboards
    - b. No. AB-3 Molded Case Circuit Breakers
  - 3. National Fire Protection Association (NFPA) Publications:
    - a. No. 70 National Electric Code (NEC)
  - 4. National Electrical Contractors' Association (NECA):
    - a. Standard of Installation
- B. Acceptable Manufacturers. Products by the following manufacturers which conform to this specification are acceptable.
  - 1. Eaton
  - 2. General Electric
  - 3. Siemens
  - 4. Square D

**1.3 SUBMITTALS**

- A. Refer to Division 1 specification section "Submittals" for submittal requirements.
- B. Manufacturers Product Data: Submit material specifications and installation data for circuit breakers and Panelboards.

- C. Shop Drawings: Submit shop drawings to indicate information not fully described by the product data to indicate compliance with the contract drawings.
1. Include electrical characteristics and ratings for each panelboard with dimensions, mounting, bus material, voltage, ampere rating, mains, poles and wire connection, and any accessories. Indicate method of ground bus attachment to enclosure.
  2. Include front elevation bussing diagram indicating each bussing circuit breaker position.
  3. Provide a schedule indicating circuit breaker type, trip and size, poles, frame type, and interrupting capacity.
  4. Nameplate identification designation schedule.
- D. Record Drawings. Include in each set:
1. A complete set of panelboard manufacturers product data and shop drawings indicating all post bid revisions and field changes.
  2. A copy of each panelboard directory incorporating all post bid revisions and field changes.

## PART 2 - PRODUCTS

### 2.1 GENERAL MATERIALS REQUIREMENTS

- A. Provide all materials under this section of the specifications.
- B. All panels and circuit breakers shall be UL listed and bear a UL label. Where panel serves as service entrance equipment, panel shall bear a UL label indicating listing as service equipment.
- C. Panels shall be of the dead front safety type.
- D. Provide panels complete with factory assembled circuit breakers connected to the bus bars. Unless shown otherwise on the drawings, position circuit breakers in panelboards with single pole breakers, equally divided, occupying top positions with two and three pole breakers occupying lower positions in the positions shown on the panel schedules or bus diagrams as indicated on the drawings.
- E. Number all panelboard circuits in the following sequence: Circuits No. 1 and 2, Phase A; Circuits No. 3 and 4, Phase B; Circuits No. 5 and 6, Phase C. Connect two pole breakers to phase indicated on the drawings.

### 2.2 MATERIALS DESCRIPTION

- A. Panelboard Bussing and Interiors
1. Main lugs and main breakers shall be UL approved for copper conductors and shall be of a size range for the conductors indicated on the drawings. Each panel shall contain an equipment grounding bus. Each lighting and appliance panelboard shall contain a full size insulated neutral bus. Distribution type panelboard neutral bus shall be insulated and full size, unless otherwise indicated on the drawings.

2. The neutral and ground busses shall have a sufficient number of lugs to singularly terminate each individual conductor requiring a connection.
  3. The ground bus shall be factory brazed, riveted or installed on studs welded or bolted to the panel enclosure or panel frame. The ground bus shall not be attached to the panel interior.
  4. Where designated on panel schedule as "space", include all necessary bussing, device support and connections for installation of future devices compatible with panel. Provide blank cover for each space.
  5. Where indicated, provide sub-feed lugs adjacent to the mains or feed-through lugs opposite the mains and increase box heights to provide additional cable bending and termination space. Lugs shall be the same size and capacity as mains.
  6. Where indicated, insulated ground bus for isolation receptacle grounding shall be solid copper, mounted in panel enclosure on insulated stand off mounts.
- B. Panelboard Enclosures
1. Provide panelboard gutters and bending space at terminals to conform to the National Electrical Code. Wiring gutters shall be oversized if necessary to provide sufficient space for taps, etc., as necessary.
  2. Cabinets shall have full sized single doors. Doors more than 48 inches high shall have three point latching mechanisms.
  3. Door locks shall be provided and shall be chromium plated combination cylinder lock and catch. Key slots shall be in the vertical position when locked. Locks shall be keyed alike and furnished with two keys per lock.
  4. Trims, clamps and hinges on flush mounted 20 or 22 inch wide panelboards shall be completely concealed when the door is closed. Trims shall have adjustable trim clamps and shall not be removable with the door locked.
  5. Panelboard width shall not be less than 20", nor more than 22" unless specific width is indicated on the drawings. Panelboard depth shall not exceed 5-3/4". Distribution panelboard width shall not be less than 31" and the depth shall not exceed 14".
  6. The directory card shall be filled in using a typewriter with circuit wording adequately identifying circuits/loads as indicated, including room numbers. Spares and spaces shall be labeled as such using pencil in a neat and legible printed lettering.
  7. For flush mounted panels, provide concealed captive clamping devices, concealed hinges and lock for all flush mounted panels. Key all panels throughout project alike.
  8. All surface mounted panels shall be provided with door-in-door hinged cover trims. Trims shall be secured by piano hinges to enclosure and secured closed by two trim clamps.
  9. Where two section panels are required, both sections shall have fully rated bus and separate cabinets connected by conduit nipples. Interconnect sections with copper conductors with ampacity equal to rating of main bus. Route phase and neutral conductors together between panels. Provide separate trims and card holder with each section.

10. Where indicated on the drawings or required for the environmental conditions, provide a NEMA 3R/12 enclosure.

C. Panelboard Circuit Breakers

1. Interrupting rating of all circuit breakers in panelboards operating on 208Y/120 volt system shall have UL rating of not less than 10,000 RMS symmetrical amps at system voltage. Panelboards for use on 480Y/277 volt system shall contain circuit breakers with UL interrupting rating of not less than 14,000 RMS symmetrical amps at system voltage. Provide circuit breakers with higher interrupting capacity when indicated on the drawings.
2. Series Ratings: Lighting and appliance panels and associated circuit breakers tested and listed in accordance with UL 67 and bearing an integrated short circuit rating shall be acceptable where system designs call for short circuit ratings of 65,000 AIC at system voltages. Note that series-rating may be with upstream fuses or circuit breakers. Provide evidence of series rating with shop drawing submittals. Provide permanently mounted plaque on panel labeled as follows: "CAUTION: Replace circuit breakers with devices rated 65kAIC only."
3. Circuit breakers shall be provided with trip rating, poles and minimum interrupting rating as indicated on the drawings or specified herein.
4. Multi-pole breakers shall be common trip and common reset; tie handle connection between single pole breakers is not acceptable.
5. Branch circuit breakers in lighting and appliance panels shall be quick-make, quick-break, thermal magnetic type bolted to the bus. Circuit breakers in distribution type panelboards shall be bolted to the bus.
6. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips.
7. Circuit breakers serving multi-motor equipment such as roof top units, compressor racks, etc.; or where required by equipment manufacturer, provide HACR type breaker.
8. Provide the following special devices and accessories when indicated on the drawings, specified herein, or required by the NEC.
  - a. Ground fault interrupting circuit breaker (GFI).
  - b. Provide handle lock-off device to prevent manually turning off device without removal. Install on all circuit breakers serving exit lighting, egress lighting, fire alarm system, security system, communications system, refrigeration equipment, and indicated on the panel schedules.
  - c. Provide UL listed "SWD" switching duty circuit breakers on the devices serving unswitched lighting loads, or where indicated on the drawings.
  - d. Provide shunt trip device for electrically tripping circuit breakers where indicated on the drawings. Shunt trip shall be for operation on a 120V source and have integral coil clearing contacts to de-energize coil after operation. Connect shunt trip to circuit indicated on the drawings.

- D. Separately enclosed molded case circuit breakers: Where separately enclosed molded case circuit breakers are shown on the drawings, provide circuit

breakers in accordance with the applicable requirements of those specified for panelboards.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Panelboards shall be mounted with the top of cabinet or enclosure 6'-6" above the finished floor, but with bottom of cabinet not closer than 6 inches to the floor.
- B. Lace and group conductors installed in panels with nylon tie straps. Only one conductor shall be installed under terminal of individual circuit breakers. Form and train conductors in panel enclosure neatly parallel and at right angles to sides of box. Uninsulated conductor shall not extend beyond one-eighths inch from terminal lug.
- C. Do not splice conductors in panels. Where required, install junction box adjacent to panel and splice or tap conductors in box. Size box in accordance with conductor conduit limitation requirements of the National Electrical Code as defined in the Wires and Cables section of the specifications.
- D. Mounting and Support
  - 1. Mounting: Enclosures shall be mounted where indicated on the drawings or specified herein. Support from the structure with fastening device specified.
    - a. Enclosure shall be secured to structure by a minimum of four (4) fastening devices. A 1.5" minimum diameter round washer shall be used between head of screw or bolt and enclosure.
    - b. Attach enclosure directly to masonry, concrete, or wood surfaces.
    - c. Mount enclosure on metal channel (strut), which is connected to structure with fastening device specified, for installations on steel structure or sheet rock walls.
- E. Conductors not terminating in panelboard shall not extend through or enter panel enclosure.
- F. Typewritten circuit directory mounted on interior of panel door shall reflect any field changes or additions.
- G. The trim covers of all flushed mounted panelboards shall be field painted. Refer to the Painting section of the specifications. Do not paint locks and exposed trim clamps.
- H. Install six 3/4" empty conduits from each flush mounted panelboard into an accessible ceiling cavity.
- I. Install push-in knock-out closure plugs in any unused knock-out openings.

- J. Identification: Panelboards and individually mounted circuit breakers shall be identified. Refer to the BASIC ELECTRICAL REQUIREMENTS section of these specifications for identification requirements.
- K. Where isolated ground receptacles are indicated, provide an isolated ground bar in the appropriate panel. Only one wire shall be terminated per a terminal lug.
- L. Where new circuit breakers are installed in existing panels, confirm that the new breaker is securely mounted to the existing panel interior before energizing.

### 3.2 CLEANING AND ADJUSTMENT

- A. After completion, clean the interior and exterior of dirt, paint and construction debris.
- B. Touch up paint all scratched or marred surfaces with factory furnished touch up paint of the same color as the factory applied paint.
- C. Adjust and align panelboard interior and trim in accordance with manufacturers recommendations, and to eliminate gaps between the two.

### 3.3 FIELD QUALITY CONTROL

- A. Contractor shall verify in the field that all factory-made connections and terminations are torqued to manufacturer's recommended tolerances.
- B. Coordination: Coordinate installation with architectural and structural features, equipment installed under other sections of the specifications and electrical equipment to insure panel access and insure that clearance minimums are provided.
- C. Refer to the ELECTRICAL ACCEPTANCE TESTING section of this specification.

END OF SECTION 26 2416

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. The work required under this section of the specifications consists of the installation of wiring devices, i.e. switches, receptacles, and device plates. All materials shall be provided under this section of the specifications.
- B. The catalog numbers listed herein for switches and receptacles are not intended to represent finish color of device. Regardless of catalog numbers, the switches and receptacles provided on this project shall have finish color as selected by the Owner's Representative, unless otherwise indicated. All special purpose receptacles shall be provided in black finish.

**1.2 QUALITY ASSURANCE**

- A. The following standards are incorporated into and become a part of this specification by reference:
  - 1. NEMA WD-1 General Purpose Wiring Devices
  - 2. NEMA WD-5 Specific Purpose Wiring Devices

**1.3 ACCEPTABLE MANUFACTURERS**

- A. The manufacturers' catalog numbers listed herein for switches and receptacles are not intended to represent the only available source of the device, they are intended to establish a level of quality. Devices as manufactured by the following which comply with this specification are acceptable, unless otherwise indicated:
  - 1. NEMA configuration:
    - a. Arrow Hart
    - b. Eagle
    - c. General Electric
    - d. Hubbell
    - e. Pass & Seymour

**PART 2 - PRODUCTS****2.1 SWITCHES**

- A. Select switches from the following:
  - 1. Single pole, 20 amp 120/277 volt switch: Hubbell 1221/3/4 series
  - 2. Incandescent Dimmer, 120V: Lutron N-series, selected to exceed the connected load
  - 3. Weatherproof, 20 amp 120/277 volt switch: Hubbell 1281/3 series
  - 4. Single pole, 20 amp 120/277 volt key switch: Arrow Hart 1191/3 series
  - 5. Single pole, 20 amp 120 volt switch, pilot light in handle: Arrow Hart 2999 series.
  - 6. Switch in narrow door jamb: Arrow Hart QST series

## 2.2 RECEPTACLES

- A. Select general purpose receptacles from one of the following:
1. 20 amp, 125 volt grounded duplex receptacle (NEMA 5-20R): Hubbell 5362
  2. Clock receptacle (NEMA 5-15R): Arrow Hart 5708
  3. Ground Fault Interrupter (GFI) 20 amp, 125 volt duplex receptacle: Hubbell GF-5362. GFCI receptacles shall be flush mounting, straight blade, rated 125 volts, and 15 amperes, unless otherwise indicated. Receptacles shall have a self-grounding mounting strap feature. Wiring terminal screws shall be brass metal. Ground Fault circuit Interrupted (GFCI) receptacles shall be U.L. listed as providing protection for personnel against line-to-ground shock hazard. The GFCI device shall continuously monitor current in the phase and neutral conductors and shall interrupt the circuit for a current differential of more than 5mA to the outlet(s). The device shall be solid state with test button and indicator, a reset button, labeled and with printed instructions. The GFCI receptacle shall be the end-of-line type

## 2.3 DEVICE PLATES

- A. Device plates shall be one piece single or multi-gang type selected to match the device or combination of devices. Device plates for flush mounted devices shall be Type 302 stainless steel unless indicated otherwise. Provide tamper proof screws where indicated.
1. Device plates for use with flush devices shall be jumbo type. Device plates for surface mounted devices shall be for use with the type of outlet box in which the device is mounted. All devices installed in areas exposed to the weather and where indicated on the drawings shall be provided with a weatherproof device plate.
  2. Areas identified as wet locations or defined as wet locations by NEC 100 or as designated as weatherproof ("WP") on the drawings shall have a weatherproof enclosure listed as weatherproof when in use.

## 2.4 SPECIAL PURPOSE RECEPTACLES

- A. Special purpose receptacles shall be of the type indicated by either NEMA designation or other designation shown on the drawings. Furnish one matching plug for the Owner's use with every special purpose receptacle indicated.

## 2.5 ATTACHMENT PLUGS AND CONNECTORS

- A. Attachment plugs shall be U.L. listed and shall have the following basic features: Dead-front construction, back-wired, Heavy duty, solid brass blades with standard end of blade located detent hole, Solid brass terminal screws, Cord grip, Grounding blade.

## 2.6 ISOLATED GROUND (IG) RECEPTACLES

- A. Isolated ground receptacles shall be standard line style, flush mounting, straight blade, rated 125 volts, and 15 amperes unless otherwise indicated,



with mounting straps fully insulated from the grounding path created through metal wall boxes. Such receptacles shall be identified by orange-colored faces and shall be grounded only through their grounding terminal screws or grounding lead. Receptacles shall be flush mounting. Wiring terminal screws shall be brass metal.

## 2.7 EMERGENCY POWERED DEVICES

- A. Emergency devices shall be red color. Label device plate with panel and circuit number in 1/8" high letters on a red nameplate.

## 2.8 FLOOR MOUNTED RECEPTACLES AND COMMUNICATIONS OUTLETS

- A. Floor mounted outlets shall include the devices indicated on the drawings as shall be as manufactured by FSI, Inc., Hubbell, Steel City, or Walker/Wiremold. Fittings shall have a base-plate that allows a 3/4-inch adjustment to either side of center.
- B. Cover plates shall be provided for each device furnished or installed. Cover plates and devices shall be of matching finish, unless otherwise specified or indicated.
- C. Devices shall be mounted recessed for flush installations, unless otherwise indicated.
- D. Refer to CONDUITS AND BOXES specification section.

## PART 3 - EXECUTION

### 3.1 GENERAL INSTALLATION

- A. Unless otherwise indicated or directed by the Owner's Representative, wiring devices shall be installed in a vertical orientation with center-of-box distances from finished floors as indicated in the drawings and between 18 and 48 inches, to meet handicapped access requirements. Device outlets in concrete block, brick or tile shall be above or below a joint such that the center-of -box is between 18 and 48 inches.
- B. Review Architectural Drawings for any device requiring specific location or mounting height. Install devices above countertops with major axis horizontal above the backsplash. Receptacles above counter tops shall be installed with top-of-box at 12 inches above the counter and with bottom of box above any splash plate. Other special mounting height devices shall be installed as indicated or required. Devices indicated located in the same approximate position on one section of wall, floor, column, etc. shall be grouped to create a functional and pleasing appearance. Similar outlet groups throughout the job shall be similarly grouped. Unless indicated otherwise, groups shall be developed as follows where applicable:
  - 1. Devices at different levels shall be aligned vertically.
  - 2. Devices at the same level shall, where possible, be grouped using sectional gang boxes.

3. Devices or device groups occurring in architectural features, i.e., wall sections, etc. shall be accurately centered in the feature(s), unless indicated or functionally required otherwise.
  4. Wall switches shall be located on the strike side of a door, six (6) inches from the door opening, unless otherwise functionally required or indicated.
- C. Device Plates:
1. Cover plates for flush, dry, ordinary locations shall be standard configuration, one piece standard size plates with matching screws, unless otherwise indicated.
  2. Wall cover plate styles, material and finishes shall be as scheduled by the plans.
  3. Cover plates with labeling shall be the engraved type, unless otherwise indicated.
  4. Unless indicated otherwise, wall cover plates shall be the device strap mounting type.
  5. Cover plate mounting screws shall be tightened to a snug tension and aligned with any screw slot in a vertical position.
- D. Furnish and install suitable attachment plugs for installed equipment not provided with appropriate plug(s). Where attachment plugs are furnished but are for any reason not suitable, remove the plugs and/or cord and replace same with suitable devices and cord. Attachment plugs shall be the straight body, dead-front grounding type, unless otherwise indicated or required.
- E. Install a green insulated bonding jumper between receptacles and grounded outlet boxes, and provide other grounding per the requirements of the GROUNDING section. Where provided, isolated ground receptacles shall be grounded only through their isolated grounding means, with grounding connection (bond) only at the separately derived electrical source. Raceways with wiring for such devices shall be metal and effectively grounded to the equipment and enclosure grounding system for the building.

END OF SECTION 26 2726

## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The work required under this section of the specifications consists of the furnishing, installation, and connection of a transient voltage surge suppression system (TVSS) for use on an electrical distribution system rated 600 volts or less. These specifications describe the electrical and mechanical requirements for a high-energy suppression system for high exposure applications as defined in ANSI/IEEE C62.41 Category A, B, and C3 environments.

## 1.2 QUALITY ASSURANCE

- A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
1. Underwriters' Laboratories, Inc. (UL) Publications: UL 1449-1998 (including August 1998 revisions) and UL-1283
  2. National Electrical Manufacturers' Association (NEMA) Standard LS 1-1992
  3. Institute of Electrical and Electronics Engineers (IEEE) Standards: 142, 518, and 1100.
  4. American National Standards Institute (ANSI) Standards: C62.11, C62.41, and C62.45
  5. National Electrical Contractors' Association (NECA): Standards of Installation
  6. Federal Information Processing Standards Publication 94 (FIPS PUB 94)
- B. Acceptable Manufacturers. Products by the following manufacturers which conform to this specification are acceptable:
1. Current Technology
  2. Rayvoss
  3. Liebert
  4. United Power
  5. Advanced Protection Technologies
  6. Siemens
- C. Enhanced Equipment Warranty. In addition to the project Warranty described elsewhere in these specifications, the TVSS manufacturer shall provide an unconditional Three/Five Year Warranty against failure of the unit when installed in compliance with these specifications and the manufacturer's Installation, Operation, and Maintenance instructions.

## 1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.4 SUBMITTALS

- A. Refer to COMMON WORK RESULTS FOR ELECTRICAL for submittal requirements.
- B. Provide the following:
  - 1. Equipment Manual. The manufacturer shall furnish an equipment manual with installation, operation, and maintenance instructions for the specified unit.
  - 2. Drawings. Electrical and mechanical drawings shall be provided by the manufacturer which show unit dimensions, weights, mounting provisions, connection details, internal wiring diagrams, and layout diagram of the unit.
  - 3. UL 1449 Suppression Ratings. Documentation of unit's UL 1449 suppression rating shall be included as required product data submittal information.
  - 4. Life Expectancy Testing. The unit shall be life-cycle tested to protect against and survive at least 2,500 ANSI/IEEE C62.41-1991 Category C3 20kV, 10kA surges without failing or degrading the UL 1449 Surge Suppression Rating by more than 10%.
  - 5. End of Life Testing. The unit shall be tested to meet the requirements of the August 1998 revision of UL-1449 regarding end-of-life testing.
  - 6. MCOV Testing. The unit shall be factory-tested and burned-in at the applicable MCOV for a minimum of one (1) hour.

## PART 2 - PRODUCTS

### 2.1 GENERAL MATERIALS REQUIREMENTS

- A. Provide all materials under this section of the specifications. The specified unit shall provide effective high energy transient voltage suppression, surge current diversion, high frequency attenuation and line control for all electrical modes of equipment connected downstream from the facility's main overcurrent device. The unit shall be connected in parallel with the facility's wiring system.

### 2.2 MATERIALS DESCRIPTION

- A. Characteristics
  - 1. Operating Temperature. Operating temperature range shall be 30 to 120 degrees F.
  - 2. Relative Humidity. Operation shall be reliable in an environment with 5% to 95% non-condensing relative humidity.
  - 3. Operating Altitude. The unit shall be capable of operation in altitudes up to 13,000 feet above sea level.
  - 4. Audible Noise. The unit shall not generate any audible noise.
  - 5. Magnetic Fields. No appreciable magnetic fields shall be generated. Unit shall be capable of use directly in computer rooms in any location without danger to data storage systems or devices.
  - 6. Unit Operating Voltage. The nominal unit operating voltage and configuration shall be as indicated on the drawings. Provide units

- suitable for protection of three phase, neutral, and ground unless otherwise indicated.
7. Maximum Continuous Operating Voltage (MCOV). The maximum continuous operating voltage (MCOV) of all suppression components utilized in the unit shall not be less than 115% of the facility's nominal operating voltage.
  8. The operating frequency range of the unit shall be 47 to 63 Hertz
  9. Protection Modes. In accordance with NEMA Standard LS 1-1992, the unit shall provide protection in seven modes:
    - a. Phase-to-Neutral (for all three phases)
    - b. Phase-to-Ground (for all three phases)
    - c. Neutral-to-Ground
  10. Tested Single-Pulse Surge Current Capacity. Based on ANSI/IEEE C62.41-1991's standard 8 x 20 microsecond current waveform, and in accordance with NEMA Publication No. LS 1-1992, the tested single-pulse surge current capacity, in amps, of the unit shall be no less than as indicated:
    - a. Phase-to-Neutral (for all three phases) - 200,000 amperes
    - b. Phase-to-Ground (for all three phases) - 200,000 amperes
    - c. Neutral-to-Ground - 100,000 amperes
    - d. The unit's published performance ratings shall be the UL 1449 Listed suppression ratings. The UL 1449 suppression rating shall be, for each mode of protection, as follows:  
120/208V: 400V without disconnect, 500V with fused disconnect.
- B. Unit Construction
1. The unit shall be thoroughly factory-tested before shipment. Testing of each unit shall include but shall not be limited to UL manufacturing and production-line tests, quality assurance checks, MCOV and clamping voltage verification tests.
  2. The unit shall include an engineered solid-state high-performance suppression system, utilizing a combination of either selenium cells or silicon avalanche diodes and arrays of fused non-linear voltage dependent metal oxide varistors with similar operating characteristics.
  3. All internal wiring associated with the suppression filter system and subject to surge currents shall utilize low-impedance copper bus bar and/or #8 AWG copper conductor or larger. All internal connections associated with the suppression/filter system and subject to surge currents shall be made with compression solderless-type lugs and shall be bolted to the bus bars in order to reduce overall system impedance. No plug-in component modules, quick-disconnect terminals, non-field replaceable fusing, or printed circuit boards shall be used in surge current-carrying paths.
  4. The unit shall include mechanical lugs for each phase, neutral and ground, if applicable.
  5. The unit shall include solid-state, long-life, externally mounted LED visual status indicators that monitor the on-line status of each phase of the unit.

6. Standard surface-mounted units shall be provided in a NEMA 1 type enclosure. Dimensions shall not exceed the available space shown on the drawings.
7. The unit shall include an integral fused and safety interlocked disconnect switch located in the unit enclosure with an externally mounted manual operator. The switch shall disconnect all ungrounded circuit conductors from the distribution system to enable testing and maintenance without interruption of power to the facility's distribution system. The switch shall be rated for 600 V. Each current-carrying ungrounded circuit conductor connected to the facility's distribution system shall be individually fused with 200,000 AIC rated fuses in order to provide maximum fault current protection. The unit shall be UL 1449 Listed with the integral fused disconnect switch and the UL 1449 Suppression Rating for this configuration shall be provided. (1.4.6 Performance Ratings).
8. The unit shall include Form C dry contacts (N.O. or N.C.) to facilitate connection to a building management system in order to monitor the on-line status of the unit. The contacts shall be normally open or normally closed and shall close or open upon failure of the suppression system and/or fuse.
9. The unit shall include disturbance counter(s). The Disturbance Counters shall utilize self-contained lithium batteries with a nominal life of ten (10) years. Reset function shall be secure.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install unit adjacent to panelboards as indicated on the drawings. Coordinate installation with architectural and structural features, equipment installed under other Divisions, and other Division 16 equipment to ensure that required working clearance minimums are maintained. Connect terminals with copper 600V conductors, #8 AWG, as indicated on the drawings. Connect to phase terminals of three-pole circuit breaker indicated (or, if no circuit breaker is indicated, drill and tap bus and provide integral unit fusible disconnect), connect to panel neutral bus, and connect to panel ground bus.

#### 3.2 FIELD QUALITY CONTROL

- A. Upon completion of installation, and after circuitry has been energized with power source, demonstrate operation. Correct malfunctioning units at site, then retest to demonstrate compliance.

END OF SECTION 26 4313

## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The work required under this section of the specifications consists of the provision of all lighting fixtures for the project, including mounting hardware, poles, and lamps.
- B. Provide complete lighting systems, including luminaires, controls, indicators, power and control wiring, ceiling reinforcements, mounting supports, hardware and other items as specified, noted by the plans, required for operation, or otherwise indicated.
- C. Provide for network lighting controls interface of existing building automation system (BAS) with lighting circuits installed in building addition. Existing BAS is as manufactured and installed by Automatic Logic Controls (ALC). Provide for all hardware and wiring to allow control of lighting circuits via low voltage Class 2 lighting control relays and modular lighting contactors. Provide for low voltage local override switches in areas as indicated on plans to provide local override control of corridor lighting.
- D. See Division 23 Section "Building Automation System " for interface of lighting control devices for additional requirements for integration of lighting controls functions of that Section into lighting system.

## 1.2 QUALITY ASSURANCE

- A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
  - 1. Underwriters' Laboratories, Inc. (UL) Publications applicable to lighting fixtures.
  - 2. National Electrical Manufacturers' Association (NEMA) Standard Publications LE 1 and LE 2 pertaining to lighting equipment.
  - 3. National Fire Protection Association (NFPA) Publications NFPA-70 and NFPA-101 pertaining to lighting fixtures.
  - 4. American National Standards Institute (ANSI) / Illuminating Engineering Society (IES) Standard ANSI 132.1 pertaining to interior lighting fixtures.
  - 5. National Electrical Contractors' Association (NECA) Standards of Installation.
  - 6. American Society of Testing Materials (ASTM).
  - 7. American Association of State Highway Transportation Officers (AASHTO).
- B. Acceptable Manufacturers.
  - 1. Lighting Fixtures: The drawings indicate lighting fixture selections by referencing one or more fixture manufacturers and product catalog numbers for each type. The fixtures were used as the basis of design. Products of the following manufacturers may be submitted for evaluation by the Architect/Engineer in accordance with any applicable Division 0 or Division 1 requirements. Fixture submittals must provide adequate information to show equivalence, including but not limited to,

photograph or isometric drawing of fixture, photometric data, dimensional data, optional features listing, and information on construction, type of finish, etc.

- a. Thomas
  - b. Lithonia
  - c. Cooper
  - d. Hubbell
2. Lamps: Products of the following, which comply with these specifications, are acceptable.
    - a. General Electric
    - b. Venture
    - c. Osram-Sylvania
    - d. Philips
  3. Ballasts: Products of the following, which comply with these specifications, are acceptable.
    - a. Advance
    - b. Roberts
    - c. Universal
  4. Poles: Products of the following, which comply with these specifications, are acceptable.
    - a. General Electric
    - b. Valmont
    - c. Millerbernd
    - d. Union Metal
    - e. Holophane
  5. Controls: Products of the following, which comply with these specifications, are acceptable.
    - a. Lutron
    - b. Leviton
    - c. Wattstopper
- C. Verification: Verify with fixture manufacturers that scheduled fixture descriptions and catalog numbers are in agreement and complete, and that fixtures are furnished with the proper trims, frames, supports, hangers, and other miscellaneous appurtenances to properly coordinate with the project requirements as indicated and by actual ceiling systems to be installed.

## PART 2 - PRODUCTS

### 2.1 GENERAL MATERIALS REQUIREMENTS

- A. Provide all materials under this section of the specifications.

### 2.2 MATERIALS DESCRIPTION

- A. General:
  1. Fixtures shall be listed and labeled by Underwriter's Laboratories (UL) or assembled from UL labeled components.
  2. Factory Assembly and Test: Fixtures shall be fully assembled and wired by the factory and ready for installation as shipped.



3. Fixture supports and hardware shall be suitable metal unless otherwise indicated. Support studs used for indoor fixture or component support shall be galvanized steel or malleable iron; diecast studs shall not be used.

B. Poles:

1. All poles and standards shall be supplied with base covers and/or nut covers.
2. Concrete bases and pedestals are not a portion of this specification. Refer to the Concrete section of this specifications.
3. Where lighting poles are specified with a prime or paint finish, the interior of the pole shall be completely finished with a rust-inhibiting finish.
4. Where poles are specified with a finish coat of paint, the finish coat shall be a minimum of 2 mils thick. Each pole shall be individually wrapped with a Kraft type paper prior to shipment to the job site.
5. All anchor bolts and nuts shall be galvanized in accordance with ASTM-A153.
6. Where poles are vertically seamed and welded the weld shall be ground smooth so as not to be readily visible.
7. Aluminum poles: Where lighting poles are specified with a painted finish the pole shall be coated with zinc chromate primer or acid etched prior to painting. Base plates, handhole covers and all welds shall be coated with zinc chromate primer prior to painting.
8. Poles and standards shall be manufactured from steel/aluminum having the following minimum yield strengths:

		Steel	Aluminum	Highmast
a.	Pole Shaft	55,000 psi	6063-T6	65,000 psi
b.	Base Plate	36,000 psi	356-T6	60,000 psi
c.	Anchor Bolts	55,000 psi	55,000 psi	105,000 psi
d.	Pipe Tenons	35,000 psi	6063-T6	

C. Ballasts:

1. Ballasts shall be suitable for operation on 60 hertz branch circuits protected at 20 amperes. Ballasts shall be rated for the voltage and circuiting indicated for each fixture type. Generally, fluorescent ballasts shall be high power factor, with sound rating "A", and with class "P" integral thermal protection having automatic reset feature. Ballasts shall be UL labeled.
2. Ballast manufacturer shall warrant ballasts to be free from defects in material or workmanship for at least five (5) years from date of manufacture under normal conditions of use. Any ballast failing within the guarantee period shall be replaced by the manufacturer at no expense to the Owner.
3. Unless otherwise indicated, ballasts for HID fixtures shall be the constant wattage, high power factor, encapsulated typed. Ballasts for outdoor locations shall be designed for cold starting at -20°C. High pressure sodium ballasts shall be auto regulator type with minimum power factor of 0.92.
4. Electronic ballasts shall:

- a. Be provided with documentation showing that manufacturer has at least ten (10) years' experience manufacturing electronic ballasts with a documented failure rate of less than 5 percent of units in service.
  - b. Be specifically designed to operate rapid-start T8 lamps, unless otherwise noted.
  - c. Be electronic type and operate lamps at a frequency above 20 kHz from an input of 60 HZ.
  - d. Consistently start and operate lamps (with a light output which does not vary) from a supply voltage of plus or minus 10 percent about the center design voltage of 120 or 277 volts.
  - e. Provide installed light level equivalent to C.B.M. certified electromagnetic ballast (plus or minus 5 percent).
  - f. Be capable of operating remaining lamp(s) if one or more of the companion lamps fail or are removed.
  - g. Comply with A.N.S.I. and I.E.E.E. standards for total harmonic distortion (THD). THD shall be less than 20%.
  - h. Have input power factor greater than or equal to 92% (.92).
  - i. Provide starting sequence consistent with lamp manufacturers' recommendations and provide full rated lamp life.
  - j. Have lamp current crest factor (ratio of peak to R.M.S. lamp current) of 1.5 or less per lamp manufacturers' recommendation.
  - k. Comply with F.C.C. requirements governing electromagnetic and radio frequency interference.
  - l. Comply with I.E.E.E. standards for line voltage transient protection.
  - m. Be compatible with occupancy sensors specified, where applied.
- D. Lenses: Plastic lenses shall be manufactured and tested to conform with SBC 2604 "Light-Transmitting Plastics & NFPA 101 Chapter 6. Lenses shall meet all of the following:
1. Fall from their mounting at an ambient temperature of at least 200 degree F(93 degree C) below the ignition temperature of the plastic material as measured by ASTM D 1929.
  2. Remain in place at ambient room temperature of 175degree F(79 degree C) for a period of not less than 15 minutes.
  3. The maximum length of any single plastic panel shall not exceed 10 ft(3048mm) and the maximum area of any single light diffuser shall not exceed 30 sq ft (2.8 sq m)
- E. Lamps: Unless otherwise indicated, linear fluorescent lamps shall be rapid-start, T8, 3500K white, CRI of 75 or greater. Compact fluorescent lamps shall be 2700K-3000K white, with tube configuration as indicated. Incandescent lamps shall be coated. Metal halide and high pressure sodium lamps shall be clear, with burning position coordinated with fixture. Metal halide lamps in non-lensed fixtures shall have self-extinguishing feature.
- F. Fixtures:
1. Fluorescent:

- a. Fixtures shall be suitable for individual or continuous row installation. Fixtures installed in continuous rows shall maintain nominal spacing.
  - b. Fixtures shall be listed and labeled for their intended application on the project. Fixtures shall be suitable for indoor locations, or for outdoor locations where indicated. Fixture housings shall be metal finished with high gloss baked white enamel of 85% minimum reflectance. Reflectors shall be highly specular. Ballasts and wiring shall be totally enclosed. Fixtures for indoor dry or damp locations may have steel or aluminum housings. Fixtures for outdoor or wet locations shall have aluminum or nonmetallic housings.
2. Incandescent:
    - a. Fixtures shall be suitable for connection to 120 volts, 60 hertz, single phase distribution systems.
    - b. Unless otherwise indicated, recessed mounted incandescent fixtures shall have thermal overload protection to protect against overheating. Fixtures installed in direct contact with insulation shall also be rated for such direct contact.
- G. Occupancy Sensors: Occupancy sensors shall:
1. Be motion detectors that provide coverage without gaps within the detection area.
  2. Be specifically designed to detect types of motion found in offices, conference rooms, classrooms, bathrooms, etc.
  3. Have crystal controlled operating frequency to within 0.005 percent. Sensors shall be available with different operating frequencies to allow individual control of adjacent areas.
  4. Have field adjustable controls for "sensitivity" and "time delay." Timing circuitry shall provide user adjustable "time of light off" delay from 0.5 to 12 minutes.
  5. Provide constant coverage after sensitivity control has been set.
  6. Be U.L. listed.
  7. Be provided with an easily visible indicator light to verify that motion is being detected.
  8. Be specifically designed for the size of the area in which they will be used.
  9. Operate on Class 2 wiring when used in conjunction with a switch pack (ceiling mounted units).
  10. Operate silently, except when actually switching the load.
  11. Withstand the inrush of power required to start the lamp. The sensor shall be designed for use with the ballast supplied.
  12. Be provided with a manual override switch in the sensor to allow the load to be turned on without tools in the event of a Sensor failure.
  13. Have electronics which shall be replaceable, upon failure, without disturbing the hardwiring or Sensor mounting.
- H. Lighting Control Relays:
1. Electrical contractor shall provide quantities of Class 2 lighting control relays as required to control lighting branch circuits indicated on the drawings.

2. Class 2 lighting control relays shall be individually UL and CUL listed and shall bear labels indicating compliance.
  3. Class 2 lighting control relays shall be designed and tested to have a minimum cycle life of 200,000 ON/OFF cycles @ FULL LOAD and 1,000,000 ON/OFF cycles at no load.
  4. Class 2 lighting control relays shall be designed for control of 120, 277 or 347 VAC lighting control circuits at a full 20 AMPS and motor loads of 1 Hp @ 120 VAC.
  5. Class 2 lighting control relays shall be designed with a magnetic latching mechanism that shall hold the relay in its last activated state indefinitely, with no change of state during an interruption of power. Solid state or electrically held relays are not acceptable.
  6. Each Class 2 lighting control relay shall contain an auxiliary set of contacts (rated at 1 AMP 30 VAC) electrically isolated but mechanically linked to the main contacts for the purpose of true status monitoring and pilot light activation.
  7. Relays shall be capable of panel remote mounting up to 2,500 feet from the controlling device. Controlling device shall be existing building automation system (BAS).
- I. 20 Amp 2 Pole Contactors:
1. Electrical contractor shall provide quantities of 20 AMP 2 pole contactors as indicated on the drawings and schedules as specified herein.
  2. 20 AMP 2 pole contactors shall be individually UL and CUL listed and shall bear labels indicating compliance.
  3. 20 AMP 2 pole contactors shall be designed for the control of 208, 240 and 480 VAC loads at a full 20 Amps.
  4. Poles within the contactor shall be electrically isolated but mechanically linked so as to open and close together without the possibility of one pole being closed while the other remains open. Systems that utilize two single-pole relays to accomplish this function are not acceptable.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Fixtures shall be installed in accordance with UL listing restrictions and local codes and ordinances.
- B. Fixtures shall be located in a manner coordinated with any suspended acoustic ceiling pattern, and in accordance with patterns as shown on the Architectural Drawings.
- C. In areas of acoustic tile ceiling, centerlines of incandescent and fluorescent fixtures shall coincide with tile centerline or joint, unless otherwise indicated.
- D. Lighting fixtures shall be properly and rigidly supported and aligned. Fixtures shall be supported independently of the ceiling support framing, except where framing is not smaller than 1-1/2-inch trade size channel or inverted tee and

approval for support of the specific category of fixture is given in writing by the Owner's Representative.

- E. Fixture supports shall be standard type bar hangers, or other accepted method. Lay-in type troffers shall be secured to the ceiling support frame by an earthquake clip similar to Caddy #515/515A.
- F. Plaster rings shall be provided for recessed fixtures in plastered ceilings of any type.
- G. Fixtures above accessible type suspended grid ceilings shall be wired with flexible metal conduit to a nearby junction box. The flexible conduit shall be between four and six feet in length, unless otherwise required by Code.
- H. Any fixtures requiring complete installation prior to installation of the ceiling shall be identified by the Contractor and so installed.
- I. Verify that only lamp types approved by the fixture manufacturer are installed in fixtures.
- J. Verify the final ceiling opening dimensions required as recommended by the manufacturer and shall provide for installation to these dimensions.
- K. Verify that fixtures, including wiring and service access methods, are acceptable to the local inspecting authorities having jurisdiction.
- L. Fixtures shall have metal parts, glassware, plastic diffusers, etc. free from scratches, chips, cracks, and other defects.
- M. Poles:
  - 1. Where lighting poles are installed with anchor bolts, the area between the pedestal and the base plate shall be grounded and smoothed after the pole has been leveled.
  - 2. The design and specification of concrete anchor bases and pedestals is not a portion of this specification, drawings of anchor bases or pedestals are for conduit detail only.
  - 3. Provide one pint of touch up paint with the poles.
  - 4. When the handhole in the base of the pole is not of sufficient size to allow the splicing of branch circuiting as indicated on the drawings in accordance with NEC fill requirements, then a weather-proof junction box shall be installed flush with finished grade adjacent to the pole. Extend only the conductors required for the adjacent pole from the junction box to the handhole in the pole base. The junction box shall be provided in accordance with the CONDUITS AND BOXES section of these specifications.
- N. Lighting Control Relays and Contactors:
  - 1. For lighting branch circuits shown on the drawings, the contractor shall furnish and install lighting controllers of the quantities, sizes and types shown on the drawings or specified herein.
  - 2. All equipment shall be installed in accordance with manufacturer requirements, existing building automation system (BAS) requirements

and in compliance with all applicable local and national codes and requirements.

3. Install control relays and contactors in common NEMA 1 enclosure with hinged, lockable, cover. Provide with barrier between line voltage and low voltage components. Provide directory on inside cover indicating lighting circuits controlled and interface points with building automation system.
4. Install low voltage override switches at locations shown on the drawings.

### 3.2 FIELD QUALITY CONTROL

- A. Upon completion of installation of fixtures, and after circuitry has been energized with power source, verify operation of all fixtures, lamps, and associated controls. Correct malfunctioning units, then retest to demonstrate compliance.

END OF SECTION 26 5100

**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 27

COMMUNICATIONS





## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. This section includes furnishing and installing all materials and providing all labor and supervision pertaining to Voice\Data wiring systems and associated components.

## 1.2 QUALITY CRITERIA AND STANDARDS

- A. Voice\Data wiring, devices, and equipment shall comply with applicable UL, NEC, and NEMA standards and requirements and shall be UL-listed and labeled.
- B. Voice\Data wiring systems shall conform to established trade and industry standards.

## 1.3 ADDITIONAL REQUIREMENTS

- A. The Contractor must be licensed in the State of Georgia as a Low Voltage Telecommunications (LV-T) or Low Voltage Unlimited (LV-U) class certification.
- B. The Contractor must show proof of employing a registered R.C.D.D. (Registered Communications Distribution Designer) staff member who will be on site to oversee and coordinate the data communications installation with the owner's project superintendent.
- C. If requested, the Contractor must show proof of being in the low voltage Data Communication trade for a minimum of three years and provide three (3) references with contact names and telephone numbers regarding successful completion of Data Communication projects.
- D. All participants in any network-wiring project must be Siemon certified. In addition all patch panels, data outlets, fiber connectors and other hardware items must be manufactured by the Siemon's company.
- E. These cabling specifications apply to all construction projects. Where renovations are done and existing equipment is replaced, testing of the entire network at the facility must be performed in accordance with these specifications to ensure continuity between existing and new construction.
- F. A pre-construction meeting involving the data cabling contractor and FCBE Technology Services shall be stipulated in the project manual.
- G. Periodic meetings and site visits should be conducted during the installation of all cabling systems.
- H. A post-construction meeting involving the data cabling contractor and FCBE

Technology Services shall be stipulated in the project manual.

- I. All products must be purchased from an authorized distributor of each manufacturer.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Horizontal Cable - Balanced twisted-pair also referred to as unshielded twisted-pair (UTP):
  1. 23 AWG/4 pair - UTP Cable must be manufactured by CommScope
  2. Jacket color - Pink
  3. Category 6
  4. CMP or CMR flammability rating as determined by local codes
  5. Cable must be factory certified to 400 MHz minimum and include test report which meets or exceeds the performance specifications set for CommScope 7504 UltraMedia Category 6 cable
  6. Channel Warranty shall support a 4-connector channel that covers all category 6 balanced twisted-pair applications approved by the Institute of Electronic and Electrical Engineers (IEEE), The ATM Forum, the American National Standards Institute (ANSI) and the International Organization of Standardization (ISO) that specify compatibility with the cabling referenced herein. Examples of applications that are covered by the vendor warranty include Gigabit Ethernet (IEEE 802.3ab) and 155 Mb/s ATM.
  7. Meet North American Standards - ANSI/TIA/EIA-568-B.2-1 and all applicable addenda.
- B. Fiber backbone - main distribution frame (MDF) to horizontal and or intermediate distribution frame (IDF)
  1. Minimum - 12 fibers between distribution frames - adhere to manufacturer's installation procedures. All 12 fibers must be terminated.
  2. Star configuration
  3. Fiber cable must be manufactured by CommScope
  4. Routed through Trade size 1 innerduct. CommScope Fiber Guard interlocking armored fiber cable may be used instead of innerduct.
  5. Below grade runs must use indoor/outdoor rated or outdoor rated water blocking fiber cable.
  6. 50/125  $\mu$ m LOMMF - OM3 laser certified multimode fiber
  7. Transmission performance - Fiber cable must be DMD (Differential Mode Delay) tested and meet or exceed the performance specifications set for CommScope LaserCore 300™ Type 5L multimode fiber.
  8. Cables must meet OFNR or OFNP determined by local code.

Optical Characteristics	850 nm	1300 nm
Maximum attenuation	3.0 dB/km	1.0 dB/km
Bandwidth OFL	1500 MHz *km	500 MHz *km
Bandwidth Laser	2000 MHz*km	500 MHz*km
Guaranteed 10 Gigabit	300 m	

C. Cable supports - 3 options:

1. Wire basket cable tray above ceiling - trapeze style supported with threaded rod and associated hardware
2. Without wire basket using threaded rod and J-Hooks
3. Gridwire and J-Hooks: J-Hooks placed every 4-5 feet. Follow manufacturer's guidelines. Number of cables per J-Hook is based upon J-Hook size. Follow manufacturer's guidelines.
4. Support method must not exceed support or cable manufacturers required weight and or cable quantity limits.

D. Surface mount raceway for horizontal (station) cables:

1. Size of surface mount raceway will depend on number of cables.
2. Surface mount raceway to be secured neatly to all surfaces - cut to length.
3. Must be installed per the manufacturers recommendations.

E. Firestopping:

1. Where data/voice cables penetrate fire rated walls, floors and ceilings fireproof the opening. Provide conduit sleeves for cables that penetrate fire rated walls. After the cabling installation is complete install fire proofing material in and around all conduit sleeves and openings. Install fireproofing material thoroughly and neatly. Seal all floor, wall and ceiling penetrations. When installing in existing installations all breached fire stopped openings must be returned to original condition.

F. Grounding and bonding:

1. Attach a #6 bare, solid ground wire from a local ground bar to each equipment rack/cabinet/tray using appropriate ground lugs.
2. Contractor to conform to NEC, EIA, ANSI, ASTM, UL, BICSI, and local regulations.

G. Category 6 Connectivity:

1. Patch panels
  - (a) 48 port RJ45 modular to 110 with (6) or (8) ports

- (b) Wired 568B
  - (c) Standard or high density - 19" wide
  - (d) Rack or wall mount
  - (e) Designation strips - front and rear
  - (f) All patch panels and hardware must be by the Siemon Company.
- 2. RJ45 Modular Jacks 8P8C
    - (a) Wired 568B
    - (b) 45° exit
    - (c) Dual jacks only
    - (d) 110 type termination
    - (e) All jacks must be manufactured by the Siemon Company.
- H. 50/125 Multimode Fiber Connectivity:
- 1. Connectors
    - (a) SC duplex only - composite or ceramic ferrule
  - 2. Fiber Patch Panels:
    - (a) Rack and wall mount
    - (b) 12 fiber adapter panels (SC Connectors only)
    - (c) Splice trays if needed
    - (d) All fiber patch panels and adapters must be manufactured by the Siemon Company.
- I. Patch cables - Category 6:
- 1. Copper:
    - (a) Color-coded - (blue)
    - (b) 4-pair - 24 AWG Stranded - PVC
    - (c) Snag less Boot
    - (d) Lengths - not to exceed 6 m (20 ft)
    - (e) Every cord must be 100 % factory performance tested included with every shipment.
  - 2. Fiber Multimode:
    - (a) Duplex
    - (b) Terminated with appropriate connector (to mate with fiber panels)
- J. Racks and cabinets: Universal Self-Supporting: 7 feet tall - 19" mounting space (23" if needed). Bolt racks securely to floor.
- K. Wire management:
- 1. Horizontal - single or double space:
    - (a) 19" or 23" rack mount
    - (b) Wire managers to be mounted between patch panels
    - (c) Ladder-rack from top of racks - secured to back wall in MDF and IDF's
  - 2. Vertical: between racks - single or double-sided

- L. MDF - Main Distribution Frame:
1. Two dedicated (3) wire 120V AC 30 ampere rated circuits with L5-30R Locking Receptacles must be provided in all schools to accommodate special equipment racks. There should be no more than 12 inches distance between the two receptacles. The location of the two receptacles is to be determined by Technology Services.
  2. A minimum of four duplex 20 ampere 120V AC outlets on separate dedicated circuits.
  3. Room size should be at least 10 ft. X 11 ft
  4. Room must have a dedicated climate control system capable of maintaining a 70 degree Fahrenheit room temperature at a minimum heat load of 20,000 BTU. An adjustable thermostat for room temperature must be provided. The climate control system must be a continuously available system.
  5. At least one closet wall shall be lined with  $\frac{3}{4}$ " plywood - 8 ft. tall painted with fire retardant paint
  6. Racks and cabinets should be placed so that there are at least 3 feet from the wall to the rear of both racks and cabinets and at least 3 feet from any wall or obstruction to the front of racks and cabinets. Racks and cabinets must have at least 3 feet of clearance on one side, preferably both sides
  7. All equipment must be properly grounded.
- M. IDF - Intermediate Distribution Frame and HC/IC:
1. Minimum of two duplex 20 ampere 120V AC electrical outlets on separate dedicated branch circuits
  2. Closets must be climate controlled
  3. Size of closet will depend on the number of square feet that it will serve.
  4. Racks and cabinets should be placed so that there is at least 3 feet from wall to the rear of racks and cabinets and at least 3 feet from any wall or obstruction to the front of racks and cabinets. Racks and cabinets must have at least 3 feet of clearance on one side, preferably both sides
  5. There may be cases where equipment may have to be wall-mounted.
  6. All equipment must be properly grounded
  7. At least one closet wall shall be lined with  $\frac{3}{4}$ " plywood - 8 ft. tall painted with fire retardant pain

### PART 3 - EXECUTION

#### 3.1 UTP CABLING INSTALLATION

- A. All cabling shall be installed per ANSI/BICSI/NECA-568, ANSI/TIA/EIA 568 B.1, ANSI/TIA/EIS-568-B.2, ANSI/TIA/EIA-568-B.2-1, ANSI/TIA/EIA-568-B.3 and local building codes.

- B. Leave 1.5 m to 3 m (5-10 ft) of service loops near both workstation and MC. Service loops are to be coiled neatly at both ends. Caution: coils should be made in large loops and preferably in figure eights to avoid transmission performance issues.
- C. Do not exceed a total cable length of 90 meters of any data UTP cable from outlet to patch panel termination. Overall channel link - (cable and 2 patch cables) not to exceed 328 feet.
- D. Do not lay data or voice cables on top of light fixtures, ceiling tiles, mechanical equipment or ductwork. Maintain at least 0.6 m (2ft) clearance from all shielded apparatus. All cables must be supported using approved method indicated.
- E. All classrooms, offices, teacher work areas, the Media Center, and any other space that may accommodate a computer will be wired for the network. All network drops must provide two (2) network data connections. Each classroom must be equipped with two drops for the students and one drop for the teacher (a total of six connections in each classroom). For computer labs and other multi-drop areas include a data connection for each network device (computer, printer, etc.). Placement of network drops in these areas shall be determined by the room layout, computer furniture and other factors. Submit floor plans for mark-up at the appropriate phase in design.

### 3.2 LABELING

- A. Furnish and install all labels throughout the entire system. Labels should be attached securely so that they will not peel off. All labels shall be machine generated or as approved.
- B. Labels should indicate telecommunications room and port number. Example: IDF2-A12 would be IDF room number 2, patch panel "A", port number 12.
- C. Label the following: faceplates, cable at each outlet (within 200 mm (8 in) of the termination, cable at the rear of patch panels (within 200 mm (8 in) of the termination, front of patch panel for each termination, all voice MDF and IDF blocks.
- D. Submit proposed labeling scheme to owner for approval prior to installation.

### 3.3 TESTING AND CERTIFICATION

- A. Category 6 Cabling: Each cabling permanent link or channel shall be tested and certified. Each pair of the permanent link or channel shall be tested. The permanent link measurement is recommended although the entire channel may

be tested. The entire channel includes the patch cables at the workstation end of the permanent link to the patch cables at the patch panel end. All links must be tested using test heads with Siemon Company patch cords. Each outlet must pass the following parameters for category 6 as described in ANSI/TIA/EIA-568-B.2-1: wire map, length, insertion loss, NEXT, Power Sum NEXT, ELFEXT, Power Sum ELFEXT, Return Loss, Propagation Delay, Delay Skew. All tests shall be favorable, no \*PASS, \*FAIL or FAIL results will be accepted. All test results shall be turned over to the owner in both electronic files and in hard copy.

- B. Fiber Optic Cabling: Optical fiber (backbone) cables shall be 100% tested for attenuation and length. Testing will be done with an optical power meter and light source. Length shall be recorded using an OTDR, optical length test measurement device or sequential cable measurement markings. Attenuation shall be tested at 850 nm and at 1300 nm for multimode fiber cable. All test results shall be turned over to the owner in both paper and electronic format. Each strand shall not exceed a level of: 3.5 db/km of attenuation for 850 nm and 1.5 db/km of attenuation for 1300 nm. Each strand shall be tested and the following information be turned over to the owner:
- From point to point
  - Fiber I.D. label number
  - RX level
  - Attenuation total
  - Wave length
  - Reference level

### 3.4 REPAIR / REPLACEMENT OF DEFECTIVE CABLES AND/OR DEVICES

- A. Replace or repair and cables, connectors, and/or jacks found to be defective.
- B. Repair, replace, and/or re-work any or all defective components to achieve cabling tests which meet or exceed TSB-67 and 568-A-5 basic link requirements prior to acceptance of the installation or payment for services.

### 3.5 AS-BUILT DRAWINGS AND/OR DOCUMENTATION

- A. As-built drawings shall be provided noting the exact cable path and cable labeling information. Drawings in .DWG format will be available to the contractor. As-builts shall be submitted to Owner on CD, saved as .DXF or .DWG files. Redline hardcopies shall be provided as well. CAD generated as-built information shall be shown on a new layer named AS\_BUILT.

### 3.6 SYSTEM ACCEPTANCE

- A. Before the system is accepted by owner, walk-through the installation with the owner's representative and the design engineer to verify proper installation. If requested, pull faceplates to verify cable labeling and/or installation compliance.

3.7 WARRANTIES

- A. The contractor shall provide a 5-year warranty on all contractor provided material and workmanship. Owner will also receive a 20-year manufacturer's warranty. There shall be a 20-year, 250 MHz transmission warranty.

END OF SECTION 27 1000



**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This section includes furnishing and installing all materials and providing all labor and supervision pertaining to CATV network wiring systems and associated components.

**1.2 QUALITY CRITERIA AND STANDARDS**

- A. CATV wiring, devices, and equipment shall comply with applicable UL, NEC, and NEMA standards and requirements and shall be UL-listed and labeled.
- B. CATV wiring systems shall conform to established trade and industry standards.

**1.3 ADDITIONAL CONTRACTOR REQUIREMENTS**

- A. The Contractor must be licensed in the State of Georgia as a Low Voltage Telecommunications (LV-T) or Low Voltage Unlimited (LV-U) class certification.
- B. Contractor shall have a minimum of three (3) year experience of installing, terminating, and testing CATV wiring systems. If requested, the Contractor must show proof of being in the CATV installation trade for a minimum of three years and provide three (3) references with contact names and telephone numbers regarding successful completion of CATV wiring projects.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. CATV station jacks, faceplates, and associated components:
  - 1. Station jacks shall be female-type F-connectors.
  - 2. Only one color and one manufacturer of station jacks and cover plates shall be used throughout the project.
  - 3. Faceplates shall be modular and shall be able to accept RJ-45, coax F connectors, and/or fiber ST connectors.
  - 4. Blank inserts shall be used in faceplates with less than maximum amount of jacks installed.
- B. CATV bulkhead patch panels:
  - 1. The appropriate number bulkhead patch thru panels shall be provided to accommodate all cables. Patch panels shall have pre-installed female/female bulkhead F-series feed thru adapters.
  - 2. Bulkhead patch panels shall have hinged mounting brackets. The contractor shall provide all necessary mounting hardware and wire management devices as required for a "neat and clean" installation.
  - 3. Bulkhead patch panels shall have identification strips.
- C. CATV station and distribution cable:

1. RG-6/U 18 AWG, 75 Ohm, quadshield, plenum-rated cable with a copper covered steel center conductor. Cable shall be capable of 5-750 MHz. RG-6/U cable shield construction shall have 2 Foils + 2-60% AL and a nominal DCR of 5.3 Ohms per 1000'. RG-6/U shall be used for station drops to 200'.
2. RG-11/U 14 AWG, 75 Ohm, quadshield, plenum-rated cable with a copper covered steel center conductor. Cable shall be capable of 5-750 MHz. RG-11/U cable shield construction shall have 2 Foils + 60% AL 40% AL and a nominal DCR of 3.7 Ohms per 1000'. RG-11/U shall be used for station drops from 200' to 300'.
3. Interior .500 distribution cable, 75 Ohm, plenum-rated cable with a copper clad aluminum center conductor. Cable shall be capable of 5-1000 MHz. .500 cable shield construction shall have ALS .500 and a nominal DCR of .40 Ohms per 1000'.
4. Exterior .500 flooded distribution cable, 75 Ohm, with a copper clad aluminum center conductor. Cable shall be capable of 5-1000 MHz. .500 cable shield construction shall have ALS .500 and a nominal DCR of .40 Ohms per 1000'. Cable shall be rated and labeled for direct burial and duct installation.
5. All CATV cables shall be tested. All cable lengths shall be noted and indicated on each label affixed to each end of each cable. See specifications section 16726 for labeling.

D. CATV station and distribution connectors:

1. Station connectors shall be one piece, hex-crimp or compression, male-type F-connectors to be used with quadshield cable and shall be installed with a tool specifically designed for the make and model of cable and connector used.
2. Distribution connectors shall be three piece shielded type connectors and shall be installed with stripping, cutting, and coring tools specifically designed for the make and model of cable and connector used.

E. CATV distribution active and passive electronic components:

1. All CATV distribution active and passive electronic components shall be capable of operating in the 5-750MHz (minimum) bandwidth. 1GHz electronic components are acceptable.
2. All CATV distribution active and passive electronic components shall be capable of two-way signal operation.
3. Loss values for taps, directional couplers, etc... are noted on the Coax Riser Diagram.

F. Associated materials and components:

1. Patch Cables: The contractor shall provide one (1) 6' CATV patch cable for each CATV port. Patch cables shall be made of RG-6/U station cable and connectors per the above requirements. Contractor shall install the CATV patch cables between the taps and bulkhead panel.

1. Patch Cables: The contractor shall provide one (1) 6' CATV patch cable for each CATV port. Patch cables shall be made of RG-6/U station cable and connectors per the above requirements. Contractor shall install the CATV patch cables between the taps and bulkhead panel.
2. Backboards: CATV backboards shall be 3/4" thick B-D INT-DFPA plywood. The backboard shall be divided so that each zone (Voice/Data/CATV) is clearly separated and marked from one another. The backboard shall be painted with GREEN fire-resistant paint.
3. AU D-rings, fasteners, etc... shall conform to established industry standards and shall be the type suitable for the task indicated on the drawing.

2.2 Color and finish:

- A. Provide matching color devices and faceplates except as otherwise selected. Color selection to be verified by Contractor with Architect / Owner's Representative.

2.3 Manufacturers:

- A. Acceptable manufacturers of CATV station jacks, faceplates, and associated components are:
  1. Hubbell
  2. Panduit
  3. Ortronics
  4. AMP
- B. Acceptable manufacturers of RG-6/U, RG-11/U, and .500 CATV station and distribution cables are:
  1. Belden
  2. Comm/Scope
  3. Times Fiber
- C. Acceptable manufacturers of CATV bulkhead patch panels, wire management, and associated components are:
  1. Ortronics
  2. Concap
  3. Hubbell
  4. AMP
- D. Acceptable manufacturers of CATV station and distribution connectors and associated components are:
  1. Gilbert
  2. PPC
  3. JS Adams

### 3. General Instrument

#### PART 3 - EXECUTION

##### 3.1 INSTALLATION OF CATV STATION JACKS AND FACEPLATES

- A. CATV station jacks and faceplates shall be installed per manufacturer's written instructions.
- B. The cables shall be installed in faceplate so that mechanical strain does not degrade the connection.

##### 3.2 INSTALLATION OF CATV STATION CABLE

- A. CATV station cable shall be installed per manufacturer's written instructions. Do not exceed the minimum bend radius (per the manufacturer's cable specifications) during installation.
- B. Allow enough cable slack to neatly route the station cable through the D-rings to the appropriate bulkhead patch panel.
- C. The cable shall not be compressed, crimped, crushed, or stretched. The cable jacket shall not be cut or damaged in any way which would expose the inside wire.
- D. Protection shall be provided against sharp edges or possible damage caused by work done in the vicinity of the cable. Cable routing shall follow the dictates of the design while avoiding of adverse environmental conditions.
- E. Tag each end of all cables as specified in the Section 16726 "Wiring Plant Labeling".
- F. Cables shall be placed on termination panel in ascending room order starting with the room having the lowest number and ending with the room with the highest number.

##### 3.3 INSTALLATION OF CATV .500 BACKBONE/DISTRIBUTION CABLE

- A. Cable shall be installed per manufacturer's written instructions. Do not exceed the minimum bend radius (per the manufacturer's cable specifications) during installation.
- B. Allow enough cable slack to neatly route the station cable through the D-rings to the appropriate bulkhead patch panel.
- C. The cable shall not be compressed, crimped, crushed, or stretched. The cable jacket shall not be cut or damaged in any way which would expose the inside wire.
- D. Protection shall be provided against sharp edges or possible damage caused by work done in the vicinity of the cable. Cable routing shall follow the dictates of the design while avoiding of adverse environmental conditions.

- E. Coil an additional 20' of .500 riser cable at all tap, amplifier, and termination locations.
- F. Tag each end of all cables as specified in the Section 16726 "Wiring Plant Labeling".

### 3.4 INSTALLATION OF CATV DISTRIBUTION ACTIVE AND PASSIVE ELECTRONIC COMPONENTS

- A. Active and passive electronic components shall be installed per manufacturer's written instructions. Contractor shall provide and install all components for complete installation.
- B. See Coax Riser Diagram for components to be installed. Note loss values of components.

### 3.5 FINAL CATV SYSTEM BALANCE

- A. The contractor shall balance the CATV system to obtain between +9db to +15db at each CATV port. The contractor is responsible to provide all test equipment to perform the CATV system balance. The contractor shall adjust amplifier(s), change out taps, etc... as required to balance system.

### 3.6 WIRING TESTS

- A. Contractor shall provide all necessary testing equipment to test all cables.
  - 1. Each cable shall be tested from each end to determine length, continuity, and that all connectors have been properly made.
  - 2. The contractor shall test all station cables with a Time Domain Reflectometer (TDR). TDR shall be supplied by the contractor.
- B. A hard copy of the test results shall be submitted for review to the owner's Project Superintendent in notebook format. Test report data shall reference cables by cable labeling standards.

### 3.7 REPAIR / REPLACEMENT OF DEFECTIVE CABLES AND/OR DEVICES

- A. Replace or repair and cables, connectors, and/or jacks found to be defective.

### 3.8 AS-BUILT DRAWINGS AND/OR DOCUMENTATION

- A. As-built drawings shall be required (owner's blueprints may be used for this purpose) noting the exact cable patch and cable labeling information.

### 3.9 SYSTEM ACCEPTANCE

- A. Before the system is accepted by owner, walk-through the installation with the owner's representative and the design engineer to verify proper installation.

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CATV NETWORK WIRING

BRPH Architects - Engineers, Inc.

School Code: 0392

The contractor may be requested to pull faceplates to verify cable labeling and/or installation compliance.

END OF SECTION 27 4133

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. The work included under this section of the specifications consists of the installation of a master - staff station intercom system. Provide all labor, materials, equipment, and supervision to install, calibrate, adjust and check-out the total system.
- B. All components shall be of the same manufacturer as the major components in the existing system.
- C. Submit shop drawings in accordance with the requirement of the specifications as outlined in the General or Special Conditions.

**1.2 ACCEPTABLE MANUFACTURERS**

- A. Existing intercommunication system is by Rauland.
- B. Equipment shall be Rauland equipment (NO EXCEPTIONS) as furnished by SWC-Richardson Technology Systems.

**1.3 SYSTEM OPERATION**

- A. The intercom system shall provide an audio path between remote staff stations and the existing master station.
- B. The intercom master station shall be modified to accommodate the new remote stations.
- C. Local Intercom: The local intercommunication buttons shall match the existing in appearance and function.

**1.4 SUBMITTALS**

- A. Refer to BASIC ELECTRICAL REQUIREMENTS for submittal requirements.
- B. Product Data: Submit manufacturer's technical product data, including specifications and installation instructions, for remote intercom stations and wiring
- C. Wiring Diagrams: Submit dimensioned floor plan drawings (minimum 1/16 inch scale) for each floor plan indicating power, signal, and control wiring and all device locations with corresponding zone next to device. Zoning shall include audio zone where applicable. Plans shall include:
  - 1. All conduit and wiring requirements indicating system interconnection, number and size of conductors and appropriate conduit size.
  - 2. Identify terminals to facilitate installation, operation, and maintenance.
  - 3. Single-line diagram showing interconnection of components.
  - 4. Cabling diagram showing cable routing.
- D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
  - 1. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

## 1.5 WARRANTY

- A. The contractor shall warrant the installed communications system for two years from date of substantial completion against defects in equipment or workmanship.

## PART 2 - PRODUCTS

### 2.1 INTERCOM MASTER (AUDIO CONTROLLER)

- A. Intercom master is existing and shall be modified as required to accommodate new devices.

### 2.2 SPEAKER CALL STATIONS

- A. Rauland Model HSS1. Remote stations shall match existing equipment in appearance and function. Two-way communications shall be accomplished by the built-in speaker-microphone. A call-in momentary pushbutton switch shall be provided. The complete unit shall be vandal-proof in design and construction, protected externally by an 11 gauge stainless steel plate with brushed finish. Actuator shall be flush with face plate and completely isolated from the push-button, and movement shall be coupled through a coil spring to prevent damage. Speaker-microphone shall be protected against tampering as well as by flame or liquids. Unit shall mount in a standard three-gang electrical box. Surface mount requires ACC1119 box.
- B. Provide caulk around all edges of all intercoms.

### 2.3 SPEAKERS

- A. Rauland Model US0188, shall be an 8" permanent magnet cone type having viscous-damped cone and a ceramic (Indox 5) magnet weighing 5 oz. It shall have a frequency response of at least 55-18,000Hz, a 10 watt program power-handling capacity and an axial spl of at least 97.6db. Voice coil shall be 3/4" diameter with 8 ohm impedance. The speaker shall be equipped with Model TML25 multi-tap transformer 1/2, 1, 2 and 4 watts, 25V. (Lowell equal).
- B. FLUSH CEILING GRILLE
  1. Speaker ceiling grille shall be Rauland ACC1000 constructed of steel and have a white baked epoxy finish. It shall include matched hardware for mounting a standard 8" speaker. Its overall diameter shall be 12 7/8" with center perforation of 7 5/8". (Lowell WB8 equal).
- C. CEILING SPEAKER BACKBOX
  1. Model ACC1101 shall be a round one-piece backbox for flush mounting a standard 8 inch speaker. The enclosure shall be of painted, one-piece 22 gauge drawn steel and shall have applied in its interior a fire retardant resonance damping material. It shall have four perforated steel mounting brackets and four knockouts for conduit. Dimensions, 9 3/4" diameter with flange diameter of 12 2/16", mounting centers 11



1/4", depth 4 1/16". (Lowell 8XD4 equal).

D. SPEAKER SUPPORT BRIDGE

1. Rauland Model ACC1104 shall be a single piece unit constructed of 24 gauge galvanized rust-resistant cold rolled steel, 23 3/4" long and 14 1/2" wide. The unit is designed for firm support of ceiling speaker, grille, and backbox. (Lowell LBS8R equal).

E. FLUSH WALL SPEAKER BAFFLE

1. Rauland Model ACC1003 constructed of heavy gauge CRS and shall have a white epoxy finish. It shall have a square grille opening with a separate subplate for mounting speaker baffle to the ACC1105 backbox. Its dimensions are 11-1/2" square by 3/16". (Lowell equal).

F. SURFACE MOUNTED BAFFLE

1. Rauland Model ACC1004 constructed of heavy gauge CRS and shall have a white epoxy finish. It shall have a square grille opening with a separate subplate for mounting speaker baffle to the ACC1102 surface backbox. The backbox shall be 12-1/2" square by 4" deep with white epoxy finish. (Lowell equal)

G. TAMPERPROOF SPEAKER GRILLE

1. Rauland Model ACC1008 vandal proof baffle is designed for mounting a standard 8 inch speaker. It shall be constructed of a special self-aging aluminum alloy with tensile strength of 44,000 psi and shall be backed up with a heavy gauge cold rolled steel perforated screen to protect speaker. Each unit shall include tamperproof hardware to prevent entry into interior. It shall be finished in textured white baked enamel and have overall dimensions of 10-3/4" square by 3/4" projection. Provide MISCO #FC8WP weatherproof speaker and ACC1108 back box. Provide for Exterior Areas. (Lowell SGVP/8C10MR/TLM25 equal)

H. CEILING SPEAKER ASSEMBLY

1. The ceiling speaker assembly shall be a Rauland BAFKIT1X2S Lay-In Tile Speaker. The speaker shall be an 8-inch speaker with a 25 volt transformer. The speaker shall be rated at 8 Watts RMS and have a Frequency Response of 65 to 17Khz. The speaker baffle shall have dimensions of 23-3/4" Width, 11 3/4" Length and 3-3/8" Depth. The total weight of the speaker shall be 4 lbs. 14 oz. Refer to the plans for quantities and locations of speakers. (Lowell Equal)

2.4 CONDUCTORS:

- A. Jacketed, twisted pair and twisted multipair. untinned solid copper. Sizes as recommended by system manufacturer, but not smaller than No. 22 AWG.
- B. Insulation: Thermoplastic, not less than 1/32 inch thick.

- C. Shielding: For speaker-microphone leads and elsewhere where recommended by manufacturer; No. 34 AWG tinned, soft-copper strands formed into a braid or equivalent foil. Minimum Shielding Coverage on Conductors: 60 percent.
- D. Plenum Cable: Listed and labeled for plenum installation.
- E. Classroom Cable: WestPenn 25357BBLUE
- F. Cable to Speaker from Call Station: WestPenn 25291BBLUE
- G. Cable for Administrative Stations: West Penn 25292BBLUE

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Wiring Method: Install wiring in raceways except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum-board partitions where cable wiring method may be used. Use plenum cable in environmental air spaces.
- B. Install raceways and boxes in accordance with Division 26, CONDUIT AND BOXES.
- C. Install all equipment as directed by manufacturer's published installation instructions.

#### 3.2 INSTALLATION

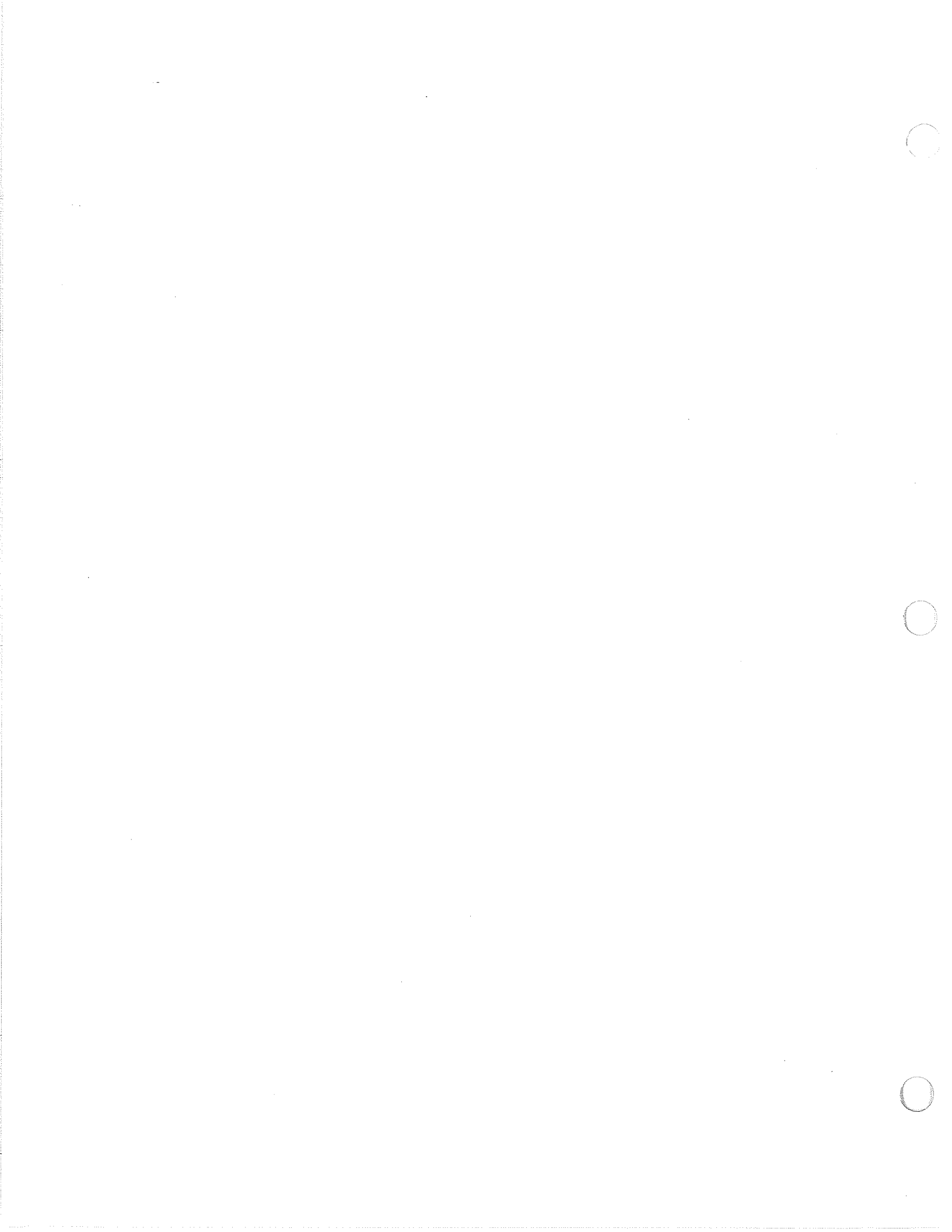
- A. On-Site Assistance: Engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels, resetting transformer taps, and adjusting controls to meet occupancy conditions.
- B. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose, without additional cost.

END OF SECTION 27 5123

**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 28

ELECTRONIC SAFETY AND SECURITY



## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The work required under this section of the specifications consists of the furnishing, installation and connection of new devices to the existing Fire Alarm System.
- B. Definition: The Fire Alarm System consists of an existing Simplex fire alarm system with new devices as indicated on the plans, and as specified herein.
- C. Interconnection with Existing System: Where indicated, the fire alarm system shall be an extension of the existing building system. New devices shall be as specified and compatible with the existing system; wiring methods shall be as specified and shall generally match existing. Provide power supply, battery, and circuit card or electronic module upgrades to the existing system as required to support the new devices indicated. Provide testing and manufacturer certification, as referenced in PART 3 - EXECUTION.
- D. The system layout on the Drawings shows the intent of coverage and is shown in suggested locations. Final quantity, system layout, and coordination are the responsibility of the Contractor.

## 1.2 QUALITY ASSURANCE

- A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
  - 1. Underwriters' Laboratories, Inc. (UL) Publications:
    - a. Manually actuated signaling box for use with Fire Protective Signaling Systems.
    - b. Smoke Detectors for Fire Protective Signaling Systems
  - 2. National Electrical Manufacturers' Association (NEMA) Standards:
    - a. SB3 Interconnection Circuitry of Non-Coded Remote-Station Protective Signaling Systems.
    - b. SB9 Smoke Detection
  - 3. National Fire Protection Association (NFPA) Publications:
    - a. National Electric Code (NEC)
    - b. National Fire Alarm Code
    - c. 72E Automatic Fire Detectors
    - d. 90A Heating, Ventilation, and Air Conditioning Systems
  - 4. National Electrical Contractors' Association (NECA):
    - a. Standards of Installation
  - 5. American National Standards Institute Publications:
    - a. A17.1 Safety Code for Elevators and Escalators
  - 6. Americans with Disabilities Act Guidelines
  - 7. Acceptable Manufacturers. Products by Simplex to match existing equipment are acceptable.
- B. Installer's Qualifications: Firm with at least 5 years of successful installation experience on projects with fire alarm systems work similar to that required for this project. Firm shall provide manufacturer's factory trained personnel or

factory authorized service organization (including NICET certification) and spare parts stock.

### 1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 26 sections for work referenced by this section.

### 1.4 SUBMITTALS

- A. Refer to COMMON WORK RESULTS FOR ELECTRICAL for submittal requirements.
- B. Product Data: Submit manufacturer's technical product data, including specifications and installation instructions, for each type of life safety system equipment. Include standard or typical riser and wiring diagrams, and operation and maintenance instructions for inclusion in maintenance manuals.
- C. Wiring Diagrams: Submit dimensioned floor plan drawings (minimum 1/16 inch scale) for each floor plan indicating all device locations with corresponding zone next to device. Zoning shall include initiation and audio zone where applicable. Plans shall include all conduit and wiring requirements indicating system interconnection, number and size of conductors and appropriate conduit size, and ancillary devices such as end-of-line resistors. Include wiring and riser diagrams.
- D. Maintenance Data: As part of close-out documentation submittals, submit maintenance data and parts lists for each type of life safety equipment installed, including furnished specialties and accessories. Include this data, product data, and shop drawings in maintenance manual; in accordance with requirements of Division 1.
- E. Manufacturer Certification: Submit a letter from the manufacturer's representative stating the proposed system being submitted for review complies with the specification and takes no exception.

## PART 2 - PRODUCTS

### 2.1 GENERAL MATERIALS REQUIREMENTS

- A. Provide all materials under this section of the specifications.

### 2.2 FIRE ALARM SYSTEM MATERIALS DESCRIPTION

- A. General: Fire alarm system and components shall operate as an extension of an existing system. Provide complete fire alarm system products of types, sizes, and capacities indicated, which comply with manufacturer's standard design, materials, components; construct in accordance with published product

information, and as required for complete installation. Provide fire alarm and detection systems for applications indicated.

1. Combination, Addressable: Either manual activation of fire alarm pullstation or activation of automatic initiating device will energize fire alarm signaling devices, sound non-coded alarm, and provide addressable device identification on annunciator panel.
- B. Design system for alarm sounding continuously throughout facility.
- C. System Wiring and Supervision:
1. Provide Class 1 initiating and alarm circuits with electrical supervision for shorts and open conditions.
  2. Install diodes or resistors in fire alarm control cabinet, or at "end-of-line" device as indicated.
- D. Additional System Features: Provide the following features in addition to the basic system features specified elsewhere in this specification
1. Control of auxiliary services:
    - a. Fan shut down relays.
    - b. Magnetic door release.
  2. Equip and wire system so that by energizing fire alarm audible signaling devices will also activate the smoke/fire door releases and fan shut down circuits.
  3. Provide alarms and controls for unlocking exit doors.
- E. System Materials: Provide basic wiring materials which comply with Division 26 Basic Electrical Materials and Methods section, CONDUITS AND BOXES, types to be selected by Installer.
1. Provide conductors which are copper, listed and approved for fire alarm usage.
- F. System features: The system shall include the following features as a minimum:
1. All alarm initiating circuit wiring, signal circuit wiring, speaker circuit wiring and emergency phone circuit wiring supervised.
  2. Modular design to allow future expansion with a minimum of hardware additions.
  3. System automatically switches to battery operation upon loss of 60 Hz power supply.
  4. Priorities for different types of alarms.

## 2.3 DEVICES

- A. Manual Pullstations: Stations shall have one (1) totally enclosed and sealed normally open alarm initiating position to give a positive indication that the station has been operated. Access for resetting, inspection and test shall be by special tool, or by lock keyed with the main control panel. Access shall not prevent an unoperated station from being operated. Station labeling shall state "FIRE", and operating instructions in large block letters. Provide manufacturer's standard construction, red enclosure, manual fire alarm stations with the following features:

1. Die-cast metal
  2. High impact Lexan
  3. Semi-flush mounted
  4. Nonresettable operation
  5. Operable by no more than five pounds of pressure
  6. Institutional cover or key operated, where indicated
- B. Automatic Detectors: Detectors shall be solid state, self compensating dual chamber, with indicator lamp. The detectors shall have a sensitivity adjustment and a circuit test set check feature. Detector units shall be preset for sensitivity at the factory and used at a fixed sensitivity determined by the elevation of the system installation. Detectors shall have a locking screw to prohibit removal by unauthorized persons. Provide manufacturer's standard construction automatic fire detectors, of the following types and temperature characteristics:
1. Automatic Heat Detectors: Combination rate of rise and fixed temperature spot type, restorable.
  2. Automatic Smoke (Combustion Products) Detectors: Provide manufacturer's standard construction automatic smoke detectors of the following types:
    - a. Ionization type, restorable, with dual ionized chambers, LED indicator which flashes on normal operation and changes to steady on alarm condition for operation with voltage indicated. Mount detector on interchangeable type base, capable of operation on either 2-wire or 4-wire loop. Provide 135 F (57 C) fixed temperature heat detector in base.
    - b. Photoelectric, spot types, restorable, with pulsed infrared LED light source for operation on voltage indicated. Design detector for mounting on interchangeable type base, capable of operating on either 2-wire or 4-wire loop. Provide 135 F (57 C) fixed temperature heat detector in base and flashing LED indicator for normal operation which changes to steady on alarm condition.
    - c. Provide Photoelectric Duct Mount Smoke Detectors with sampling tubes as shown on the plans. Duct mount smoke detectors shall be installed by the mechanical contractor and electrically connected to the Fire Alarm System by the electrical contractor. Each detector shall have its own SPDT 3 amp rated relay.
- C. Alarm indicating appliances:
1. System signal alarms shall be vibrating audio-visual horns or visual-only devices as indicated. The visual indication shall provide a strobe-type flash and be visible within a 180 degree range when the unit is vertically mounted. Visual Units within a room, space, or corridor shall be synchronized. Devices shall have field adjustable sound levels set by the factory at maximum. Provide manufacturer's standard construction fire alarm appliances.
  2. Lights and Strobes: Provide manufacturer's standard construction alarm lights.
- D. Addressable Interface Device



1. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.
2. Integral Relay: Capable of providing a direct signal to equipment interface as required.

#### 2.4 ACCESSORIES AND MISCELLANEOUS EQUIPMENT

- A. Provide manufacturer's standard construction magnetic door holder with features coordinated with system characteristics and door hardware requirements.
- B. Annunciators: Modify existing annunciator panel to incorporate new devices.
- C. Provide notification appliance circuit extenders as required to support additional notification appliance load.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Examine areas and conditions under which life safety systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
- B. Install wiring, raceways, and electrical boxes and fittings in accordance with Division 26 sections WIRES AND CABLES and CONDUIT AND BOXES.
- C. Install wiring of power-limited circuits in raceways. Provide cables in plenum spaces in metallic raceways or with cable jackets approved for use in plenum spaces.
- D. Install wires and cables without splices. Make connections at terminal strips in cabinets or at equipment terminals. Make soldered splices in electronic circuits in control cabinets.
- E. Wiring: Wiring of life safety system is work of this section, but is not specifically detailed on drawings.
  1. Complete wiring in accordance with manufacturer's requirements. Color code wiring and install per manufacturer's point-to-point wiring diagram. Determine exact number of wires for each fire area zone from number and types of devices installed. Connect each device with sufficient wiring to complete its intended operation.
  2. Where there are a number of power requiring devices such as smoke detectors, fan relays, door holders and smoke damper operators installed in a circuit, group in numbers so power required does not exceed 80% of manufacturer's power supply rating. Provide extra wiring, or extra power supplies required to fulfill that requirement. In addition, provide extra or larger size wiring to alleviate voltage drops which makes device operate beyond voltage limits for which it was

- designed. Determine above with manufacturer's representative while equipment is being installed.
3. Strobes shall be on a dedicated appliance circuit. Horns and chimes shall be on a dedicated appliance circuit.
- F. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
1. Connect new equipment to existing control panel in existing part of the building.
  2. Connect new equipment to existing monitoring equipment at the supervising station.
  3. Expand, modify, and supplement existing control and monitoring equipment as necessary to extend existing control and monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.

### 3.2 SEQUENCE OF OPERATION

- A. Actuation of any alarm initiating device shall initiate the following:
1. Illuminate the system priority one alarm LED, cause an audible alarm signal to sound, display the alarm condition on the alphanumeric display, and print the assigned English language message for the point in alarm at the Fire Command Center.
  2. Release all magnetically held smoke doors.
  3. Provide signals to the mechanical controls to shut down or reroute air handling systems to prevent the recirculation of smoke.
  4. Activate signals to the electric door locks.
  5. Provide a signal for connection to a central station or local municipal fire department.
- B. In addition to the above listed functions, actuation of any smoke detector located in the air handling units and/or equipment rooms shall activate signals to the mechanical controls indicating the floor.
- C. The fire alerting tone shall be a low to high "slow whoop" from 200 Hz to 830 Hz nominal lasting 2.5 seconds.
- D. Provide magnetic door holders where indicated on plans and called for in the architects door schedule.

### 3.3 FIELD QUALITY CONTROL

- A. Connection and Supervision: Make connections to panel under manufacturer's supervision. Run wiring to main terminal cabinet located adjacent to main fire alarm panel. Complete connections from this cabinet to panel utilizing Manufacturer's technicians.
- B. Prior to starting work, establish that system is in proper working order. If condition exists which prevents normal operation of specified additions and extensions, bring this fact to Architect's attention prior to doing work affecting existing system. Where work is done without such notification, it is assumed

that connections have been made to a working system, and performance requirements and guarantee will apply to entire system.

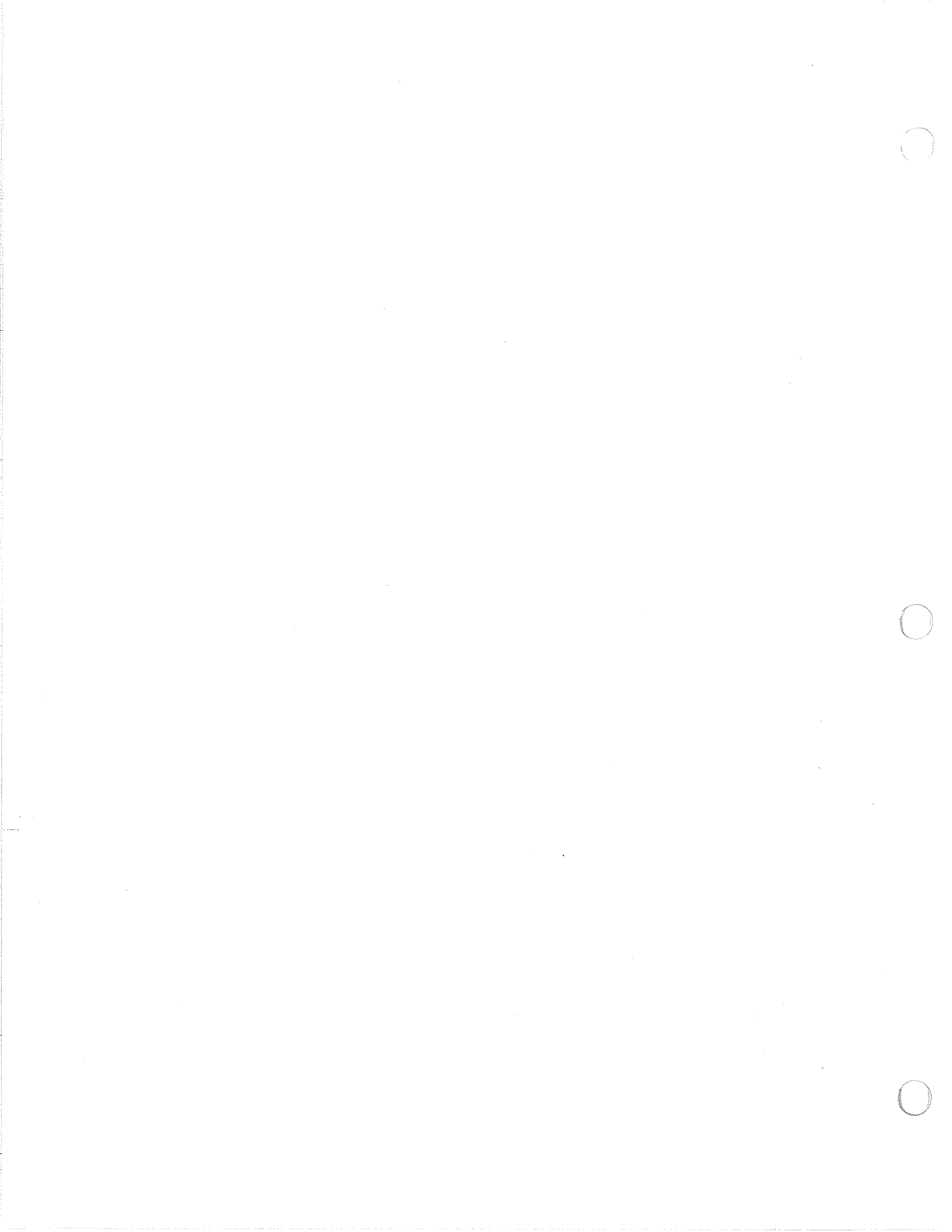
- C. System Test and Approval: Submit shop drawings for function and operation only, pre-approved by authority having local jurisdiction.
1. Prior to final acceptance of system, manufacturer of system shall, in presence of Contractor, and Owner's Representative, test each sensing or detection and alarm device.
  2. Physical and Visual Tests:
    - a. Inspect each device for physical damage.
    - b. Check for proper labeling of conductors.
    - c. Inspect all test switches for proper operation.
    - d. Inspect all system lamps and LED's for proper operation. Replace all non-operational equipment.
    - e. Check all cabinet doors latches and hinges for proper operation. Adjust, lubricate, and/or repair as required.
  3. Electrical Tests:
    - a. Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
    - b. Verify the absence of unwanted voltages between circuit conductors and ground that would constitute a hazard or prevent proper system operation.
    - c. Megger test all conductors (other than those intentionally grounded) for isolation from ground.
    - d. Test all conductors (other than those intentionally connected together) for conductor-to-conductor isolation using as insulation testing device.
    - e. With each circuit pair short-circuited at the far end of the circuit, circuit resistance should be measured with an ohmmeter and recorded for each circuit. Indicate ohm values on the as-built drawings.
    - f. The control unit shall be tested to verify it is in the normal supervisory condition as detailed in the manufacturer's manual.
    - g. Each initiating and indicating circuit shall be tested to confirm that the integrity of installed conductors is being properly monitored by a suitable response at the control unit. One connection each shall be opened at no less than 10% of all initiating devices and indicating appliances.
    - h. Each initiating device and indicating appliance of the system shall be tested for alarm operation and proper response at the control unit. All intended functions shall be tested in accordance with the manufacturer's manual including all supplementary functions. Main and standby power supplies shall be tested.
    - i. Restorable heat detectors shall be tested by exposing each detector to a heat source until it responds. The detector should reset after each test. Test all detectors.
    - j. Smoke detectors shall be tested by initiating an alarm at each detector with smoke or other aerosol to demonstrate that smoke can enter the chamber and initiate an alarm. Test all detectors.



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 31

EARTHWORK



**PART 1 - GENERAL**

The contractor shall coordinate construction activities with Fulton County Schools.

**1.1 DESCRIPTION**

- A. Work described in this section includes tree and vegetation removal, clearing and grubbing and protection of trees to remain and removal of improvements not to remain.
- B. Tree protection: protection of trees to remain.
- C. Environmental protection
- D. Related work specified elsewhere.
  - 1. Runoff and sediment control
  - 2. Earthwork

**1.2 JOB CONDITIONS**

- A. No clearing or demolition shall commence until tree protection barriers are in place and an onsite predevelopment meeting with owner, architect and engineer has been conducted.
- B. Conduct site-clearing operations without interference to vehicle and pedestrian traffic on adjacent roadways.
- C. Protect existing site improvements, and utilities designated to remain and benchmarks from damage. Repair or replace if damaged.
- D. The contractor shall be responsible for controlling soil erosion during all phases of construction, not only to preserve and protect slopes, drainage structures, pavement, and other facilities, but also to reduce potential sources of water pollution and damage to adjacent property. There will be full coordination of all activities with CHATTAHOOCHEE HIGH SCHOOL.
- E. It shall be the contractor's responsibility to maintain all access to the site in such manner as to prevent mud from washing of being tracked onto existing pavements.
- F. The contractor shall keep airborne dust to a minimum by using water sprinkling or tossing and/or other suitable means as approved by the engineer to limit dust and dirt from rising and scattering in the air.

- G. The contractor shall make every effort to control both air and water pollution. No tires, oils, asphalts, paint or coated metals are permitted in combustible waste piles. Pollutants such as fuels, lubricants, bitumens, raw sewage and other harmful materials will not be discharged into or near rivers, streams or manmade channels.

PART 2 - PRODUCTS (Not Applicable)

3.0 EXECUTION (Not Applicable)

3.1 REMOVAL

- A. Remove trees and shrubs not designated to remain, low vegetation and debris. Remove stumps and roots encountered within the limits of disturbance to not less than 2'-0" below finish grade.
- B. Materials resulting from site clearing operations shall become property of the contractor and shall be removed from owner's property. Material that is removed from the site shall be disposed at an approved location. No material of clearing and grubbing operations shall be pushed or placed in areas, which are outside the "limits of work" line.
- C. Onsite burning of materials shall not be permitted.
- D. Contractor shall be responsible for complying with all local ordinances and obtaining the necessary permits for disposing of trees, stumps, and other debris.

3.2 TREE PROTECTION

- A. Construct or maintain orange vinyl barricades, minimum 3'-0" high around individual trees and groups of trees designated to remain. Construct barricades at drip line.
- B. Protect tree root systems from damage due to deleterious material caused by runoff or spillage during mixing, use or discarding of construction material for drainage from stored materials. Protect root systems from compaction, flooding, erosion or excessive wetting.
- C. No construction activity of any kind will be permitted within tree save areas.
- D. Store no construction materials, debris or excavated material with drip line. Permit no vehicular traffic or parking with drip line.

END OF SECTION 31 1000



## PART 1 - GENERAL

The contractor shall coordinate construction activities with Fulton County Schools.

### 1.1 DESCRIPTION

- A. Work described in this section includes excavating, filling and grading as indicated or required, proofrolling, subgrade replacement where required, compaction, and stripping, stockpiling, and placing of topsoil materials.
- B. The contractor shall accept the site as is.
- C. The scope of grading for this phase of the contract shall include all earthwork grading and fine grading for a complete and finished site. The contractor is to provide borrow material as necessary in quantities sufficient to achieve final grade.
- D. Related work specified elsewhere includes runoff and sedimentation control, site clearing, site drainage, and testing laboratory services.
- E. All construction shall conform in strict compliance with the most recent OSHA regulations.
- F. An exploration and evaluation of subsurface conditions have been conducted as part of the CHATTAHOOCHEE HIGH SCHOOL project. A copy of the investigation report may be obtained from the Construction Manager.

### 1.2 JOB CONDITIONS

- A. Verify existing grades and lay out grade stakes for parking areas, roadways and appurtenances. If existing grades are at variance with drawings, notify engineer immediately and receive instructions prior to proceeding.
- B. The contractor shall agree to accept the site, as it presently exists. The Construction Manager shall make available geotechnical investigative report for review. However, neither the engineer nor owner assumes responsibility for completeness or accuracy of data contained therein. Contractor is also advised that recommendations contained therein may not coincide with these specifications. Where conflicts exist, requirements of the contract drawings and specifications shall govern.
- C. Roadways and parking lots shall be graded to subgrade elevation. All applicable stabilization measures should be employed as required. All applicable proofrolling and field density testing must conform to contract specifications prior to final

acceptance. This may necessitate remedial work if graded areas are left at final subgrade elevation for an extended period prior to release of area to owner.

Contractor shall provide all remedial work required to meet contract specifications at no additional cost to the owner.

D. Protection

1. Protect benchmarks and monuments; if disturbed or destroyed, replace in original position.
2. Protect existing facilities and adjacent property. Prevent ponding or washing of water on site or onto adjacent property. Erect and maintain silt fence and sediment ponds as indicated.
3. Barricade open excavations occurring as part of this work and post with warning lights.

E. Utilities

1. Coordinate all earthworks with utility installations performed by others. Cooperate with utility companies in provision of utilities to the site connection locations.
2. Comply with all rules and regulations governing respective utilities.
3. Protect active utilities and remove or relocate as shown. Active utilities encountered but not shown on drawings shall be removed or relocated in accord with engineer's written instructions and contract sum will be adjusted in accord with contract conditions.
4. Plug or cap inactive utilities encountered not less than 5'-0" outside building lines.

1.3 TESTING

- A. The owner will provide and pay for inspection and testing service by a qualified engineering testing laboratory such service shall be provided for the owner's benefit to ensure compliance with specifications. Owner shall provide and pay for testing services required to comply with code as required. All earthworks shall be subject to the inspection and acceptance of the testing laboratory's decision, in conjunction with the engineer, as to the acceptability of any materials or work containing those materials.
- B. Testing agency shall perform the following testing.
  1. Compaction tests on each material to be used as fill, in accord with laboratory standard proctor compaction tests, (ASTM D-698) or modified proctor compaction tests, (ASTM D-1557).
  2. Inspection of site following topsoil removal to verify completeness.

3. Proofrolling inspection of original and final subgrade surfaces, and as otherwise directed.
  4. Inspection and testing of subgrades and proposed fill materials. Monitoring of all undercutting and subgrade replacement.
  5. Inspection of fill placement and installation of stabilization measures. During all filling processes. Monitoring of soil moisture content and remedial measures.
  6. Field density test in accord with ASTM standards; one test for each 5,000 square feet of area performed on each 2 ft. vertical.
  7. Trench backfill shall be tested at 100 ft intervals every 2 ft. vertically.
  8. Inspection of footings and foundation bearing surfaces, if applicable.
  9. Backfill at trenches and structures.
- C. During the work, if the initial test results fail to meet the required specifications, the material shall be replaced or reworked and then recomputed and retested. All costs of such remedial work shall be borne by the contractor.
- D. If, in the opinion of the testing laboratory, substandard conditions are encountered (such as questionable soil, poor moisture content, inadequate compaction, etc.) The testing laboratory will require that it be corrected at the expense of the contractor.
- E. Contractor's duties relative to testing include:
1. Notifying the testing agency of conditions requiring testing. The contractor shall provide written notification to the test lab at least 5 days prior to the start of the project. The notice shall identify the date and time that earthwork will start, and the name of the person who will be in charge of the operations in the field. During the course of construction the contractor shall provide at last one-day prior notice to the test lab of events requiring testing and of the scope of testing required so that adequate personnel may be scheduled. If work is interrupted, the contractor shall notify the testing laboratory 24 hours prior to the resumption of work.
  2. Delivering a 50 lb. sample of each material to be used as fill or backfill material to the testing laboratory for approval and appropriate testing. No material shall be placed until the testing lab has approved the material for use on this project.
  3. Coordinating and cooperating with the testing agency for field-testing.
  4. Paying costs for additional testing performed beyond the scope of that required for performing code-required testing, and for retesting where initial tests reveal nonconformance with specified requirements.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS:

#### A. Definitions:

1. Satisfactory soil materials for use as structural fill shall be organic-free soil.
2. Satisfactory soil materials shall be as described in NOVA Geotechnical Evaluation dated February 14, 2008.
3. Drainage fill: meeting City of Johns Creek specifications.

### 2.2 GEOTEXTILE FABRICS

- A. Trench/french drain fabric shall be Mirafi 140ns or Amoco 4545 nonwoven geotextile fabric or equivalent.
- B. Stabilization fabric shall be Amoco 2002 or Mirafi 500x or equivalent.
- C. Backfill and fill materials: satisfactory soil materials free of clay, rock or gravel larger than 4" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter. Rock or gravel greater than 2" in diameter should not be placed in the top 5 feet of fill.

## PART 3 - EXECUTION

### 3.1 TOPSOIL STOCKPILING/USE

- A. Remove topsoil to full depth encountered in areas indicated to be graded. Unused topsoil shall be removed from the site.
- B. Topsoil used in landscape and lawn areas shall be fertile, friable, natural loam, surface soil, reasonable free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 2" in any dimension, and other extraneous or toxic matter harmful to plant growth. The surface shall then be thoroughly raked and conditioned.
- C. Topsoil shall be spread on all lawn areas to a minimum 8-inch thickness.
- D. Topsoil and structural fill mixture may be permitted in lower portions of pavement and non-structural areas if approved in writing by the geotechnical engineer. No topsoil will be permitted under building or future building areas.

### 3.2 EXCESS, UNSUITABLE, AND INSUFFICIENT MATERIALS

- A. Remove excess and unsuitable fill materials from project site. Dispose of materials off owner's property.
- B. Provide satisfactory fill material and/or stabilization measures in areas where existing materials are insufficient or unsuitable for earthwork operations.

### 3.3 EXCAVATION

- A. Excavation classifications: the following classifications of excavation will be made when rock excavation is encountered in work:
  1. Earth excavation includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.
  2. Rock excavation in trenches and pits includes removal and disposal of materials and obstructions encountered which cannot be excavated with a 1.0 cubic yard (heaped) capacity, 42" wide bucket on track-mounted power excavator equivalent to Caterpillar model 225B, rated at not less than 90 hp flywheel power and 33,000 lb. drawbar pull. Trenches in excess of 10'-0" in width and pits in excess of 30'-0" in either length or width are classified as open excavation.
  3. Rock excavation in open excavation includes removal and disposal of materials and obstructions encountered which cannot be dislodged and excavated with a single-tooth ripper drawn by a crawler tractor having a draw bar pull rated at not less than 56,000 pounds (Caterpillar D8 or equivalent) or excavated by a front end loader with a minimum bucket breakout force of 25,600 pounds (Caterpillar 977 or equivalent).
  4. Intermittent drilling or blasting performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
  5. Do not perform rock excavation work until material to be excavated has been cross-sectioned and classified by architect/engineer. Such excavation will be paid on basis of contract conditions relative to changes in work.
  6. Rock payment lines are limited to the following:
    - a. 5 feet outside of basement wall work for which forms are required, except footings.
    - b. 5 feet outside perimeter of footings.
    - c. In pipe trenches, 6" below invert elevation of pipe and 2 ft. wider than inside diameter of pipe, but not less than 3 ft. minimum trench width.
    - d. Neat outside dimensions of concrete work where no forms are required.
    - e. Under slabs on grade, 12' below bottom of concrete slab, under floor drains in basement area.

7. Over blasted materials below the payment line shall be removed and replaced with structural fill within the building limits. This shall be done at no additional cost to the owner.
8. Blasting to achieve excavation of rock should be accomplished in accordance with the Georgia Blasting Standards Act. Engage experienced mechanics to perform blasting. Provide heavy mats to minimize concussion. Handle, store, and use explosives in accordance with the "Manual of Accident Prevention in Construction of The Associated General Contractors of America, Inc." with latest amendments.

It is the contractor's responsibility to monitor blast vibrations at near by structures. It is recommended that blast vibrations not exceed those set forth in US Bureau of Mines Report No. R1-8507; however, the contractor shall be responsible for designing each blast and setting limits using an experienced blasting contractor who shall evaluate specific site conditions.

The responsibility for safe blasting and any consequential damage to existing property resulting from blasting shall lie solely with the contractor.

9. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of architect/engineer, unauthorized excavation, as well as remedial work directed by architect/engineer, shall be at contractor's expense.
  - a. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to architect/engineer.
  - b. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by architect/engineer.
10. Additional excavation: when excavation has reached required subgrade elevations, notify architect/engineer who will make an inspection of conditions.
  - a. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by architect/engineer and soil engineer.
  - b. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work. Refer to unit prices in spec section.
  - c. Foundations bearing on partially weathered rock (pwr) shall be over excavated at least 6" and back filled with structural fill material.
11. Stability of excavations: slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping

is not possible because of 8 space restrictions or stability of material excavated.

- a. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
  - b. Shoring and bracing: provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross-braces, in good serviceable condition.
12. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
  13. Maintain shoring and bracing excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

END OF SECTION 31 2300





## PART 1 - GENERAL

The contractor shall coordinate construction activities with Fulton County Schools.

### 1.1 DESCRIPTION

- A. Work described in this section shall consist of control measures during the life of the contract to control water runoff, erosion, and sedimentation. This control may be variously accomplished through the use of berms, dikes, dams, sediment basins, mulches, grasses, slope drains, and other devices as required by local conditions.
- B. In general, the work required to accomplish the planned facilities will be performed in a way, which will minimize even temporary increase in suspended matter or pollutants into the City of Johns Creek storm drains.

### 1.2 QUALITY CRITERIA

- A. All items in this section of the specifications shall meet the requirements as set forth by the Federal Clear Water Act, the State of Georgia, and the City of Johns Creek.
- B. Erosion control measures should conform to the Georgia Division of Water Resources.
- C. The erosion control program shall conform to the Federal E.P.A. regulations under NPDES permitting. The contractor shall be responsible for making notifications as required by said program.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

Furnish materials and equipment necessary to implement the work. Silt fence, rip rap, etc. shall be as specified on civil drawings. Temporary seeding and grassing shall be as specified on civil drawings erosion control plan. The entire disturbed area of the site outside building and pavement areas must be provided with temporary seeding and final grassing as per the erosion control plan immediately upon reaching final grade elevation.

## PART 3 - EXECUTION

### 3.1 RUNOFF CONTROL

- A. In order to obtain the runoff requirements described above, control techniques will be categorized as either permanent or temporary. The distinction between the two is based on the necessity to clear away temporary devices prior to final payment of contract, unless directed to leave in place by owner or engineer.

- B. Careful coordination between the use of permanent and temporary measures shall be maintained.
- C. During construction the contractor shall maintain careful scheduling and performance to insure that land stripped of its natural ground cover is exposed only in small quantities and for limited durations, before permanent erosion protection is established.

### 3.2 SEDIMENTATION CONTROL

- A. During construction, site runoff shall be routed through sedimentation barriers and other sedimentation devices as indicated on plans. Unless otherwise stated, all sedimentation barriers are temporary in nature and shall be removed as soon as ground protection is established or as a part of final cleanup of site.
- B. Use shall be made of as many other techniques as required to control erosion problem areas. Other techniques include diversion dikes, additional mulching, or grassing, and slope pipes.
- C. The contractor is responsible for maintaining sedimentation control devices in their proper functional condition. As a guide to be followed, sedimentation barriers and check dams will be cleaned out when these devices are at 60 percent of their capacity. As often as necessary, defective materials in the barriers and check dams will be replaced.
- D. The contractor shall be responsible for establishing barriers at the toe of slopes under construction. These barriers shall be as those shown on the detail sheet included in the plans. These barriers may be relocated and reused after permanent slope stabilization becomes fully established. As they are relocated, any defective material in the barrier shall be replaced. In addition, all debris and silt at the previous location shall be removed.
- E. Silt, debris, and deposits removed from control barriers shall be removed from the site or placed in areas approved by the architect.
- F. Borrow and waste shall be obtained and deposited only in authorized areas. Earthwork operations in the vicinity of streambeds shall be carefully controlled to avoid dumping or sloughing into the natural runoff.
- G. Any haul roads built for temporary use shall be stabilized to prevent erosion and to support vehicular traffic for which the road is intended. All haul roads shall be maintained for the duration of their use, and shall be periodically top-dressed as necessary to support traffic and to prevent pumping of mud to the road surface.

3.3 GRASSING

- A. Temporary and/or permanent seeding shall be applied to any disturbed areas outside building or pavement limits within 45 days after reaching final grade and within 14 days if left exposed and unworked as required by Georgia Erosion Control Law. Seeding shall be a continuous process based on completion of specific slopes, pads, shoulders, etc. Areas shall be reseeded where required.
- B. Temporary seeding of all disturbed areas shall be in accordance with the "temporary seeding" schedule on civil drawings. The Georgia State Soil and Water Conservation Commission shall fertilize Grass in conformance with recommendations.

END OF SECTION 31-2500



## SECTION 31 3100 - SOILS TREATMENT

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Soil treatment with termiticide.
- B. Related Sections include the following:
  - 1. Division 6 Section "Rough Carpentry" for wood preservative treatment by pressure process.

## 1.3 PERFORMANCE REQUIREMENTS

- A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective for not less than five years against infestation of subterranean termites.

## 1.4 SUBMITTALS

- A. Product Data: For termiticide.
  - 1. Include the EPA-Registered Label for termiticide products.
- B. Product Certificates: For termite control products, signed by product manufacturer.
- C. Qualification Data: For Installer of termite control products.
- D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:
  - 1. Date and time of application.
  - 2. Moisture content of soil before application.
  - 3. Brand name and manufacturer of termiticide.
  - 4. Quantity of undiluted termiticide used.
  - 5. Dilutions, methods, volumes, and rates of application used.
  - 6. Areas of application.
  - 7. Water source for application.

## 1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.
- B. **Regulatory Requirements:** Formulate and apply termiticides according to the EPA-Registered Label.
- C. **Source Limitations:** Obtain termite control products from a single manufacturer for each product.

## 1.6 PROJECT CONDITIONS

- A. **Environmental Limitations:** To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

## 1.7 COORDINATION

- A. **Coordinate soil treatment application with excavating, filling, grading, and concreting operations.** Treat soil under footings, grade beams, and ground-supported slabs before construction.

## 1.8 WARRANTY

- A. **Special Warranty:** Manufacturer's standard form, signed by Applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
  - 1. **Warranty Period:** Five years from date of Substantial Completion.
  - 2. **Repeat Treatment:** Upon evidence of subterranean termite activity, the area shall be retreated at no charge to the Owner. The additional treatment shall be sufficient to prevent termites from attacking the building or its contents.
  - 3. **Damage by Termites:** Upon the occurrence of damage to the building or to its contents within the guarantee period, the contractor shall retreat the soil and shall replace damage at no cost to the Owner up to \$25,000.
  - 4. **The Guarantee shall be drawn in the favor of the owner, his successor or assigns.**

## PART 2 - PRODUCTS

### 2.1 SOIL TREATMENT

- A. **Termiticide:** Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for

application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control.
  - 1. Proceed with application only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
  - 1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

#### 3.3 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

#### 3.4 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
  - 1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.

2. Foundations: Adjacent soil including soil along the entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and chimney bases; also along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
  3. Masonry: Treat voids.
- B. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
  - C. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
  - D. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
  - E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION 31 3100



**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 32

EXTERIOR IMPROVEMENTS



**PART 1 - GENERAL**

The contractor shall coordinate construction activities with Fulton County Schools.

**1.1 SCOPE**

- A. Pavement shall be installed with design thickness as specified on construction details.
- B. All areas to be paved onsite shall receive full paving section application as depicted on plans.

**1.2 SUBMITTALS**

- A. Certificates: provide certificates stating that materials supplied comply with specifications. Asphalt producer and contractor shall sign certificates.
- B. Mix design: submit mix design for base and surface paving courses to testing laboratory for approval.
- C. A representative 50 lb. sample of graded aggregate base to the test lab for sieve analysis and other testing as required (soundness, abrasion, etc.)
- D. Product data: submit for traffic marking paint approval.

**1.3 JOB CONDITIONS**

- A. Weather limitations:
  - 1. Apply bituminous prime and tack coats only when the ambient temperature in the shade is 40 degrees f. for 12 hours immediately prior to application.
  - 2. Do not apply when surface is wet or contains excess of moisture, which would prevent uniform distribution and required penetration.
  - 3. Construct asphalt courses only when atmospheric temperature is above 40 degrees f., when the underlying base is dry and when weather is not rainy.
  - 4. Place aggregate base course when air temperature is above 35 degrees f., and rising.
- B. Grade control: establish and maintain the required lines and grades from each course during construction operations.
- C. Traffic control:
  - 1. Maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.

2. Provide flagmen, barricades, warning signs and warning lights for movement of traffic and safety and to cause the least interruption or work.

#### 1.4 QUALITY CRITERIA

- A. Industry standards: Georgia Department of Transportation standard specifications for construction of roads.
- B. Allowable variation in thickness:
  1. Aggregate base course: +/- 1/2"
  2. Intermediate (binder) course: +/- 1/4"
- C. Surface smoothness: test finished surface of each asphalt course for smoothness using a 10'-0" straightedge. Intervals of tests shall be as directed by engineer. Surfaces will not be acceptable if exceeding the following:
  1. Base course: 1/4" in 10'-0".
  2. Binder course: 3/16" in 10'-0".
  3. Surface course: 1/8" in 10'-0".
- D. True grade: all paved surfaces to be applied meeting consistent grades as depicted on plans to prevent ponding in paved areas. Paved surfaces will be unacceptable if ponding conditions occur one hour after rain.

#### 1.5 TESTING

- A. The owner will provide and pay for inspection and testing service by a qualified engineering testing laboratory during the course of construction of all asphalt pavements. Such service shall be provided for the owner's benefit to ensure compliance with specifications.
- B. Testing agency shall perform the following testing:
  1. Review asphalt mix designs.
  2. Sieve analysis of graded aggregate base, other tests as may be deemed necessary.
  3. Compaction testing of sub grade, grade aggregate base, and asphalt binder and surface courses.
  4. Monitoring of sub grade proof rolling and of all necessary undercutting and repair.
  5. Field thickness checks of aggregate base and asphalt binder and surface courses, during placement.
  6. Field temperature tests of asphalt materials.

7. Marshall stability tests on asphalt materials, to include gradation, bitumen content, voids, flow, specific gravity and marshal stability, as determined necessary by owner/engineer.
  8. Asphalt plant inspections as determined necessary by the owner or engineer.
  9. In-place coring as determined necessary by owner/engineer.
- C. Contractor's duties relative to testing:
1. Notify the testing agency at least 24 hours in advance of all activities requiring testing.
  2. Submittal of mix designs and graded aggregate base samples.
  3. Coordination of and cooperation with the testing agency for all field-testing and plant inspections.
  4. Paying costs of retesting where initial test reveal nonconformance with specified requirements, and for investigative testing following completion of work if initial testing reveals nonconformance with specifications and drawings.

## PART 2 - PRODUCTS

### 2.1 PAVING MATERIALS

- A. Graded aggregate: meeting Georgia D.O.T. and City of Johns Creek specifications.
- B. Binder course: meeting Georgia D.O.T. specifications for Type "B" modified hot-mixed asphaltic concrete.
- C. Surface course: meeting Georgia D.O.T. specifications for Type "F" hot-mixed asphaltic concrete, as specified on the plans.

### 2.2 MARKING PAINT

- A. All pavement marking to be in accordance with designations as shown on plans (paint type and color).
- B. Stripping and marking with road right of way shall be thermo plastic in accordance with Georgia D.O.T. standards.

## PART 3 - EXECUTION

### 3.1 SUBGRADE PREPARATION

- A. Prior to beginning paving work, inspect sub grade for loose or soft material, rock or organic matter. No stone over 2" in diameter will be allowed in top 6" of sub grade.

- B. Verify that the upper 1-foot of all pavement sub grades have been compacted to 98% standard proctor (ASTM D698) maximum dry density. In cut areas, this will require the removal of the upper 6" of sub grade material, thorough compaction of the exposed sub grade, and replacement and compaction of the upper 6". The testing laboratory shall test compaction of both lifts.
- C. Proof roll sub grade using heavy rubber tired vehicle to verify that exposed sub grades are stable and to identify loose or soft areas requiring undercutting or stabilization. Proof rolling shall be under surveillance of testing laboratory.
- D. Stabilization of soft or unstable sub grades shall be accomplished to minimum depth of 1 ft. stabilization aggregate shall be of type specified for base course aggregate.
- E. Verify proper elevations and cross sections of sub grade immediately prior to placing base material.

### 3.2 PLACING ASPHALT PAVING

- A. Place and spread aggregate base material to specified compacted depth, to elevation and shape. Aggregate base shall be deposited by mechanical means to true line and grade. Hand spreading or tailgating of material will be allowed only in small inaccessible areas. Compact base course to dry density of 100% in accord with ASTM D1557. Aggregate base shall be placed, compacted and tested in max. 8" lifts.
- B. Apply primer coat ranging from 0.2 to 0.3 gallons per square yard after base course has been compacted and brought to grade. Select material and proper application and temperature tolerances as specified in Georgia D.O.T. specifications. Apply tack coat, per Georgia D.O.T. specifications.
- C. Following application and curing of prime coat, apply binder course to specified compacted thickness.
- D. Following application of binder course, apply tack coat per Georgia D.O.T. specifications.
- E. Following application and curing of tack coat, apply surface course to specified compacted thickness.
- F. Mix, transport and place asphalt in accord with Georgia D.O.T. specifications.

- G. Place asphalt at proper temperature and compact to at least 96% of laboratory density as specified in ASTM D1559. While hot, compact mixture by rolling. Asphalt temperature at time of application shall be in conformance with Georgia D.O.T. specifications

3.3 MARKING ASPHALT PAVEMENT

- A. Cleaning: sweep surface with power broom supplement by hand brooms to remove loose material and dirt.
- B. Apply paint with mechanical equipment in uniform straight lines four inches to width or as indicated. Apply two separate coats in accord with manufacturer's recommended rates.

3.4 CLEANING AND PROTECTION

- A. At completion of each operation, remove excess or spilled materials from site. Dumping or spreading of excess asphalt materials on project site is prohibited.
- B. After placement of surface course, vehicular or pedestrian traffic on pavement is prohibited until it has cooled and hardened for a minimum period of 24 hours.

END OF SECTION 32 1216





## PART 1 - GENERAL

The contractor shall coordinate construction activities with Fulton County Schools.

### 1.1 DESCRIPTION

- A. Related work:
  - 1. Concrete formwork
  - 2. Concrete reinforcement
  - 3. Cast-in-place concrete

### 1.2 JOB CONDITIONS

- A. Scheduling and sequencing: schedule site improvement work of other trades required to be installed prior to execution of this work.

### 1.3 QUALITY CRITERIA

- A. Industry standards:
  - 1. American Concrete Institute, (ACI) ACI-301.
  - 2. American Wood Preservers Association (AWPA) standards.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Concrete: concrete shall be 3000 psi unless specified otherwise.
- B. Expansion joint material: non-extruding type cane fiber bound and impregnated with bituminous material.
- C. Abrasive aggregate for steps: aluminum oxide or emery; graded from particles retained on a #50 mesh screen to particles passing a 1/8" mesh screen.

## PART 3 - EXECUTION

### 3.1 CURB AND GUTTER

Contractor shall construct curb and gutter and shall maintain or repair curb and gutter to remain at interface points.

- A. Curb and gutter shall be type as indicated on construction plans.
- B. Form curb and gutter to profiles indicated.

- C. Form in lengths not to exceed 25'-0", with expansion joints at 50'-0" intervals.
- D. Curb and gutter may be placed using automatic curb and gutter machine.
- E. Form curb and gutter to straight lines and true arises. Formwork shall hold weight of wet concrete without deflection. Lay out radii with curved formwork.
- F. Curbs shall receive a smooth formed finish in accord with ACI-301.

3.2 CONCRETE WALKS, STEPS, AND PAVEMENT

- A. Place as indicated, with expansion joints at 50'0" o.c., maximum, and ¼" by 1" deep control joints into top surface of concrete work at dimension equal to walk width.
- B. Slope walks and pavements minimum of 1/8" per foot to prevent puddling or ponding of water.
- C. Tool edges of walks and pavements to ¼" radius.
- D. Walks and pavements shall receive broom finish in accord with ACI-301 and at right angles to directions of traffic.
- E. Achieve non-slip finish at steps by broadcasting non-slip aggregate at rate of ¼ lbs./sq.ft. and troweling into surface.

END OF SECTION 32 1313

## SECTION 323113 - CHAIN LINK FENCES AND GATES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Chain-link fences.
  - 2. Gates: swing.
- B. Related Sections:
  - 1. Division 3 Section "Cast-in-Place Concrete" for cast-in-place concrete post footings.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated
  - 1. Fence and gate posts, rails, and fittings.
  - 2. Chain-link fabric, reinforcements, and attachments.
  - 3. Gates and hardware.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show accessories, hardware, and operational clearances.
- C. Samples for Initial Selection: For components with factory-applied color finishes.

## 1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

## 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with CLFMI Product Manual and with requirements indicated below:
1. Fabric Height: As indicated on Drawings.
  2. Steel Wire Fabric: Wire with a diameter of 0.148.
    - a. Mesh Size: 2 inches.
    - b. Polymer-Coated Fabric: ASTM F 668, Class 1 over zinc coated steel wire.
      - 1). Color: Black, complying with ASTM F 934.
    - c. Coat selvage ends of fabric that is metallic coated before the weaving process with manufacturer's standard clear protective coating.
  3. Selvage: Knuckled at both selvages.

## 2.2 FENCE FRAMING

- A. Posts and Rails: Comply with ASTM F 1043 for framing, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 based on the following:
1. Fence Height: As indicated on Drawings.
  2. Heavy Industrial Strength: Material Group IA, round steel pipe, Schedule 40.
    - a. Line Post: 2.375 inches in diameter.
    - b. End, Corner and Pull Post: 2.875 inches in diameter.
  3. Horizontal Framework Members top rails complying with ASTM F 1043.
    - a. Top Rail: 1.90 inches in diameter.
  4. Brace Rails: Comply with ASTM F 1043.
  5. Polymer coating over metallic coating.
    - a. Color: Black, complying with ASTM F 934.

## 2.3 TENSION WIRE

- A. Polymer-Coated Steel Wire: 0.177-inch- diameter, tension wire complying with ASTM F 1664, Class 2a over zinc-coated steel wire.
1. Color Black, complying with ASTM F 934.

## 2.4 SWING GATES

- A. General: Comply with ASTM F 900 for gate posts and double swing gate types.
1. Gate Leaf Width: As indicated.
  2. Gate Fabric Height: Two inch less than adjoining fencing.
- B. Pipe and Tubing:
1. Zinc-Coated Steel: Comply with ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framing.
  2. Gate Posts: Round tubular steel.
  3. Gate Frames and Bracing: Round tubular steel.

- C. Frame Corner Construction: Welded.
- D. Hardware:
  - 1. Hinges: 180-degree outward swing.
  - 2. Latches permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.

## 2.5 FITTINGS

- A. General: Comply with ASTM F 626.
- B. Post Caps: Provide for each post.
  - 1. Provide line post caps with loop to receive tension wire or top rail.
- C. Rail and Brace Ends: For each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
  - 1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
- E. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
  - 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:
    - a. Hot-Dip Galvanized Steel: 0.148-inch- (3.76-mm-) diameter wire.
- F. Finish:
  - 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.
    - a. Polymer coating over metallic coating.

## 2.6 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
  - B. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 PREPARATION
- A. Stake locations of fence lines, gates, and terminal posts. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.
- 3.3 INSTALLATION, GENERAL
- A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements indicated.
- 3.4 CHAIN-LINK FENCE INSTALLATION
- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
  - B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
    1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
    2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
      - a. Exposed Concrete: Extend 2 inches (50 mm) above grade; shape and smooth to shed water.
  - C. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
  - D. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
    1. Extended along bottom of fence fabric. Install top tension wire through post cap loops. Install bottom tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.
  - E. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to

radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

- F. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1 inch between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- G. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.
- H. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
  - 1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.
- I. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

### 3.5 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

### 3.6 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware, and other moving parts.

END OF SECTION 32 3113





**Chattahoochee HS Band Suite Addition  
Fulton County Board of Education**

Division 33

UTILITIES



**PART 1 - GENERAL**

The contractor shall coordinate construction activities with Fulton County Schools and City of Johns Creek.

**1.1 DESCRIPTION**

- A. Work in this section includes exterior water piping for domestic service including control valves and water meter.
- B. Related work specified elsewhere:
  - 1. Fire main system

**1.2 QUALITY CRITERIA**

- A. City of Johns Creek standards and specifications.
- B. National Standard Plumbing Code.
- C. City of Johns Creek Fire Department.

**1.3 SCOPE**

- A. Water system included in this scope of work shall be at and below the finished grade and up to 5 ft. outside the limits of the building. Plug and mark all service connections to building.
- B. Obtain required permits, pay all required tap, meter, and permit fees to the local water authority. Coordinate any work to be performed with City of Johns Creek.
  - 1. PVC pipe:
    - a. Constructed to meet the requirements of US Department of Commerce product standard PS22-70, and bear the National Sanitation Foundation Testing Laboratories, Inc., seal for potable water.
    - b. Class 200, SDR 21, PVC 1120, conforming to ASTM D2241, min.

**PART 2 - MATERIALS****2.1 WATER MAIN PIPING**

- A. Water service piping: (PVC may be used only where allowed by local jurisdiction).
- B. Provisions must be made for contraction and expansion of each PVC pipe joint with a rubber ring, tapered barrel end, and a joint as specifically approved. Pipe and fittings must be assembled with a non-toxic lubricant. Solvent weld joints are not acceptable.

- C. 40-ft. pipe lengths will not be permitted.
- D. The contractor shall provide for detecting the PVC pipe, 2-in. metallic detector tape for the full length of the pipe in order that the owner may locate the pipeline after construction is completed using a standard pipeline detection device. Detector tape shall be installed in accordance with the manufacturer's instructions and in a manner approved by the engineer.

## 2.2 WATER MAIN FITTINGS

PVC fittings: fittings for PVC water mains smaller than 6 in. in diameter: as recommended by the manufacturer of the pipe furnished, suitable for use under the conditions specified for the pipe, with ring-tite or fluid-tite bells or spigots at all ends for jointing.

## 2.3 VALVES AND BOXES

- A. Valves 2 in. and larger: cast iron gate valves, AWWA type, the standard product of a recognized valve manufacturer such as Mueller, Iowa or M & H, constructed with an interchangeable parts system, with parts readily available, to meet the following requirements:
  - 1. Iron body, bronze-mounted
  - 2. Double disc, parallel seat "o" ring seal
  - 3. 150 psi, min., working pressure
  - 4. Counterclockwise (left) opening
  - 5. 2 in. operating nut
  - 6. Non-rising stem
  - 7. Joints to be as required for pipe to be connected to
- B. Valves 2 in. and smaller: brass or bronze gate valves, conforming to federal specification WW-V-76.
- C. Underground valves: two-piece, screw type, adjustable to suit the depth of bury and type of valve, with a min. shaft diameter of 5-1/4 in.

### PART 3 - INSTALLATION

#### 3.1 GENERAL

Line and grade: lay and maintain to the required lines and grades; with fittings, valves, and meters at the required locations; and with joints centered and spigots home; and with all valve stems plumb. Line and grade may be varied with the written approval of the engineer.

#### 3.02 LAYING PIPE:

- A. General: before lowering pipe into trenches, grade the bottom of the ditch so that when pipe is in the ditch it will have a bearing for its entire length. Examine the pipe for defects and clean the inside. After placing pipe in ditch, wipe the bell, gasket and spigot free from all dirt, sand and foreign material. Apply a film of lubricant to the gasket and spigot. Enter the plain end into the socket after which force the pipe into the socket until it makes contact with the bottom of the socket.
- B. Trench water: at times when pipe laying is not in progress, close the open ends of pipe by approved means, and permit no trench water to enter the pipe.
- C. Cutting pipe: cut pipe for inserting valves, fittings or closure pieces in a neat and workmanlike manner without damage to the pipe.
- D. Direction of laying: unless otherwise directed, lay pipe with bell ends facing in the direction of laying. For lines on an appreciable slope, face bells upgrade.
- E. Permissible deflections: wherever necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructing, to plumb stems, or where long radius curbs are permitted, deflect as recommended by the manufacturer of the pipe.
- F. Unsuitable conditions: lay no pipe in water or when the trench conditions or weather is unsuitable for such work.
- G. Provide ground cover of 3-ft. min.

#### 3.3 MECHANICAL JOINTS

Bolt all mechanical joints in accordance with the manufacturer's recommendations with tee head bolts and bolts of high strength, heat-treated cast iron. Gaskets and bolts and nuts shall conform to ANSI specification A21.11. Glands shall be of high strength cast iron.

### 3.4 SETTING APPURTENANCES

- A. Valves and fittings: set gate valves and pipe fittings to new pipe in the manner previously specified for cleaning, laying, and jointing pipe.
- B. Valve boxes: firmly support cast iron valve boxes, and maintain centered and plumb over the wrench nut of the gate valve, with box cover flush with the surface of the finished pavement or at such other level as may be directed.

### 3.5 ANCHORAGE OF BENDS, TEES, AND PLUGS

- A. Limiting pipe diameter and degree of bend: apply reaction or thrust blocking on all pipe lines at all tees, plugs, caps and at bends deflecting 11 degrees or more; or prevent movement by attaching suitable metal rods or straps.
- B. Material for reaction or thrust blocking: concrete, placed between solid ground and the fitting anchored; the area of bearing on pipe and on ground in each instance to comply with local standards. Place the blocking so that the pipe and fitting joints will be accessible for repairs.

## PART 4 - FIELD QUALITY CONTROL

### 4.1 HYDROSTATIC TESTS: PRESSURE DURING TEST

After the pipe has been laid and partially backfilled as specified, pressure test all newly laid pipe, or any valved section of it, in accordance with local water department required procedures.

## PART 5 - ADJUSTING AND CLEANING

### 5.1 STERILIZE IN ACCORDANCE WITH LOCAL REQUIRED PROCEDURES

Clean out the water distribution system and leave free from foreign materials of any sort prior to sterilization.

END OF SECTION 33 1116

## PART 1 - GENERAL

The contractor shall coordinate construction activities with Fulton County Schools and City of Johns Creek.

### 1.1 SCOPE

The scope of work included in this section includes installation of new sanitary sewer system for buildings all appurtenant structures; and demolition, removal, and/or plugging of all existing facilities on site not to be used, as shown on drawings.

### 1.2 DELIVERY AND STORAGE OF MATERIALS

Pipe, materials and appurtenances for sewer system shall be delivered to the site and stored in such a manner to insure against damage prior to installation. Proper facilities shall be provided for handling and lowering sections of pipe and appurtenances into place to avoid injury or damage.

### 1.3 SUBMITTALS

Contractor shall submit two (2) copies of certifications and other data as may be required, stating that all pipe and materials are in compliance with these specifications.

### 1.4 FEES AND CHARGES

The contractor shall pay for all connection and tap charges for the sewer work under this section unless advised by the owner otherwise.

### 1.5 CODES AND STANDARDS

All work shall be in accord with requirements and standards of the City of Johns Creek. Construction shall be accomplished using OSHA standard regulations.

## PART 2 - MATERIALS

### 2.1 SANITARY SEWER

- A. Clay pipe shall be accordance with ASTM C278 or ASTM C200 vitrified clay extra strength bell and spigot. Fittings shall be Type III couplings in accordance with ASTM C425.
- B. Ductile iron pipe: all ductile iron pipe shall be designed and manufactured in accordance with ANSI A 21.50 and a 21.51, using 60/42/10 iron. Joints will be

compression push-on type joints in accordance with ANSI A21.11. Pipe shall be coated on the outside with a bituminous coat.

C. PVC pipe: shall conform to ASTM D-3033 Type PSP or ASTM C-3034 Type PSM.

D. Connections between pipes of dissimilar materials: neoprene couplings with stainless steel band and shear rings are required.

## 2.2 MANHOLES

Precast concrete manhole sections shall meet requirements of AASHTO M199-74.

## 2.3 FRAMES AND COVERS

Frames and covers for manholes shall be cast iron manhole frame and cover in accordance with City of Johns Creek standards. Frames and covers must be suitable for vehicular traffic.

## 2.4 BRICK

Brick for manholes shall conform to applicable requirements of ASTM C32 Grade M. Radial brick may be used. Poured in place or pre-cast concrete manholes may be used in lieu of brick.

## 2.5 MORTAR

Mortar for masonry in sanitary sewer structures shall be 1:3 cement-sand mix. Hydrated lime may be substituted not to exceed 10% by weight of the weight.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF SANITARY SEWER SYSTEM

A. Excavation: all excavation of every description and of whatever substances encountered, shall be performed to the depths indicated or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance cave-ins.



All excavated materials not required or suitable for backfill shall be removed. Grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved methods. Sheeting and shoring shall be done as may be necessary for the protection of the work and for the safety of personnel. All installation methods shall conform to the minimum standards of OSHA.

- B. Trenches shall be of the necessary width for proper laying of pipe. The banks of pipe trenches shall be as nearly vertical as practical. Care shall be taken not to over excavate. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe on firm compacted soil continuously along its entire length, except for the portions of the pipe sections where it is necessary to excavate for bell holes and for the proper sealing of pipe joints. Bell holes and depressions or joints shall be dug after the trench bottom has been graded and shaped, in order that the pipe rest on the prepared bottom for its full length, depth, and width as required for properly making the particular type of joint. Stones shall be removed as necessary to avoid point bearing. Where unstable material is encountered in the bottom of the trench, such material shall be removed to a depth of at least 18" and the trench backfilled to the proper grade with coarse sand, or other granular fill well compacted.
- C. The width of the trench at and below the top of the pipe shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed 8" on either side of the pipe. The width of the trench above this level shall not be wider than necessary; sheeting and bracing may be required to limit trench width and for the proper performance of the work. The bottom of the trench shall be rounded so that at least the bottom quadrant of the pipe is fully supported on firm soil for the full length of the barrel. This part of the excavation and shaping shall be done manually only a few feet in advance of the pipe laying by men skilled in this type of work.
- D. Excavation for appurtenances: excavation for appurtenances and similar structures shall be maintained and controlled as small as possible and practical. Excavations shall be kept dry and surface water shall not drain into them. Provide sheeting and shoring as required to protect banks and adjacent structures. Any overdepth excavation below such appurtenances shall be refilled with compacted granular earth or concrete. Remove and replace unsuitable soil under structures as noted in B above.
- E. Existing utility lines that are shown on the drawings or the locations of which are made known to the contractor prior to excavation and that are to be retained, as well as utility lines constructed during excavation operations, shall be protected from damage during all operations, and if damaged, shall be satisfactorily repaired by the contractor at no additional cost to the owner. In the event that the contractor damages any existing utility lines that are not shown on the drawings or

the locations of which are not known to the contractor, report thereof shall be made immediately to the engineer.

- F. Backfilling: the trenches shall not be backfilled until all required tests are performed. Trenches will be backfilled to the ground surface with selected excavated material or other material that is suitable. The surface shall be restored to its original condition as near as practicable. Backfill material shall be clean fill.
1. Lower portion of trench: backfill material shall be deposited in 6" maximum thickness layers and hand compacted with suitable tampers to 90% of maximum density determined by ASTM D698, until there is a cover of not less than 18" over pipe. The backfill material in this portion of the trench shall consist of granular materials free from stones larger than 2" in any dimension.
  2. The remainder of the trench shall be backfilled with granular material that is free of stones larger than 6" in any dimension. Backfill material shall be deposited in layers not exceeding the thickness specified. Each layer shall be compacted to a density not less than 96% of maximum density as determined by ASTM D-698.
- G. Handling: pipe, fittings, and other accessories shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Special care shall be taken not to injure pipe coatings or linings. If coatings or linings of pipe or fittings are damaged, satisfactory repairs shall be made at no extra cost. Pipe shall be carried to the trench and not dragged.
- H. Pipe laying and jointing: pipe, fittings and accessories will be carefully inspected before and after installation and those found defective will be rejected. Pipe and fittings shall be free from fins and burrs. Before being placed in position, pipe, fittings and accessories shall be cleaned, and shall be maintained in a clean condition. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe, fittings or any other material be dropped or dumped into trenches. Pipe shall be cut accurately to measurements established at the site and shall be worked into place without springing or forcing. Piping that does not allow sufficient space for proper installation of jointing material shall be replaced by one of proper dimensions. Blocking of wedging between bells and spigots will not be permitted. Bell-and spigot pipe shall be laid with the bell end pointing in the direction of laying. Where possible, laying should proceed from low end toward high end. The pipe shall be graded in straight lines, horizontal and vertical, taking care to avoid the formation of any dips or low points. Pipe shall be supported at its proper elevation and grade, care being taken to secure firm and uniform support. Wood support blocking will not be permitted. The full length of each section of pipe and fittings shall rest solidly on the pipe bed, with recesses excavated to accommodate bells, joints and couplings. Anchors and supports shall be

provided where necessary for fastening work into place. Proper provision shall be made for the expansion and contraction of pipelines. Trenches shall be kept free of water until joints have been properly made. Open ends of pipe at the end of each day's work shall be closed temporarily with wood blocks or bulkheads. Pipe shall not be laid when the conditions of trench or weather are unsuitable.

- I. Masonry: lay brick in manholes, and other sewer structures in level courses, with a full bead of mortar, and with shove joints completely filled with mortar. Horizontal joints shall not exceed 1/2", vertical joints 1/4" on their interior face. Bricks or blocks shall be moist when laid. In circular structures, lay all bricks as headers, breaking joints between courses. Strike interior joints smooth with the face of the wall. Plaster the exterior of the manholes to a thickness of at least 1/2".

### 3.2 COMPACTION TESTING

Testing laboratory shall be employed by the owner to observe placement of the backfill to conduct in-place density tests at the minimum rate of 2 feet vertical and 100 feet horizontal.

### 3.3 TESTING

Sewer shall be subject to testing as may be required by City of Johns Creek, including low-pressure air test, infiltration test and visual test. Fulton County Schools require video pipe inspections.

END OF SECTION 33 3313



## PART 1 - GENERAL

The contractor shall coordinate construction activities with Fulton County Schools.

### 1.1 QUALITY CRITERIA

- A. City of Johns Creek standards.
- B. OSHA construction regulations

## PART 2 - PRODUCTS

### 2.1 DRAINAGE SYSTEM MATERIALS

- A. Concrete: 3000 psi compressive strength, in accord with Division 3, concrete, including formwork, reinforcing and finish.
- B. Mortar: meeting ASTM C-270, Type M.
- C. Corrugated steel pipe: bituminous coated, meeting AASHTO M36-74 and M190-70, Type I. Gauge shall conform to City of Johns Creek standards.
- D. Concrete pipe to conform to ASTM C76. Rubber gasket joints shall conform to AWWA C302 or ASTM C443. Class shall conform to City of Johns Creek standards.
- E. Plastic pipe: manufacturer shall specify plastic storm drainpipe and storm collection systems on the construction plans. Plastic pipes not specified on construction drawings by manufacturer shall conform to the following:
  - 1. Pipe sizes 3" to 10" shall be PVC, smooth and rigid Schedule 40, ASTM D1785 or corrugated polyethylene drainage tubing smooth core interior AASHTO M252-"S".
  - 2. Pipe sizes 12" to 36" shall be corrugated polyethylene smooth core interior AASHTO M294-"S".
- G. Construction castings: meeting ASTM A48, Class 40A, with angle frames.
- H. Manhole steps: meeting ASTM A-48, Class 30-B, integrally cast into manhole sidewalls.
- I. Precast concrete manholes and drop inlets: meeting AASHTO M199-74.
- J. Stone riprap: cubic shaped granite, 8" minimum dimension, weighing approximately 150 lbs./cu.ft. Stones shall have a minimum weight of 50 lbs. each.

### PART 3 - EXECUTION

#### 3.1 CONSTRUCTION OF DRAINAGE SYSTEM

- A. Excavation, filling and compaction for construction of drainage system shall be in accord with earthwork section.
- B. Field stake the designated alignment of the storm system prior to construction. Establishing curb and building lines first shall locate structures. If existing or newly constructed design grades are at variance with the drawings notify engineer for further direction. It shall be the contractor's responsibility to properly locate inlets and catch basins.
- C. Lay piping with joints lapped upgrade with uniform horizontal and vertical alignment.
- D. In residual material not meeting minimum bearing capacity of 3000 psf, backfill around piping and structures to centerline with crushed stone in 6" lifts, power tamping each lift. In good soil conditions, backfill to center of pipe with good clean fill in 8" lifts, power tamping each lift. Fill remainder of piping trench with satisfactory fill material and have tested as specified in earthwork section.
- E. Place stone riprap on sub-grade compacted and tested in accord with earthwork section. Place riprap in rubble pattern with tight joints.
- F. Clean interior of piping of dirt and debris as work progresses.
- G. Place plugs in the ends of uncompleted piping at the end of each work period.
- H. Flush lines between manholes or drainage structures if required to remove collected debris.
- I. Notify owner for inspection of system. All structures and pipes shall be inspected for alignment and cleanliness prior to acceptance and final payment.
- J. Provide "as-builts" of the stormwater managements, prepared by a surveyor licensed in the State of Georgia to the engineer for conformance verification.

3.2 DRAINAGE STRUCTURES

- A. Place precast concrete sections as shown on the drawings. Where manholes occur in pavements, set tops of frames and covers flush with finish surface. Elsewhere, set tops 3" above finished surface, unless otherwise indicated.
- B. Set drain inlets within pavements so that they will be  $\frac{1}{4}$  in. below compacted surface course.

END OF SECTION 33 4116

